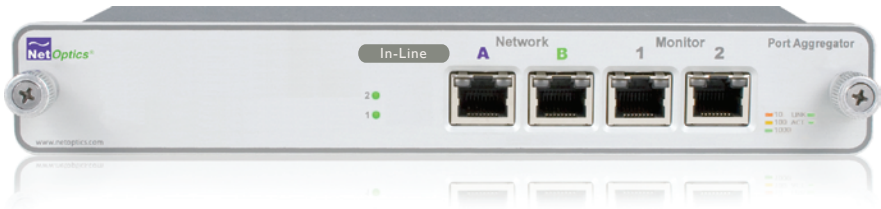




Installation Guide for 10/100/1000 Copper Port Aggregator

Model TPA-CU3



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Additional Information

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Introduction

Net Optics 10/100/1000 Copper Port Aggregators provide ultra-efficient access to critical triple-speed links. This pioneering technology enables any device to simultaneously monitor a full-duplex link using only one NIC per monitoring device.

Typically, full-duplex monitoring with a network tap requires two NICs (or a dual channel NIC) – one interface for each side of the tapped full-duplex connection. The 10/100/1000 Copper Port Aggregator combines and regenerates these streams, sending all aggregated data out two passive monitoring ports.

Buffering Prevents Lost Data

The 10/100/1000 Copper Port Aggregator is designed to handle the combined traffic of a single full-duplex link. Normally, the traffic should be below the receiving capacity of the NIC.

When the traffic queue exceeds the capacity of the NIC, the Tap buffers the overflow of up to one gigabyte of data for both sides of the full-duplex connection. The buffer clears automatically when the traffic volume falls below the receiving capacity of the NIC. For example, if there is a traffic burst on a 1000 Mbps network port and a monitoring device is now receiving 1.2 Gbps of traffic, the Tap buffers data until the burst is over. The Tap then sends the buffered data to the monitoring device until the buffer is cleared.

Simple to Deploy

Net Optics 10/100/1000 Copper Port Aggregator is a simple plug-and-play solution addressing the fact that many monitoring systems, including most software-based solutions, only offer a single channel NIC, limiting full-duplex visibility. While adding a second NIC can help maintain data integrity and visibility, there is a tradeoff in flexibility and ease-of-use. An operating system and NICs that enable binding are often required to achieve the same functionality as the 10/100/1000 Copper Port Aggregator. In contrast, the 10/100/1000 Copper Port Aggregator requires no additional components or configuration on the monitoring devices.

Note:

All ports that connect to the 10/100/1000 Copper Port Aggregator must be configured for autonegotiation. The links will not function properly with fixed speed devices.

Better than Span Ports

In the past, Span ports were occasionally used to aggregate tapped traffic. However, in addition to missing Layer 1 and Layer 2 errors, Span ports support very limited buffering and can simply drop data during bursts. The generous buffers of the 10/100/1000 Port Aggregator prevents data loss in these conditions.

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.

Simply Plug It In

Full-duplex monitoring is a snap when each side of the signal is sent to the same NIC on the monitoring device. All network and monitoring cables required for plug-and-play deployment are included with the 10/100/1000 Copper Port Aggregator.

Link Fault Detect™

The 10/100/1000 Copper Port Aggregator features Link Fault Detect on the Network ports. The Tap negotiates separately with each side of the full-duplex link, detecting if either side fails. In the event of a failure, the Tap ceases negotiation with the remaining side, enabling a clean fail-over to a redundant network connection (if one is available). Link Fault Detect requires that both sides of the full-duplex link are communicating at the same speed.

Reliability

For extra 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 source – even if power is lost and reapplied, the network is not affected.

Key Features

Passive, Secure Technology

- Supports full-duplex monitoring with a single NIC, increasing monitoring efficiency
- Regeneration Tap technology enables two devices to simultaneously monitor all aggregated traffic – using only one NIC per device
- Network and Monitor ports operate in auto-negotiation mode and advertise all available speeds
- One gigabyte of memory for the full-duplex link prevents data loss during excessive traffic loads
- Provides complete full-duplex visibility at 1000 Mbps 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
- Fully IEEE 802.3 compliant
- Fully RoHS compliant

Ease of Use

- LED indicators show redundant power, speed, link, and activity status
- Front-mounted connectors support easy installation and operation
- Monitoring and network cables included
- Optional 19-inch rack frames hold up to two Taps
- Compatible with all major manufacturers' monitoring devices, including protocol analyzers, probes, and intrusion detection/prevention systems

Support

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

Unpacking and Inspection

Carefully unpack the 10/100/1000 Copper Port Aggregator and check for damaged or missing parts. The Port Aggregator ships with the following:

- 10/100/1000 Copper Port Aggregator (TPA-CU3)
- Two power supplies
- Installation Guide
- CAT5e cables

You may have also ordered a one-rack-unit panel for mounting two Taps and 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 Diagram

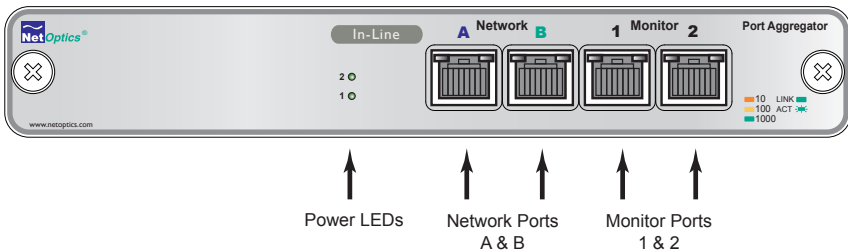


Figure 1. Front Panel View (TPA-CU3)

LED Indicators

- **1 / 2:** Main and Redundant Power. If the Tap is deployed with both power supplies, both LEDs will illuminate when the Tap is plugged in. If an LED is off, this indicates that the corresponding power supply is not functioning.
- **Link Speed Indicator:** Located in the upper left corner of each RJ45 connector. It illuminates solid amber for a 10Mbps link, yellow for a 100Mbps link, and green for a 1000Mbps link.
- **Link/Activity Indicator:** Located in the upper right corner of each RJ45 connector. If a good link is established, the LED illuminates a steady green. If there is current activity on this link, the LED flashes.

Application Diagrams: Memory Operation

All traffic that passes through the Tap is sent to the monitoring device NIC on a first-in, first-out basis, including traffic that is temporarily stored in memory. If two packets enter at the same time then one packet is processed while the other is stored briefly in memory, preventing collisions.

When there is a burst of data, traffic in excess of the NIC's capacity is sent to the Tap's memory. One gigabyte of data from the full-duplex stream can be stored in memory. Memory continues to fill until its capacity is reached, or the burst ends – whichever comes first.

In both cases, the Tap applies a first-in, first out procedure, processing stored data before new data from the link. If memory fills before the burst ends, the memory stays filled as the stored data is processed – data that leaves the buffer is immediately replaced. If the burst ends before the memory fills, memory clears until the full gigabyte of capacity is available, or another until another burst in excess of the NIC's capacity requires additional memory.

The following three diagrams illustrate a simple example of a 1000 Mbps NIC moving from 80% utilization, to 140% utilization, then back to 80% utilization.

State 1: Side A + Side B is less than or equal to 100% of the NIC's receive capacity.

Example: On a 1000 Mbps link, Side A is at 300 Mbps and Side B is at 500 Mbps. The NIC receives 800 Mbps of traffic (80% utilization), so no memory is required for the monitoring device NIC to process all full-duplex traffic.

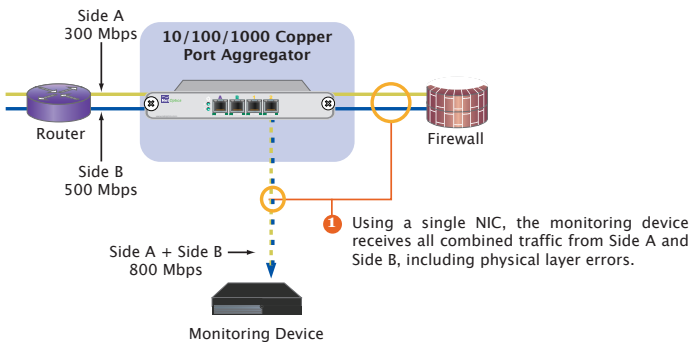


Figure 2. 80% Utilization

State 2: Side A + Side B becomes greater than 100% of the NIC's receive capacity.

Example: There is a burst of traffic, so Side A is now at 900 Mbps, while Side B remains at 500 Mbps. The NIC's utilization is at 140%, requiring the use of memory to help prevent data loss.

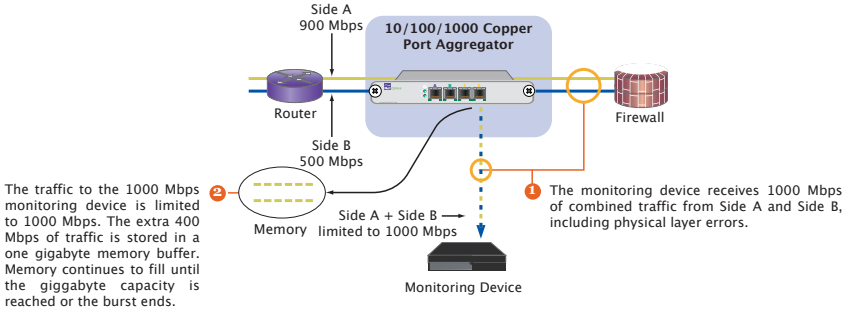


Figure 3. 140% Utilization

State 3: Side A + Side B is once again less than 100% of the NIC's receive capacity.

Example: Side A is again at 300 Mbps and Side B remains at 500 Mbps. The NIC's utilization is again at 80%.

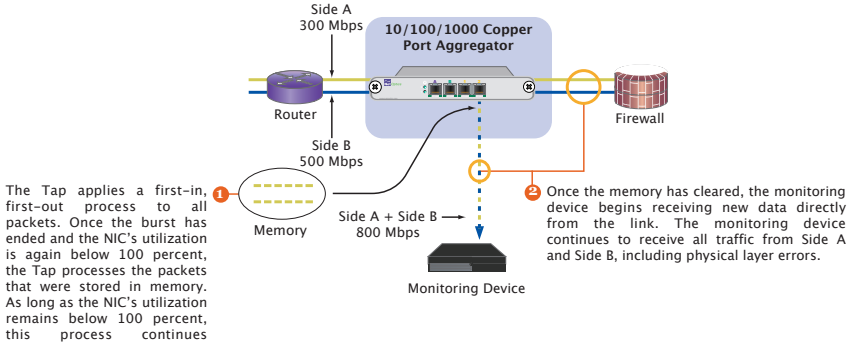


Figure 4. Return to 80% Utilization

Connecting to the Network

1. Unpack the Tap and verify that you have all components. This Tap ships with two power supplies and two power cords.
2. Connect Network Port A to the appropriate network device using an RJ45 CAT5e straight-through cable.
3. Connect Network Port B to the appropriate network using an RJ45 CAT5e straight-through cable.
4. Verify that the Tap Network Ports are cabled in-line between two devices.

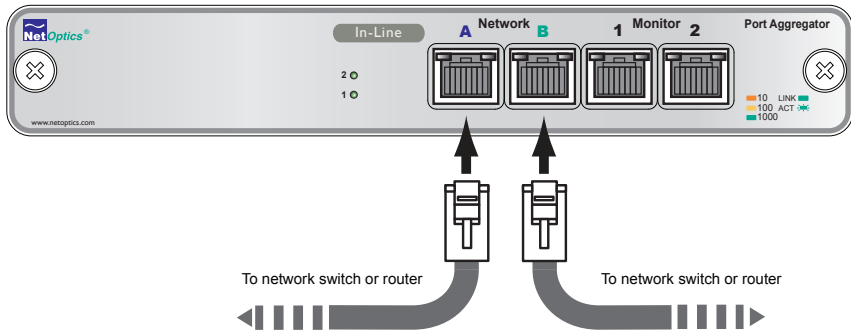


Figure 5. Connecting to the Network

Note:

The network links connected to the 10/100/1000 Copper Port Aggregator must run with autonegotiation. Be sure to configure the ports on the switches and routers for autonegotiation if you are cabling them to this device.

Connecting to the Monitoring Device

1. Supply power to the Tap using the power supplies included with the unit. Two power supplies are included. The use of the second redundant power supply is optional.
2. Verify that the Power LEDs illuminate. PWR 1 LED illuminates when the first power supply is in use, and PWR 2 LED illuminates when the second power supply is in use. Both power supplies can be plugged into the Tap at the same time.
3. Connect Monitor Port 1 and Monitor Port 2 to the appropriate ports on the monitoring devices using RJ45 CAT5e straight-through cables to monitor the full-duplex link.

Note:

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 will supply all power for the Tap.

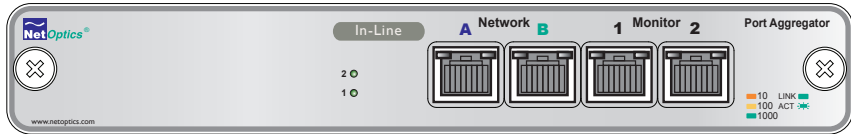
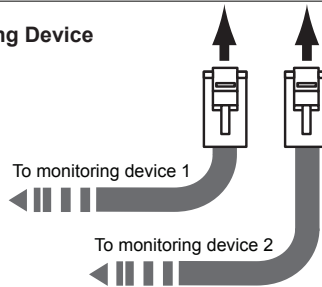


Figure 6. Connecting to the Monitoring Device



Note:

The monitor links connected to the 10/100/1000 Copper Port Aggregator must run with autonegotiation. Be sure to configure the ports on the monitoring tools for autonegotiation if you are cabling them to this device.

Specifications

Environment

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

Power

Power Supply Input:
100-240VAC, 0.5A, 47-63Hz
Output: 12V, 5A

Mechanical

Dimensions: 1.125" high x 11.0" deep x 8.75" wide

Cable Interface

Copper Cable Type: 22-24 AWG unshielded twisted pair cable,
CAT5/CAT5e

Connectors

(2) RJ45, 8-pin connectors (monitor ports)
(2) RJ45, 8-pin connectors (network ports)

Certifications

Fully RoHS compliant

Limitations on Warranty and Liability

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Net Optics, Inc. warrants this 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.

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Send correspondence to
Net Optics, Inc.
1130 Mountain View Alviso Road
Sunnyvale, CA 94089-2237 USA
Telephone: +1 (408)737-7777
Fax: +1 (408)745-7719
Email: info@netoptics.com/[Internet:www.netoptics.com](http://www.netoptics.com)

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