



User Guide

10/100/1000 iBypass Switch with Heartbeat™



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Additional Information

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Chapter 1

Introduction

iBypass Switch Overview

Thank you for choosing 10/100/1000 iBypass, the most versatile intelligent Bypass Switch available today. This installation guide is designed to help answer questions and provide an installation reference.

Net Optics 10/100/1000 iBypass Switch with Heartbeat provides a permanent and trouble-free access port for in-line network security and monitoring. The iBypass Switch automatically switches network traffic through added devices, or bypasses devices that are about to be removed. With Heartbeat, the intelligent iBypass Switch provides notifications to protect network traffic against both signal and power loss on an attached device.

Link Fault Protection

The 10/100/1000 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

The iBypass Switch supports fail-open monitoring with 10/100/1000BaseT devices 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.

Key Features

Passive, Secure Technology

- Protection against power, link, and application failure
- Increased reliability on critical network links
- Link Fault Detect prevents undetected link failures
- High-speed switching with minimal insertion loss
- Custom Heartbeat packet option with configurable time-out period and retry count
- Tap mode during Bypass
- Fully RoHS Compliant

Ease of Use

- LED indicators show power, speed (tricolor), link, and activity status alarms
- Front-mounted connectors support easy installation and operation
- Silk-screened application diagram illustrates all connections for easy deployment
- Optional 19-inch rack frame holds two iBypass Switches
- Tested and 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 web site at www.netoptics.com

About this Guide

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

Part Number	Description
IBP-HBCU3	10/100/1000 iBypass Switch with Heartbeat

Bypass Modes

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 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 switch checks the path through the monitoring device by sending a packet a certain number of times in a period (for example, once every second from Monitor Port 1). The iBypass Switch validates the path when it receives the packet on the Monitor Port 2. If the iBypass Switch does not receive the packet after a configurable number of tries, the switch automatically enters Bypass Enabled (On) mode. You can use the CLI to change the number of the Heartbeat packets required before the iBypass switch enters Bypass Enabled mode (see *Using the Command Line Interface* in chapter 2). For example, if PERIOD=1 and RETRY=3, then the switch goes into bypass mode in 3 seconds if the device does not respond with the heartbeat packet.

This is the default IP Heartbeat packet sent once every second from Monitor Port 1:

Packet Contents (Hex)	Description
-----	-----
00 50 C2 3C 60 00	MAC DA Net Optics
00 50 C2 3C 60 01	MAC SA Net Optics
08 00	Packet Type IP
45 00 00 3C 18 D2 00 00	
80 01 0A FF 0A 02 01 DC	
0A 01 01 12 08 00 37 5C	
02 00 14 00 61 62 63 64	
65 66 67 68 69 6A 6B 6C	
6D 6E 6F 70 71 72 73 74	
75 76 77 61 62 63 64 65	
66 67 68 69	
B8 8E 1C A9	CRC

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.

Monitor Link Failure Bypass

The iBypass Switch protects link integrity when a link to the attached monitoring device is down. If the iBypass Switch detects a link failure on Monitor Port 1, for instance if the cable is unplugged, it immediately enters Bypass Mode.

Manual Bypass

The iBypass Switch can be manually set to Bypass Mode by setting the Heartbeat Timeout parameter to 0 using the CLI or remote interfaces. It returns to normal operation when the Timeout parameter is restored to a non-zero value. No Heartbeat packets are transmitted when the iBypass Switch is in Manual Bypass mode.

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

iBypass Switch Configuration Options

The iBypass Switch allows you to set several configuration options and to display configuration information. You can set:

- The frequency of the heartbeat to define the period of time that passes before the switch considers the packet to have timed out. The default is 1 second.
- The number of time-outs allowed to define the number of packets missed before the switch bypasses the IPS (retry count). The default is 3 missed packets.
- Port communication parameters to turn Link Fault Detect and Bypass Detect on or off. The default is LFD and Bypass Detect on.
- A custom Heartbeat packet to suit special needs. The default is the IPX packet.
- Reset to factory defaults to quickly restore the original configuration.
- For quick reference, you can constantly display the configuration settings and heartbeat packet.

Link Fault Detect

You can set the iBypass switch to drop the remaining link when one side of the link fails. The Link Fault Detect feature ensures that connected devices are aware of a failure on both sides of the link.

Bypass Detect

You can set the Monitor Ports to cycle on and off while the iBypass Switch is in Bypass Enabled 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.

Chapter 2

Installing the iBypass Switch

Overview

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

- Planning the installation
- Unpacking and Inspecting the iBypass Switch
- Configuring the iBypass Switch Default Values
- Using the iBypass Switch Command Line Interface (CLI)
- Rack Mounting the iBypass Switch
- Connecting the Management Port to the Network
- Connecting the iBypass Switch to Network Devices
- Connect iBypass Switch Ports to Monitoring Devices
- Connecting Power to the iBypass Switch
- Checking the iBypass Switch Installation

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

iBypass Switch Diagrams

The following figure shows the front panel of the iBypass Switch.

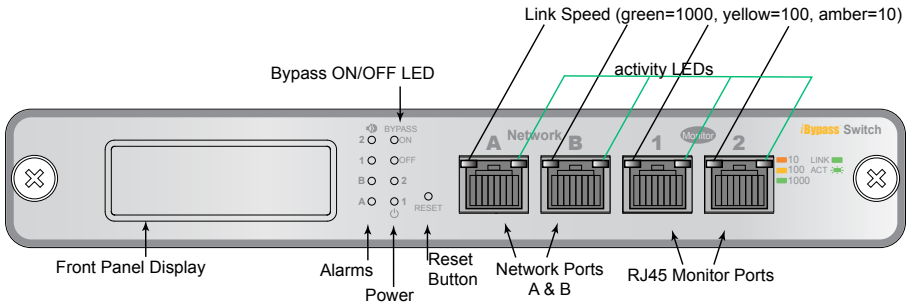


Figure 1: IBP-HBCU3 Front Panel Features

The following figure shows the rear panel view of the iBypass Switch.

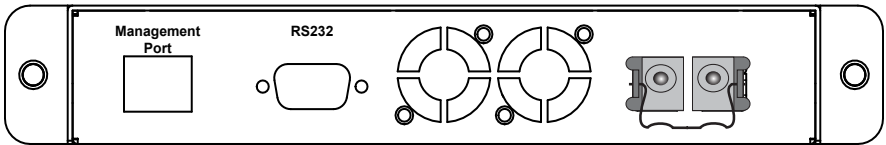


Figure 2: IBP-HBCU3 Rear Panel Features

iBypass Switch LEDs

Threshold Alarms: When traffic utilization exceeds the user-set threshold, the LED for that link illuminates. Use the Reset button to clear the Threshold Alarms.

Link Indicators: If a good link is established, the corresponding LED on the RJ45 connector illuminates green for a 1000 MB connection, yellow for 100 MB and amber for 10 MB.

Bypass Mode: These LEDs indicate the current mode of the Bypass Switch. When Bypass ON is illuminated, traffic is not flowing through the in-line device. When Bypass OFF is illuminated, traffic is routed through the in-line device.

PWR 1/ PWR 2: Main and Redundant Power. If the iBypass Switch is deployed with both power supplies, both LEDs illuminate when the iBypass Switch is connected to power.

Planning the Installation

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

- 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(es).
- IP address of the remote management console, if deployed over a network.
- Gateway to the remote management console, if deployed over a network.

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

Unpacking and Inspecting 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
- 4 straight CAT5e cables
- 1 crossover CATe cable
- 1 DB-9 RS232 cable
- 1 Quick Installation Guide
- CD containing System Manager software and this documentation

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.

Changing iBypass Switch Default Communications Values

The iBypass Switch is configured with default values that allow you to install the iBypass Switch and then modify parameters from the Web Manager or System Manager. The defaults values are:

IP Address: 10.60.0.123
Netmask: 255.255.0.0

Threshold Port A: 50%
Threshold Port B: 50%
Port A: Auto-negotiate
Username: netoptics
Password: netoptics

You can set all parameters, check status, and view statistics from the Command Line Interface. You can change most settings later from one of the remote manager interfaces (for more information about remote interfaces, see Chapters 4 and 5).

About the iBypass Switch Command Line Interface (CLI)

All configuration options, status, and statistics are accessible from the iBypass Switch Command Line Interface. For security reasons, some parameters can only be set with the password-protected CLI. You must set the following values:

- New username and password
- IP address for the iBypass Switch
- Utilization threshold levels for Port A and B
- Current date and time
- Enable or disable the remote interfaces and display
- Turn character echo to the terminal emulation software On or Off

Other parameters are optional, and will depend on your installation.

A complete list of CLI commands is contained in Appendix B.

Using the iBypass Switch CLI

The following subsections describe the use of some of the CLI commands to set up the iBypass switch.

To disable the Management Port and remote interfaces use the CLI **Display** command to toggle the display on and off.

To access the iBypass Switch CLI:

1. Make sure power to the iBypass Switch is off.
2. Using a DB-9 RS232 cable, connect a PC that is running terminal emulation software such as HyperTerminal to the iBypass Switch.
3. Launch the terminal emulation software, and set the communications parameters to the following:
 - 19200 baud
 - 8 data bits
 - No parity
 - 1 stop bit
 - No flow control
4. Connect power to the iBypass Switch. The CLI banner and login prompt will display.

```

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

Figure 3: Login and Password Prompts

5. At the login prompt, type **netoptics** and press the **Enter** key.
6. At the password prompt, type **netoptics** and press the **Enter** key. The **NetOptics: CLI** prompt displays.

To change the CLI username and password:

1. Change the username by typing the following command:

```

set username <username>
where <username> is your new username.
    
```

2. Change the password by typing the following command:

set password <password>

where <password> is your new password.

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

To set the iBypass Switch IP address:

Be sure that you know the correct IP address for the iBypass Switch before you change the default value.

1. Type **set ip <ip address>** where <ip address> is the IP address you are assigning to the iBypass Switch.
2. Press the **Enter** key.

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

To set utilization threshold levels:

1. Type **set threshold port a <level>** where <level> is the percentage of the available bandwidth at which the utilization alarm for Port A is triggered. Press the **Enter** key.

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

2. Type **set threshold port b <level>** where <level> is the percentage of the available bandwidth at which the utilization alarm for Port B is triggered. Press the **Enter** key.

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

Tip!

You can set the utilization threshold levels at any time from the remote manager interfaces.

To set the current date and time:

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

2. Press the **Enter** key. Time is based on the 24-hour clock.

To display current settings:

Type **show set** and press the **Enter** key. The CLI displays the current setting similar to the example in the following figure.

```

NetOptics: show set
      Model:
System Time:    01/11/2006 15:09:06
IP Address:    10.60.0.121
Netmask:      255.0.0.0
Manager:      10.10.1.40
Gateway:      200.0.0.10
    
```

Figure 4: Show Set Command Example

To disable the display and remote interfaces:

1. Type **show display** to view the current setting. The default value is Display: ON.
2. Type **display** and press the **Enter** key. Access to the tap from remote interfaces will be blocked and the front panel will not display link utilization or peak information.
3. Type **display** and press the **Enter** key again to restore the display and remote interfaces.

To use the Help command:

1. Type **Help** at the NetOptics prompt. The list of help topics displays.

```

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 5: iBypass Switch CLI Help Menu

2. To view the syntax for changing the iBypass Switch configuration parameters, type **help set** and press the **Enter** key.
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.

Rack Mounting the iBypass Switch

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 thumbscrews on the panel.
2. Slide the iBypass Switch into one of the slots and secure the device by tightening the thumbscrews.
3. Make sure that the rack is properly grounded.

Connecting the Management Port to the Network

To use the remote interfaces you must connect the Management Port to the network.

To connect the iBypass Switch Management Port:

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

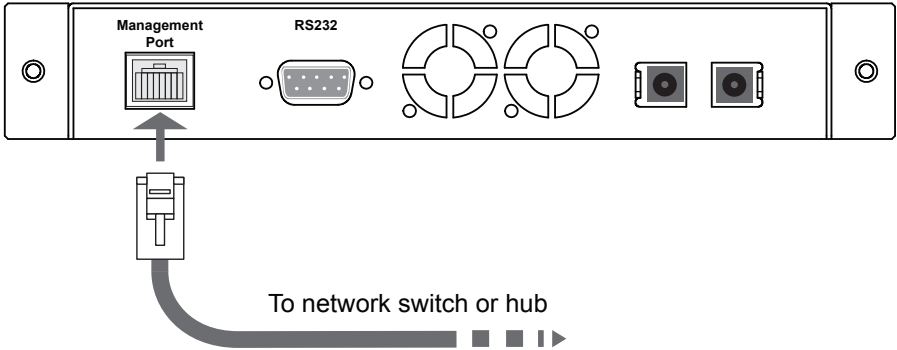


Figure 6: Connecting the Management Port

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

Connecting the iBypass Switch to Network Devices

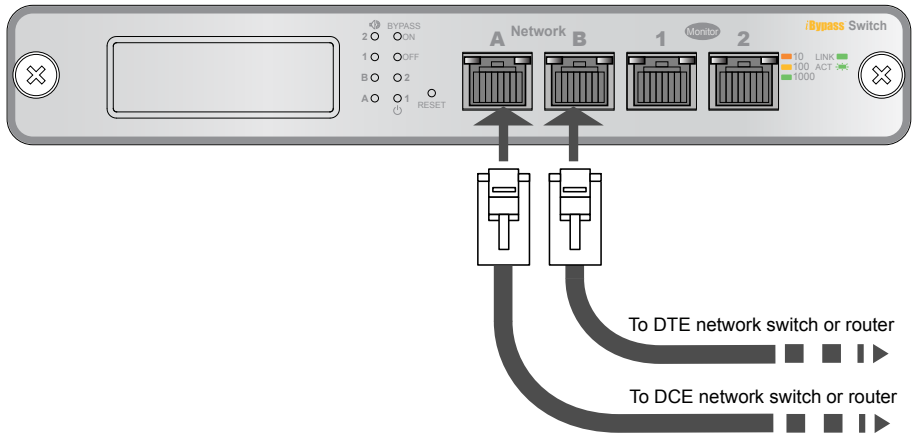


Figure 7: IBP-HBCU3 Network Connections

The iBypass Switch is delivered with two network cables, ready for iBypass Switch installation.

To connect the iBypass Switch to your network:

1. Connect Network Port A to the appropriate network device using the cables supplied with your iBypass Switch, then connect Network Port B to the appropriate network device using the cables supplied with your iBypass Switch.
2. Verify that the iBypass Switch Network Ports are cabled in-line between two devices.

Connecting 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.

If you plan to use redundant power, make sure that you connect the power supplies to two separate, independent power sources. After connecting the power supplies, verify that at least one Power LED is illuminated.

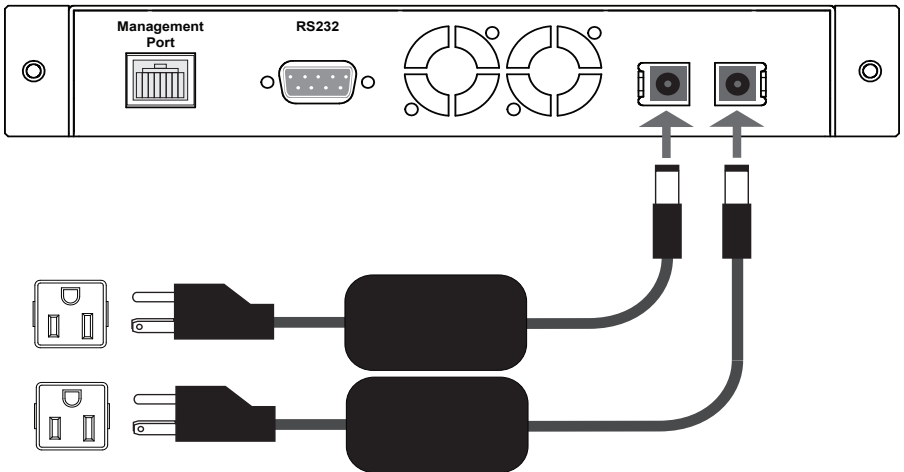


Figure 8: Connecting Power

Connecting the iBypass Switch to Monitoring Devices

The iBypass Switch is delivered with two monitor cables that you will use for iBypass Switch installation.

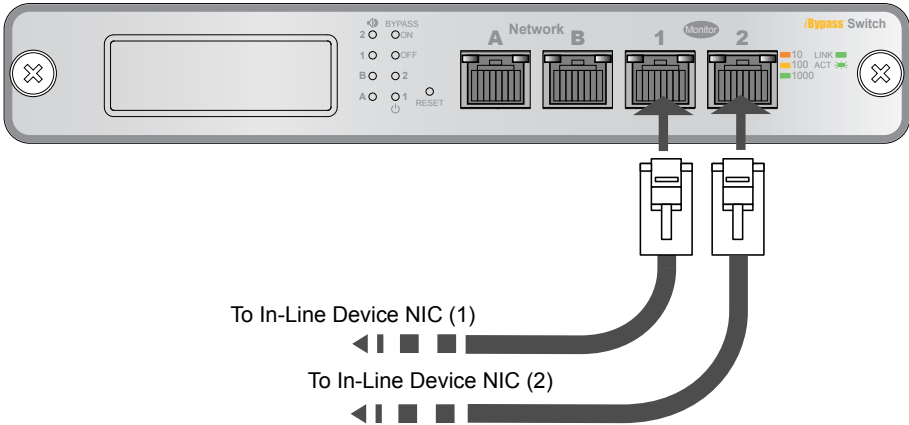


Figure 9: Connecting to a Copper Monitor Port

Connect Monitor Port 1 and Monitor Port 2 to an in-line device as shown here.

Checking the Installation

After you have connected the iBypass Switch to the network, monitoring device and power, verify that the iBypass Switch is functioning correctly.

- Check that at least one Power LED located on the front panel is illuminated.
- Check the Link Status LEDs located on the front panel to verify that traffic is passing through the iBypass Switch.
- Check the Front Panel Display and the Threshold LEDs for utilization and peak information. If no traffic is flowing through the device, the display will reflect this. Use the CLI to set the contents of the Front Panel Display.
- Check the Link LEDs to ensure that the monitoring device is receiving traffic from the iBypass Switch.
- Check that the Management Port is functional by typing the iBypass Switch IP address in your Web browser. Net Optics Web Manager should display. 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

About the Front Panel Interface

Overview

This chapter describes how to interpret and work with the front panel features of the iBypass Switch. The following topics are covered:

- Display
- LED indicators
- Reset button

The iBypass front panel provides information in two ways. The displays shows utilization and peak information and the LEDs show link status and alarm conditions. The front panel also has a recessed reset button to clear the peak data.

Display

The front panel of the iBypass Switch provides network traffic information on a 2x16 character LCD. After a bootup message, the display scrolls through the following messages, advancing every five seconds:

Display Message	Description
A Util = XX% A Peak = XX%	Percent of Network Port bandwidth currently being used by incoming traffic and percentage of bandwidth used at the peak since the last reset. Four of these appear in succession, representing Ports A, B, C, D.
A PK @ AAA, hh:mm:ss B PK @ AAA, hh:mm:ss	Day and time of the highest peak on Network Ports since last reset, where AAA is the day of the week and hh:mm:ss is hours, minutes, and seconds on a 24-hour clock. First Ports A and B are displayed, then C and D.

The percentage 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 iTap's 24-hour clock through the CLI or using the remote Manager interfaces.

For example:

If you have set the thresholds for 30% utilization on Friday and during the weekend several peaks over this level occur, the iTap provides information only on the highest peak event.

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 each Network Port. 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.

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.

Reset Button

Press the Reset button to quickly 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

Using iBypass Switch Web Manager

Overview

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, the Display option in the CLI must be set to ON. For more information, see *Using the Command Line Interface* in Chapter 2.

Accessing Web Manager

Web Manager is a browser-based interface that provides access to any iBypass Switch that has an IP address Configured. 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 and press **Enter**. The Web Manager window displays, as shown in the following figure.

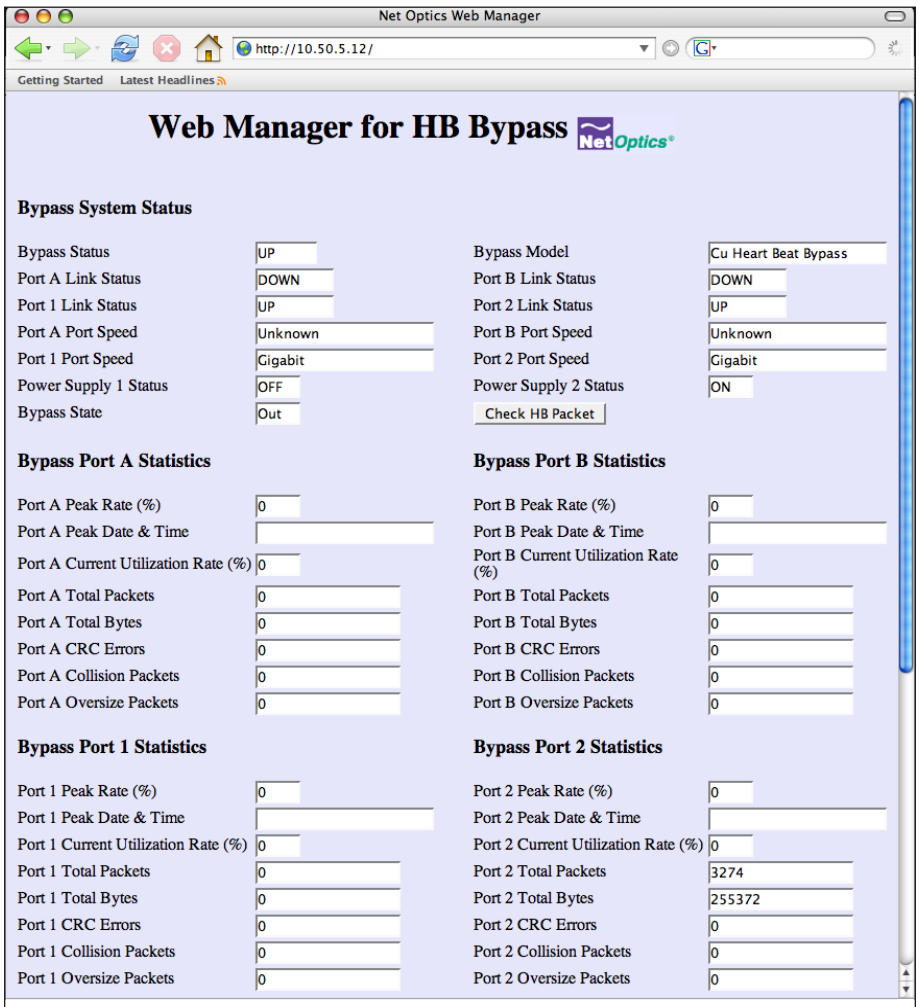


Figure 10: Web Manager Window - Top Portion

Bypass Configuration

IP Address	<input type="text" value="10.50.5.14"/>	Manager IP Address	<input type="text" value="10.10.1.40"/>
Net Mask	<input type="text" value="255.0.0.0"/>	Gateway IP Address	<input type="text" value="10.10.1.40"/>
<input type="button" value="Set Port Parameters"/>		<input type="button" value="Edit HB Packet"/>	
Port A Utilization Threshold (%)	<input type="text" value="88"/>	Port B Utilization Threshold (%)	<input type="text" value="88"/>
Port 1 Utilization Threshold (%)	<input type="text" value="88"/>	Port 2 Utilization Threshold (%)	<input type="text" value="88"/>
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="Off"/>
Heart Beat Timeout Period(s)	<input type="text" value="1"/>	Heart Beat Retries	<input type="text" value="3"/>
<input type="button" value="Set Date & Time"/>		<input type="button" value="Submit Changes"/>	

Figure 11: Web Manager Window - Bottom Portion

To save any changes to the iBypass Switch, you must click the **Submit Changes** button located at the bottom of the page. To update the display, click your browser's refresh button.

The following table describes the fields on the Web Manager window.

Field Name	Value	Description
Bypass System Status		
Bypass Status	UP/DOWN	Indicates the current status of the iBypass.
Port A Link Status	UP/DOWN	Indicates the current status of the Port A Link.
Port 1 Link Status	UP/DOWN	Indicates the current status of the Port 1 Link.
Port A Port Speed	Gigabit/ Unknown	Indicates the speed for Port A.
Port 1 Port Speed	Gigabit/ Unknown	Indicates the speed for Port 1.
Power Supply 1 Status	ON/OFF	Indicates whether or not power is On for this power supply.
Bypass State	ON/OFF	Indicates the bypass state,
Bypass Model	Model	Indicates the iBypass model number.
Port B Link Status	UP/DOWN	Indicates the current status of the Port B Link.

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

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

Field Name	Value	Description
Reset Port A/Port B Peak Rate	Yes/No	<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 $F(t)$ is a function to represent traffic utilization with time variable t, network measurement will be: $F(1) = 1\%$; $F(2) = 2\%$; $F(3) = 50\%$; $F(4) = 15\%$; $F(5) = 20\%$; $F(6) = 30\%$; $F(7) = 40\%$; $F(8) = 60\%$;</p> <p>In the Status window, at time $F3$ 50% will display as the "Peak Rate" and remain that way until time $F8$, if no reset Yes value was selected. If a reset Yes value was selected at time $F4$, then the Peak Rate will change to 20, then 30, then 40 and so forth until time 8.</p>
Reset Port A/Port B Statistics	Yes/No	Reset (toggle Yes/No) the statistics-gathering parameters.
Reset Port 1/Port 2 Statistics	Yes/No	Reset (toggle Yes/No) the statistics-gathering parameters.
Enable LFD	On/Off	Enable/Disable Link Fault Detection.
Heartbeat Timeout Period(s)	n	Number of seconds between Heartbeat Packets sent from the iBypass unit to a connected monitoring device. The default is 1 second. If this parameter is set to 0, the Switch is forced into Bypass Mode.
Enable/Disable Detection	On/Off	Turn Bypass Detect ON and OFF.
Heartbeat Retries	n	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.

Field Name	Value	Description
Set Date and Time (BUTTON)	N/A	Displays a window where you can set the date and time (24-hour clock).

Check Heartbeat Packet Window

This window displays when you select the **Check HB Packet** button on the Web Manager.

Use the Check Heartbeat window to view hexadecimal information about the current Heartbeat packet.

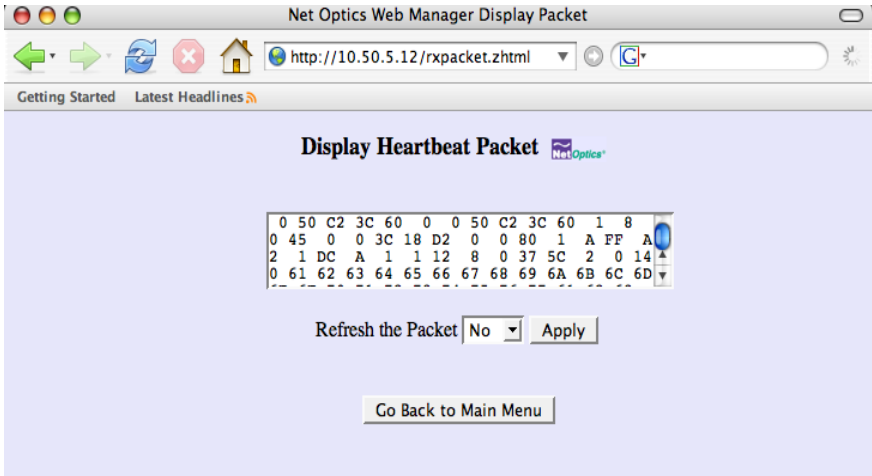


Figure 12: Check Heartbeat Packet Window

1. Select **Yes** on the **Refresh the Packet** list and click **Apply** to refresh the displayed packet.
2. Click **Go Back to Main Menu** to return to the Web Manager window.

Edit HB Packet Window

This window allows you to edit and save the contents of a Heartbeat packet.

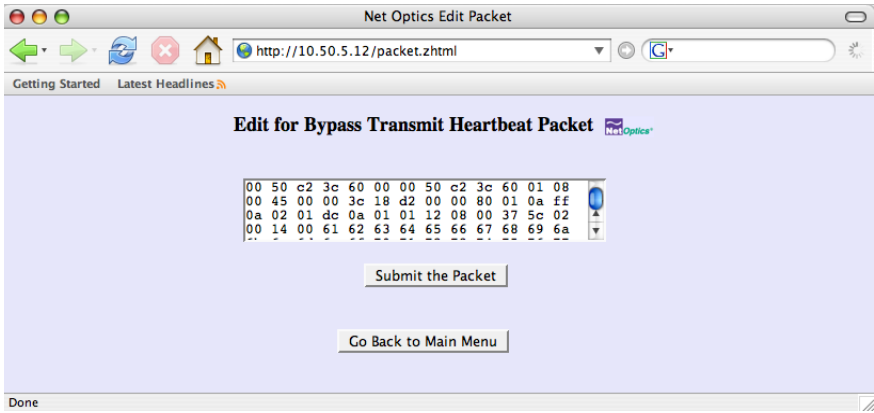


Figure 13: Edit For iBypass Transmit Heartbeat Packet Window

Use the Edit for iBypass Transmit Heartbeat Packet window to edit the Net Optics Heartbeat packet and create your own customized Heartbeat packets (one for each monitored device).

To use the editor:

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

Edit Port Settings Window

Use the Port Settings window to set parameters and to enable or disable ports.

- Auto-Negotiation (receive any speed)
- Gigabit (receive 1000 BaseT)
- 100 BT (receive 100 BaseT)
- 10 BT (receive 10 BaseT)
- Duplex (Full or Half)

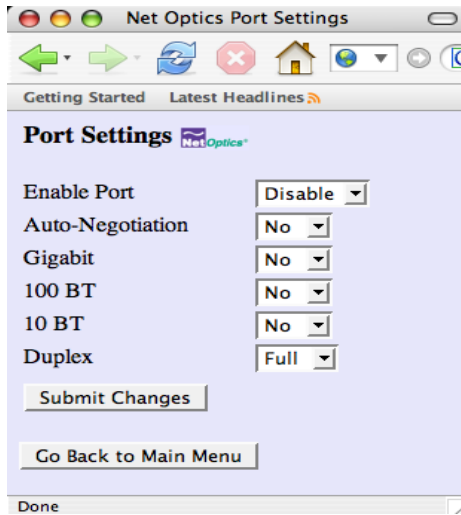


Figure 14: Port Settings Window

Enable or disable the port from the first drop-down menu.

Set Auto-Negotiation to **Yes** to receive all traffic speeds.

Set either Gigabit, 100 (BaseT), or 10 (BaseT) to **Yes** to restrict the receipt of traffic to a particular speed.

Set Date and Time Window

Use the Set Date and Time window to set the current date and time.

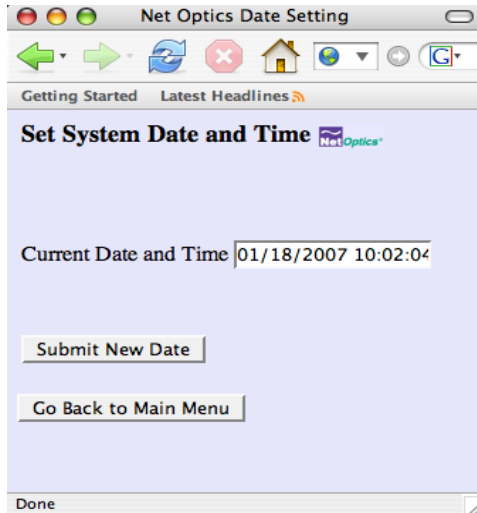


Figure 15: Set Date and Time Window

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

Using 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:

- Installing System Manager
- Exploring System Manager
- Creating a Group
- Deleting a Group
- Adding iBypass Switches to a Group
- Delete an iBypass Switch
- Configure an iBypass Switch
- View iBypass Switch Information
- Control iBypass Switch Connections
- Enter a Port Name and Notes about a Port

Installing 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 and click to select the **Setup.exe** icon on the Net Optics CD. The License Agreement dialog displays, as shown in the following figure.

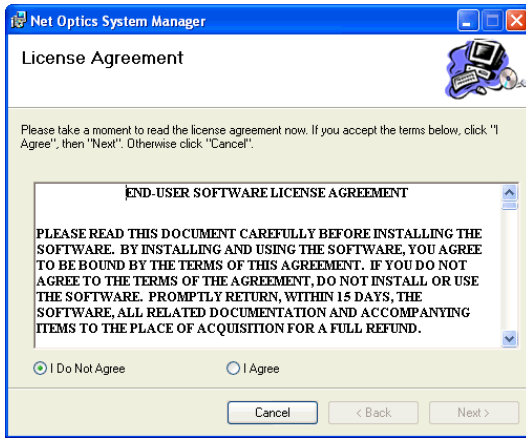


Figure 16: Net Optics System Manager License Agreement

3. After reading the agreement, select **I Agree** and click the **Next** button to install System Manager. The Welcome dialog displays as shown in the following figure.

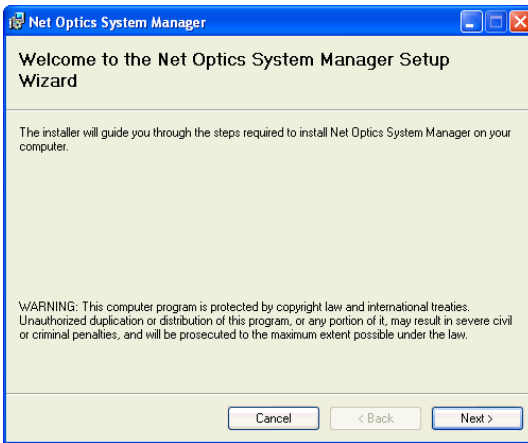


Figure 17: Welcome Dialog

3. Click **Next**. The Select Installation Folder dialog box shown in the following figure.

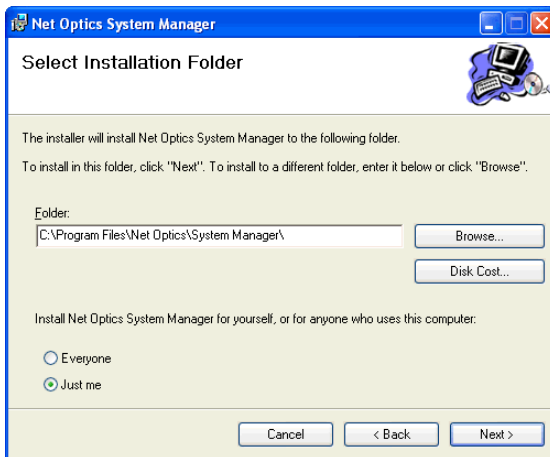


Figure 18: Select Installation Folder

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**.
7. Click **Next**. The Confirm Installation dialog shown in the following figure displays. To continue with the installation, click **Next**.

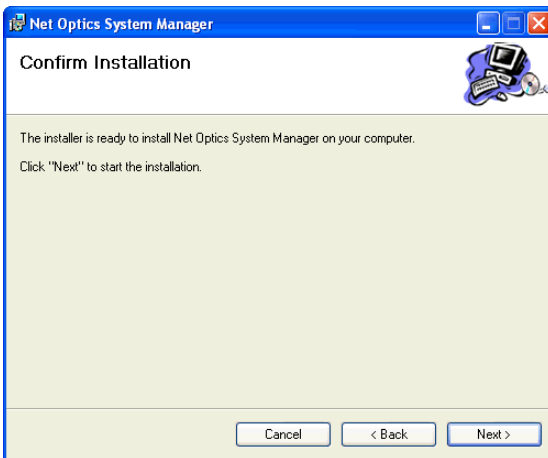


Figure 19: Confirm Installation

The Progress dialog displays, as shown in the following figure.

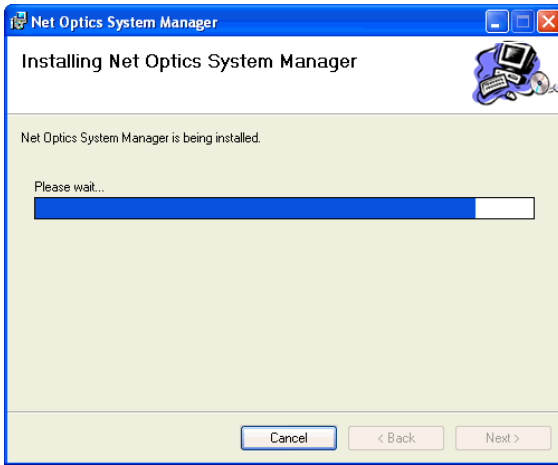


Figure 20: Installation Progress

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

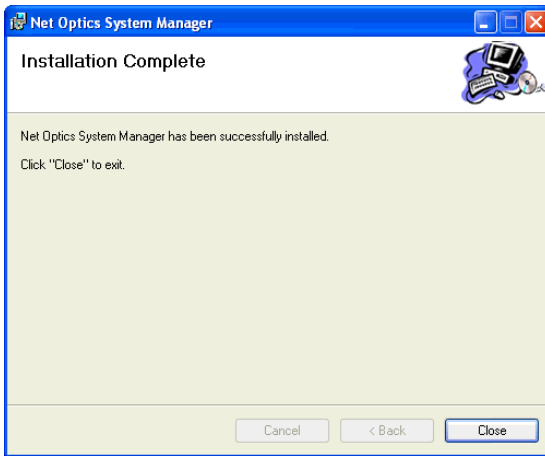


Figure 21: Installation Complete

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

Exploring System Manager

This section explains the features and functions of System Manager. Use the Net Optics System Manager to:

- Create iBypass Switch groups
- Add iBypass Switches to the system
- Delete iBypass switches from the system
- Remotely configure iBypass Switches
- View iBypass Switch status information
- Connect Monitor Ports to Network ports
- Add text information about the iBypass Switch

NOTE

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

To access System Manager:

1. Double click the System Manager icon on your PC desktop. The startup window, shown in the following figure, will not show any iBypass Switches.

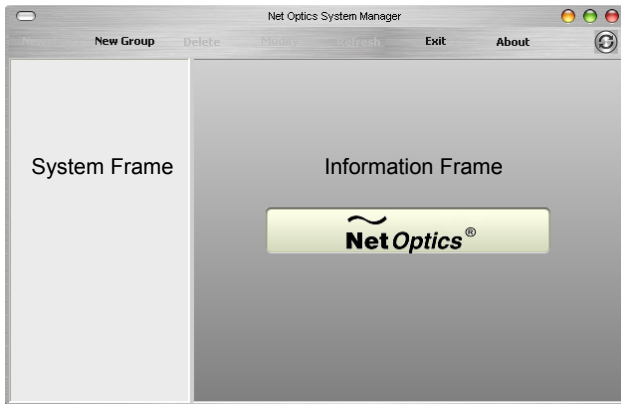


Figure 22: Startup Window

The **System Frame** portion of the window will display iBypass Switches and iBypass Switch Groups as you add them to the system. The **Information Frame** portion of the window will display Status, Configuration and Control information for individual iBypass Switches.

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.

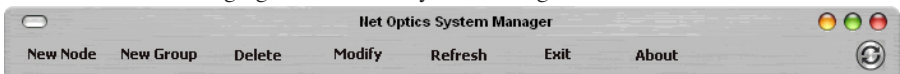


Figure 23: Toolbar

The table below describes the headings found on the toolbar.

Tool	Description
New Node	Add iBypass Switches to a group
New Group	Create an iBypass Switch group
Delete	Delete iBypass Switch from System Manager
Modify	Change the iBypass Switch name, IP address, model, and add notes
Refresh	Refresh the data displayed in the Information Frame.
Exit	Close Net Optics System Manager
About	View information about System Manager

Creating an iBypass System Manager Group

You can organize iBypass Switch devices into groups for quick access. You must create a Group before you can add iBypass Switches to your system.

To create an iBypass Switch group:

1. Click **New Group** in the toolbar as shown in the following figure.

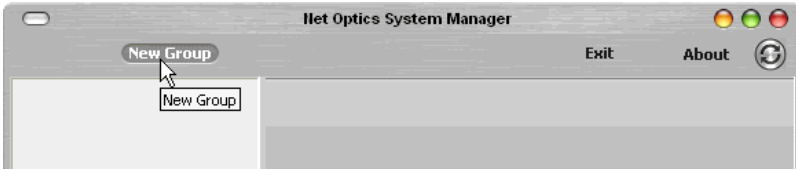


Figure 24: New Group

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

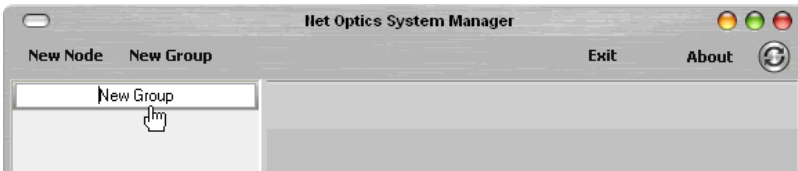


Figure 25: Group Bar

2. The New Group label can be edited to name the new Group. Type the name of the new group and press **Enter**.

Deleting a Group

You can delete a group, however all iBypass Switches within that group will 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 will continue 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 iBypass Switches will be deleted from System Manager.

Adding iBypass Switches to a Group

To configure and control iBypass Switches with System Manager, you must add iBypass Switches to System Manager. Once you have added an iBypass Switch, you can configure, modify, group, 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 bar where the iBypass Switch will be added.
2. Click **New Node** in the toolbar as shown in the following figure. The **New Node** dialog box displays.

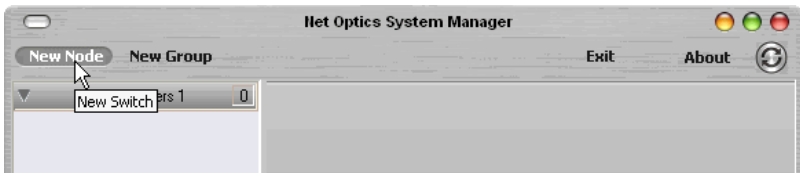


Figure 26: Adding a New iBypass Switch to a Group

3. Enter a name for the iBypass Switch in the **Node Name** text box. Each Node Name in the system must be unique.

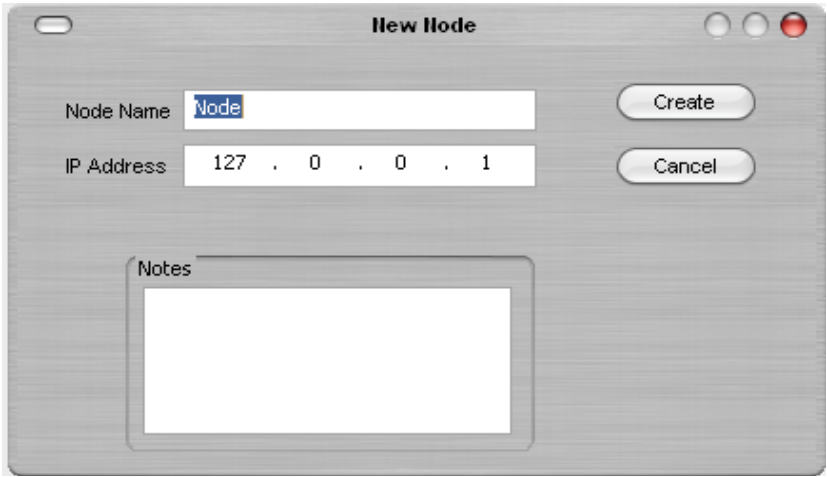


Figure 27: New iBypass Switch

4. Enter the IP address of the iBypass Switch in the **IP Address** text box. Make sure that the IP address is unique on the network.
5. Either elect your iBypass Switch model from the **Product** drop-down list, or leave it blank for automatic discovery.
6. Enter any relevant information about the iBypass Switch in the **Notes** text box.
7. Check your settings and click **Create**.

You may see an automatic re-definition window.

8. Click **OK**.

System Manager now displays the iBypass Switch in the system similar to the ones in the following figure.

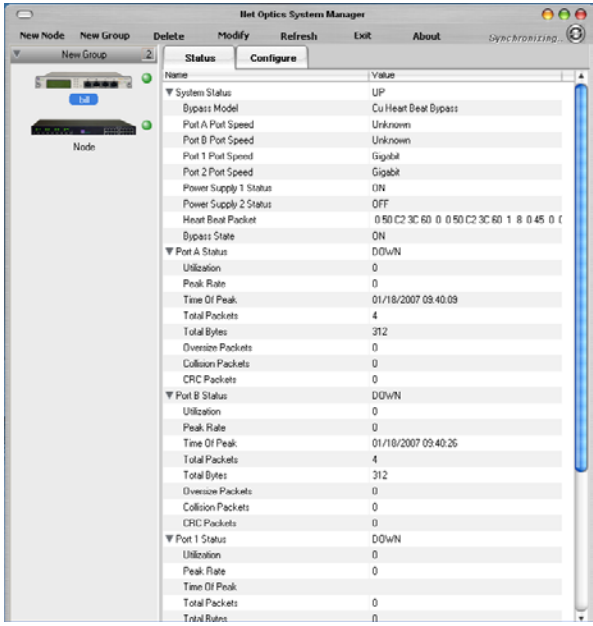


Figure 28: Net Optics System Manager with an iBypass Switch

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 graphic of the switch displays 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 order in which iBypass Switches display in the System Frame, click and drag iBypass Switches into the desired order.

Deleting an iBypass Switch

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 will continue 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 iBypass Switch you want to delete by clicking its icon.
2. Click **Delete** in the toolbar. A confirmation dialog appears.
3. Click **Yes** to delete the iBypass Switch from System Manager.

Configuring an iBypass Switch

You can set configuration parameters of an iBypass Switch in the system from the **Configure** tab.

To configure the iBypass Switch:

1. Click the icon of the iBypass Switch you want to configure and click the **Configure** tab as shown in the following figure.

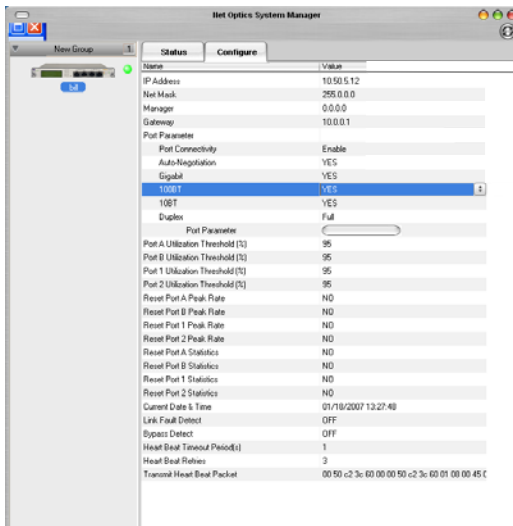


Figure 29: Configure Tab

2. For the parameter you wish to configure, click on the corresponding value field.
3. Select an option from the drop-down list or enter a new value from your keyboard.
4. The new configuration parameters take effect next time System Manager polls the iBypass Switch.

The table below describes the configuration 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.
Net Mask	The net mask; 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 Connectivity	ENABLE/DISABLE the connections on all four ports.
Auto-Negotiation	Turn auto-negotiation on or off; if auto-negotiation is on, the next three parameters are ignored. (All four ports have the same setting.)
Gigabit 100BT 10BT	These three parameters set the speed for all the ports if auto-negotiation is off. Set Gigabit=YES for 1 Gbps, 100BT=YES for 100 Mbps, and 10BT for 10 Mbps. Only one of these parameters should be set to YES, and the other two to NO. (All four ports have the same setting.)
Duplex	Sets the port mode to full duplex or half duplex. (All four ports have the same setting.)
Port Parameter	Button reserved for future function.
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.

Field Name	Description
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 always NO; when you change it to YES, the values for the peak rate are reset, and this value returns to NO.
Reset Port B Peak Rate	This value is always NO; when you change it to YES, the values for the peak rate are reset, and this value returns to NO.
Reset Port 1 Peak Rate	This value is always NO; when you change it to YES, the values for the peak rate are reset, and this value returns to NO.
Reset Port 2 Peak Rate	This value is always NO; when you change it to YES, the values for the peak rate are reset, and this value returns to NO.
Reset Port A Statistics	This value is always NO; when you change it to YES, the values for the statistics are reset, and this value returns to NO.
Reset Port B Statistics	This value is always NO; when you change it to YES, the values for the statistics are reset, and this value returns to NO.
Reset Port 1 Statistics	This value is always NO; when you change it to YES, the values for the statistics are reset, and this value returns to NO.
Reset Port 2 Statistics	This value is always NO; when you change it to YES, the values for the statistics are reset, and this value returns to NO.
Current Date & Time	Click the existing date and adjust it with the up and down arrows.
Link Fault Detect	Turn Link Fault Detect ON or OFF.
Bypass Detect	Turn Bypass Detect ON or OFF. In most environments, Bypass Detect should be OFF.
Heartbeat Timeout Period(s)	Number of seconds between Heartbeat Packets sent from the iBypass unit to a connected monitoring device. The default is 1 second. If this parameter is set to 0, the Switch is forced into Bypass Mode.

Field Name	Description
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

Viewing iBypass Switch Information

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. A window similar to the following figure displays.

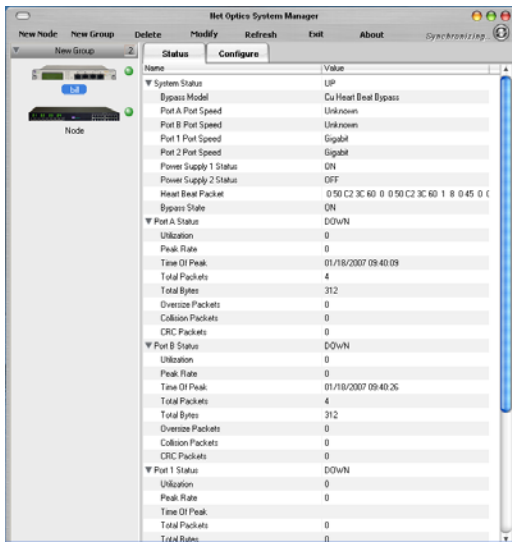


Figure 30: iBypass Switch Status Tab - top part of screen

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 will display with a circle and arrow just to the left of the value field.

The following table describes the status fields.

Switch 1 Model	Model of the iBypass Switch.
Hardware Version	Hardware version of the iBypass Switch. The hardware version is not displayed for Client iBypass Switches.
Software Version	Software version of the iBypass Switch. The software version is not displayed for Client iBypass Switches.
Monitor Port 1 Data Port	The Network port currently connected to Monitor Port 1. To change the Monitor Port connection, use the Control Tab.
Monitor Port 2 Data Port	The Network port currently connected to Monitor Port 2. To change the Monitor Port connection, use the Control Tab.

Modifying an iBypass Switch Configuration

You can change the IP address and other basic iBypass Switch configuration parameters from the Modify iBypass Switch dialog.

To modify the iBypass Switch configuration:

1. In the System Frame, click on the image of the iBypass Switch you want to change.
2. Click **Modify** in the toolbar. The Modify Node dialog displays as shown in the following figure.

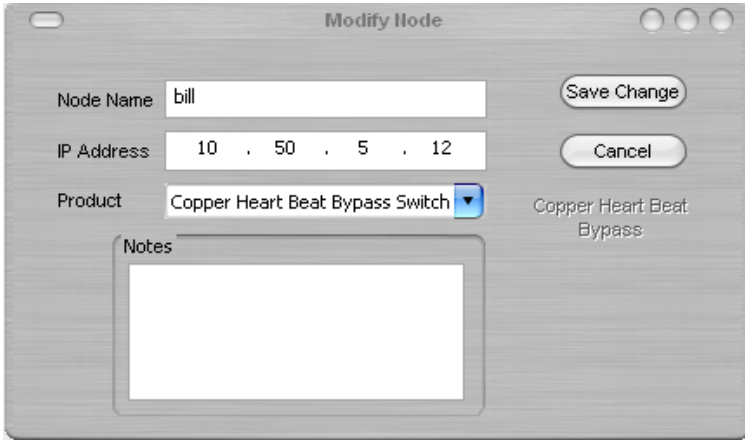


Figure 31: Modify iBypass Switch (Node)

3. Make the desired changes and click **Save Change**.

Change a Heartbeat Packet from System Manager

The heartbeat packet for a 10/100/1000 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, 1.5A

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

1.3125" high x 12" deep x 8.75" wide

IBP-HBCU3 Connectors

- (1) DB9 (RS232 configuration port)
- (1) RJ45 (management port)
- (2) RJ45 (monitoring ports)
- (2) RJ45 (network ports)

Indicators

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

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 Model

IBP-HBCU3	10/100/1000 iBypass Switch with Heartbeat
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Accessory

RK-iTP2 Two slot rack-mount panel

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 Port	set parameter port <parameter>	Where <parameter> is defined in the table on page 54.
	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.
	LFD	set LFD <on or off>	Link Fault Detection
	Detection	set detection <on or off>	Bypass detection
	txpacket	set txpacket	Edit HB packet
	Timeout	set timeout <# secs>	The default time out for a heartbeat packet is 3 seconds with no heartbeat answer. If this parameter is set to 0, the Switch is forced into Bypass Mode.
	Retries for Bypass	set retry <#>	The default is 3 non-returned heartbeat packets to trigger bypass.

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.
	rxpacket	show rxpacket	Shows received HB packet in HEX format
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.

Set Parameter Port Command

The parameters for the set parameter port command are defined in the following table.

Note:

Enter <parameter> in decimal for the set parameter port command. The parameter is displayed in hex in response to the show set command.

Mode of all ports	Auto-negotiate	<parameter>	
		Hexadecimal	Decimal
10/100/1000Mbps, full duplex	On	0x37	55
10/100Mbps, full duplex	On	0x36	54
10Mbps	On	0x34	52
100Mbps	On	0x32	50
1000Mbps (Gigabit)	Off	0x31	49
10Mbps, half duplex	Off	0x2C	44
100Mbps, half duplex	Off	0x2A	42
10Mbps, full duplex	Off	0x24	36
100Mbps, full duplex	Off	0x22	34
Ports 1 and 2 disabled	Off	0x17	23

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