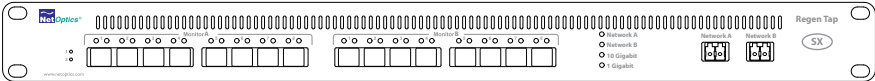




Installation Guide for 8x1 Regeneration Taps™ 10G, 1G, and 10/100/1000 Speeds

RG-800 Series



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Additional Information

Net Optics, Inc. reserves the right to make changes in specifications and other information contained in this document without prior notice. Every effort has been made to ensure that the information in this document is accurate.

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Introduction

Net Optics 8x1 Regeneration Taps solve the key physical layer challenges of multi-device network monitoring. For a better picture of network health, these Taps connect up to eight different network management and security devices at any single network location or two switch Span ports.

One Tap, No Idle Resources

Keep your intrusion detection and prevention systems, forensic traffic recorders, protocol analyzers, RMON probes, and other security and performance monitoring devices productive with a single Regeneration Tap. Maximize resources and save on access points when multiple devices can monitor link traffic simultaneously through a single Regeneration Tap. Secure, passive access for multiple devices simply means a better return on monitoring investments.

Security and Visibility

Without an IP address, monitoring devices are isolated from the network, dramatically reducing their exposure to attacks. However, the monitoring device connected to the Tap still sees all full-duplex traffic as if it were in-line, including Layer 1 and Layer 2 errors.

Reliability

For superior uptime protection, Net Optics Taps offer redundant power connections. Should the primary power source fail, the Tap automatically switches to the backup power source. Power LEDs on the front of the Tap indicate the current power.

Any Media

The RG-800 family of Regeneration Taps includes models for any network media: 10G, 1G, and 110/100/1000; copper and fiber; singlemode (SM) and multimode (MM); inline and Span.

SFP Monitor Ports

All fiber models have SFP (1G) or SFP+ (10G) cages for monitor ports, enabling tools with any type of fiber or copper media to be attached to the Regeneration Tap outputs. (10G models support only 10G SFP+ transceiver modules; they do not perform data rate conversion to 1G SFP transceivers.)

Inline or Span Ports

Models are available for either inline or Span deployments. Inline models tap one link and create eight copies of the traffic traveling in one direction on the link, plus eight copies of the traffic traveling in the other direction. A monitoring tool with two NICs has visibility of the full duplex traffic at full link bandwidth.

Span models act as two independent regeneration functions, with eight copies created for the traffic from two separate Span ports or external taps.

Key Features

Passive, Secure Technology

- Enables real-time, simultaneous monitoring of a single link or two Span ports with up to eight monitoring devices
- Provides complete full-duplex visibility at 10G, 1G, and 10/100/1000 traffic speeds without data stream interference or introducing a point of failure
- Passes all traffic (including errors) from all layers for comprehensive troubleshooting
- No IP address is needed for the Tap or monitoring device, enhancing monitoring security
- Redundant power ensures monitoring uptime
- SFP/SFP+ monitor ports support all types of monitoring tool connection media
- Fully RoHS compliant

Ease of Use

- LED indicators show redundant power, speed, link, and activity status
- Front-mounted connectors support easy installation and operation
- Push-button selection for 10/100/1000 copper port settings
- Compatible with all major manufacturers' monitoring devices, including protocol analyzers, probes, and intrusion detection systems

Support

- Net Optics offers technical support throughout the lifetime of your purchase. Our technical support team is available from 8:00 to 17:00 Pacific Time, Monday through Friday at +1 (408) 737-7777 and by e-mail at ts-support@netoptics.com. FAQs are also available on the Net Optics Web site at www.netoptics.com.

About This Guide

Please review this entire guide before attempting to install an 8x1 Regeneration Tap. The guide covers the following models:

Part Number	Description
RG-820	Regen, 8x1, Inline, Copper, 10/100/1000
RG-825	Regen, 8x1, Span, Copper, 10/100/1000
RG-830	Regen, 8x1, Inline, Fiber, 1G, MM, 62.5µm, SFP, 50:50
RG-835	Regen, 8x1, Span, Fiber, 1G, MM, 62.5µm, SFP
RG-840	Regen, 8x1, Inline, Fiber, 1G, MM, 50µm, SFP, 50:50
RG-845	Regen, 8x1, Span, Fiber, 1G, MM, 50µm, SFP
RG-850	Regen, 8x1, Inline, Fiber, 1G, SM, 8.5µm, SFP, 50:50
RG-855	Regen, 8x1, Span, Fiber, 1G, SM, 8.5µm, SFP
RG-830X	Regen, 8x1, Inline, Fiber, 10G, MM, 62.5µm, SFP+, 50:50
RG-835X	Regen, 8x1, Span, Fiber, 10G, MM, 62.5µm, SFP+
RG-840X	Regen, 8x1, Inline, Fiber, 10G, MM, 50µm, SFP, 50:50
RG-845X	Regen, 8x1, Span, Fiber, 10G, MM, 50µm, SFP+
RG-850X	Regen, 8x1, Inline, Fiber, 10G, SM, 8.5µm, SFP+, 50:50
RG-855X	Regen, 8x1, Span, Fiber, 10G, SM, 8.5µm, SFP+

Add -DC to the part numbers for the -48VDC models.

Fiber models require SFP/SFP+ transceiver modules installed in utilized monitor ports; transceiver modules are sold and shipped separately.

Unpacking and Inspection

Carefully unpack the 8x1 Regeneration Tap and check for damaged or missing parts. The Tap ships with the following:

- 8x1 Regeneration Tap
- Two power cords
- Installation Guide
- Fasteners for rack mounting

You may have also ordered an extended warranty. Carefully check the packing slip against parts received. If any part is missing or damaged, contact Net Optics Customer Service immediately.

Product Diagrams

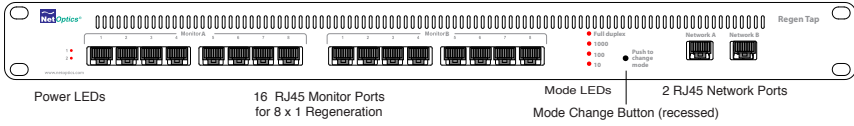


Figure 1: Front panel, copper models

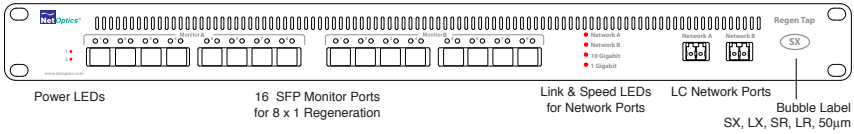


Figure 2: Front panel, fiber models

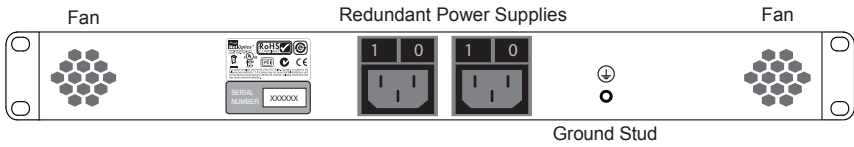


Figure 3: Rear panel, AC models

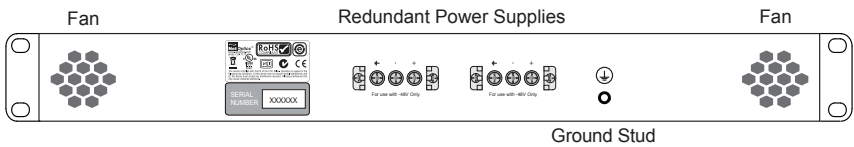


Figure 4: Rear panel, DC models

Note:

Each AC or DC power source should be independent of the other in order to have power redundancy. If you do not require power redundancy, the unit can be operated with a single power cord connected to a single AC or DC power source. In this case, either AC or DC power connector on the rear of the unit can be used for the connection.

LED Indicators

- **Power LEDs:** Each LED illuminates to show that power is being sourced by one of the power supplies.
- **Link LEDs:** For copper models, a LED on the right corner of each RJ45 illuminates when a link is established. The Link LEDs for fiber network ports are located in the top two positions in the stack of four LEDs to the left of the network ports.
- **SFP Present LEDs:** The left side LED above each SFP/SFP+ cage illuminates when a module is properly plugged in. The right side LED about the cage is not used.
- **Activity LEDs:** For copper models, a LED on the left corner of each RJ45 connector flashes when there is activity on the port.
- **Link Speed Indication:** For 10/100/1000 copper ports, the color of the Link LED is amber if the link speed is 10 Mbps, yellow for 100 Mbps, and green for 1000 Mbps. On the fiber models, bottom two LEDs in the stack of four LEDs to the left of the network ports indicate whether the model is for 10 Gbps (second-from-bottom LED) or 1 Gbps (bottom LED) link speed.

Link Speed Setting

For 10/100/1000 copper interface models, the link speed and duplex mode are set by pressing the mode change button. The button is recessed to prevent accidental activation; use a pen tip or straightened paper clip so press it. Each time you press the button, the mode changes. Press it repeatedly until you reach your desired operating mode as indicated in the speed and duplex LEDs. The modes and LED indications are illustrated below.

	10 Mbps	100 Mbps	1000 Mbps	Auto-negotiate
Duplex	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10 	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10 	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10 	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10
Half-duplex	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10 	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10 	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10 	<ul style="list-style-type: none"> ● Full duplex ● 1000 ● 100 ● 10

Warnings on Product

WARNING: Warranty void if removed

Two of the labels illustrated above cover screws on the chassis top cover near the front corners. They prevent you from taking the cover off without voiding your warranty. You should not take the cover off because there are no user-serviceable parts inside, and there is a danger of electrical shock.

Symbols on Product



Indicates WEEE compliance



Indicates CE compliance



Indicates RoHS compliance



Indicates C-Tick compliance



Indicates VCCI compliance



Indicates MET compliance
(U.S.A. safety)



Indicates the chassis ground stud
(also called safety ground or earth ground)

Connecting Power

Use the following procedures to safely connect AC or DC power to the unit.

Caution:

For AC models, use the AC power cords supplied with the product. If you use other AC power cords, they should have a wire gauge of at least 20 and a 230VAC 1A rating. Be sure to use a three-prong cords and connect them to sockets with good earth grounds.

For DC models, you must supply your own power cables. DC power cables should have a wire gauge of at least 18 and a 72VDC 2A rating. Always connect the earth grounds first, and keep the earth grounds connected whenever you are working on the device. When disconnecting the device from DC power, remove the earth ground connections last.

To connect AC input power on AC models:

1. Connect the ground stud near the center of the rear panel to a good earth ground. Usually this will be the same as the equipment rack ground.
2. Connect one of the AC power cords to one of the AC power connectors on the rear panel.
3. Install a power supply clip over the head of the AC power cord to keep it from accidentally being unplugged from the AC power connector.
4. Plug the other end of the cord into an AC power source.
5. Push the "1" side of the power switch immediately above the power connector to activate power.
6. Repeat Steps 2 to 5 for the other AC power source. Be sure to plug it into an independent power circuit for power redundancy.

To connect DC input power on DC models:

1. If you have not already done so, unpack the Regeneration Tap and verify that you have appropriate DC power cables. You also need a Phillips screwdriver to complete the installation.
2. If present, remove the protective covers from the DC power terminal blocks.
3. Connect an earth ground lead to the terminal labeled with the ground symbol (\oplus), which is the left-most terminal, on both DC power terminal blocks on the rear of the chassis. Use the screwdriver to tighten the connections. Also connect the earth ground to the ground stud near the center of the rear panel.
4. Connect one of the DC power cables to one of the DC power terminal blocks on the rear panel. Connect the negative (-48VDC) side of the cable to the terminal labeled with the minus symbol (-) and the positive (0V) side of the cable to the terminal labeled with the plus symbol (+). The minus terminal is in the center and the plus terminal is on the right. Use the screwdriver to tighten the connections.
5. Repeat Step 4 for the other DC power cable, connecting it to the remaining DC power terminal block on the rear panel.
6. Carefully connect the other ends of the DC power cables to two -48VDC power sources. If possible, turn off the power to the power source while you are making these connections. Be sure to connect the positive sides of the cables to the positive (plus) sides of the power sources, and the negative sides of the power cables to the negative (minus) sides of the power sources.

Installation in a Restricted Access Location in Finland and Norway

Because of concerns about unreliable earthing in Finland and Norway, this equipment must be installed in a Restricted Access Location (RAL) in these countries. An RAL is defined as an access that can be gained only by trained service personnel who have been instructed about the reasons for the restricted access and any safety precautions that must be taken. In these cases, the use of a tool (such as lock and key) or other means of security is required for access to this equipment.

Connecting to the Network

1. Connect Network Port A to the appropriate switch Network or Span port using a an appropriate cable.
2. Connect Network Port B to the appropriate switch Network or Span port using an appropriate cable.
3. Check the Link and Activity LEDs to verify that the Regeneration Tap is receiving traffic into the Network ports. For inline models, verify that traffic is passing between the devices on both sides of the Regeneration Tap.

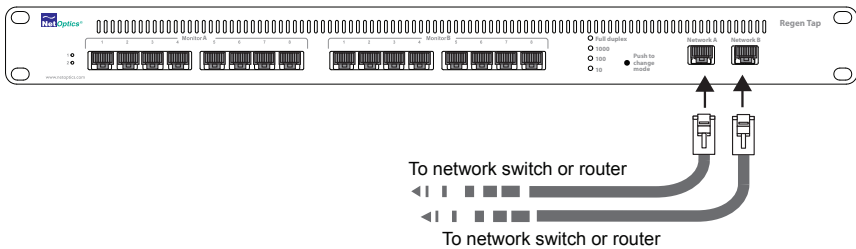


Figure 5: Connecting to the Network

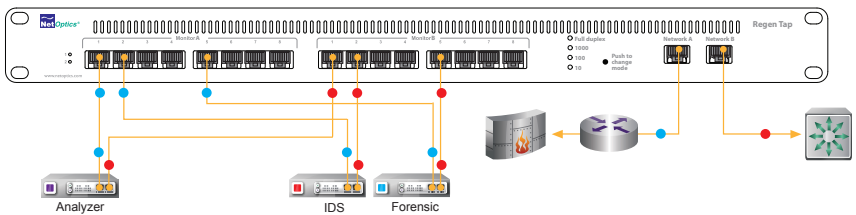


Figure 6: Application diagram for inline models

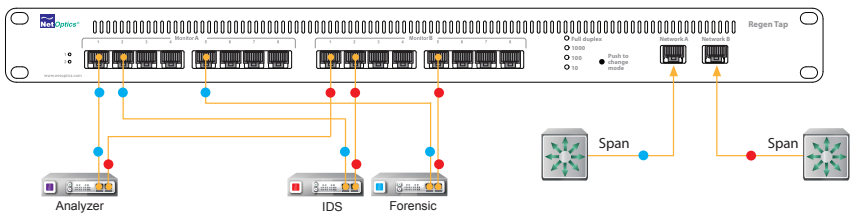


Figure 7: Application diagram for Span models

Connecting to the Monitoring Devices

1. If you have a fiber model, install the appropriate SFP or SFP+ transceiver modules in the Monitor ports. (You need to install modules only in ports to which you will be connecting monitoring tools). Push each module in until you hear a click and see the SFP Present LED above the port illuminate.
2. Connect any Monitor A port to the appropriate monitoring device using an appropriate cable. The device will monitor Network traffic being received at Network A port over this cable.
3. Connect any Monitor B port to another NIC on the same monitoring device using an appropriate cable. The device will monitor Network traffic being received at Network B port over this cable.
4. Connect other monitor devices to the remaining monitor ports as desired. All of the Monitor A ports mirror the traffic being received at Network A, and all of the Monitor B ports mirror the traffic being received at Network B.

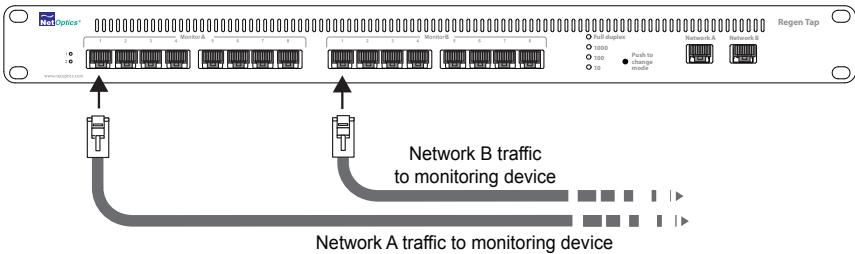


Figure 8: Connecting the Monitoring Devices

Note:

On inline models, if traffic is passing between the devices on both sides of the Network ports but no traffic can be seen on the monitoring ports, the cables plugged into the Network ports may have TX and RX reversed. To fix this condition, reverse the TX and RX connections on BOTH Network A and Network B ports. If you reverse the connections on only one of the ports, traffic will not be able to pass between the devices.

Specifications

Environmental

Temperature: 0°C to 40°C (Operating), -10°C to 70°C (Storage)
Relative Humidity: 10% min, 95% max, non-condensing

Redundant Power Supplies, each

Input: 100-240VAC, 0.5A, 47-63Hz
DC Input: -48VDC nominal, -36 to -72VDC, 1A
Power Consumption: 50W

Mechanical

Dimensions: 1.75" high x 13" deep x 17" wide (19" rack mount, 1U)
Weight: TBA lbs

Connectors

Network: (2) RJ45 (copper models); (2) duplex LC type (fiber models)
Monitor: (16) RJ45 (copper models); (16) SFP/SFP+ (fiber models);
AC Power: Universal power cord plugs
DC Power: Terminal peak, 12-14 gauge wire

Indicators

Link and Activity LEDs on copper ports; Link LEDs on fiber network ports
SFP Present LEDs
Speed indication, 10/100/1000 model: Link LED is amber (10 Mbps),
yellow (100 Mbps) or green (1000 Mbps)
Two power LEDs for the redundant power supplies
Mode (speed and duplex) LEDs on 10/100/1000 models

Performance

Drops: No packets dropped from 0 to 1 Gbps (10 Gbps on 10G models)
Latency: TBA

Splitter (fiber models)

Split Ratio: 50/50 (other split ratios available on request)
Multimode Insertion Loss (network port): 4.5 dB max
Singlemode Insertion Loss (network port): 3.7 dB max

Fiber Optic Interface:

Laser: Class I, eye-safe, laser emitter type. These Class I Lasers conform to the applicable requirements per US 21 CFR (J) and EN 60825-1, also UL 1950 applications
Optical Transmitter Wave Length: 850nm nominal (MM)
Output Power: -9.5 dB to -4 dB, Input Sensitivity: 0 dB to -17 dB
Optical Transmitter Wave Length: 1310nm nominal (SM)
Output Power: -10 dB to -3 dB, Input Sensitivity: -3 dB to -20 dB

Certifications

Safety: UL, CE
EMC: FCC, VCCI, C-Tick
Environmental: RoHS, WEEE
Protocol: IEEE 802.3 compliant

Limitations on Warranty and Liability

Net Optics offers a limited warranty for all its products. IN NO EVENT SHALL NET OPTICS, INC. BE LIABLE FOR ANY DAMAGES INCURRED BY THE USE OF THE PRODUCTS (INCLUDING BOTH HARDWARE AND SOFTWARE) DESCRIBED IN THIS MANUAL, OR BY ANY DEFECT OR INACCURACY IN THIS MANUAL ITSELF. THIS INCLUDES BUT IS NOT LIMITED TO LOST PROFITS, LOST SAVINGS, AND ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT, even if Net Optics has been advised of the possibility of such damages. Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Net Optics, Inc. warrants this Regeneration Tap to be in good working order for a period of one year from the date of purchase from Net Optics or an authorized Net Optics reseller.

Should the unit fail anytime during the said one year period, Net Optics will, at its discretion, repair or replace the product. This warranty is limited to defects in workmanship and materials and does not cover damage from accident, disaster, misuse, abuse or unauthorized modifications.

If you have a problem and require service, please call the number listed at the end of this section and speak with our technical service personnel. They may provide you with an RMA number, which must accompany any returned product. Return the product in its original shipping container (or equivalent) insured and with proof of purchase.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, EXPRESS OR IMPLIED. No Net Optics reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Net Optics is always open to any comments or suggestions you may have about its products and/or this manual.

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