nTAP™

10/100 and 10/100/1000 Full-duplex Copper TAP

10/100/1000 Full-duplex Copper to Optical Converter TAP

Installation Guide

January 2005

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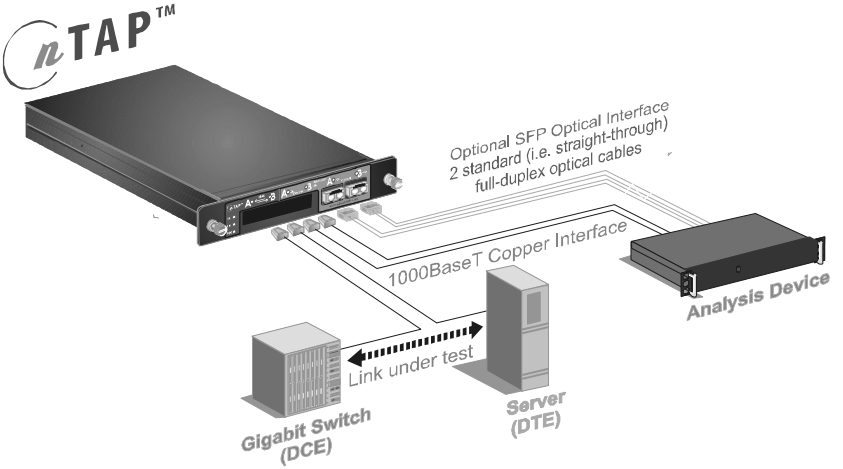
Contents

Introduction

Thank you for purchasing the *n*TAP, which supplies a convenient, secure mechanism for network analyzers and similar devices to collect data streams from high-capacity network links.

What is a Network TAP?

A network Test Access Point (TAP) provides access to the data streams passing through a high-speed, full-duplex network link (typically between a switch and DTE "device of interest"). The *n*TAP duplicates both halves of a 10/100 or 10/100/1000BaseT full-duplex copper link, sends the copied data streams to an analyzer, probe, or Intrusion Detection System (IDS) device equipped with a compatible dual-receive capture card:



Depending on the configuration purchased, the TAP transmits the analyzer signals through a pair of 10/100 or 10/100/1000BaseT RJ45 ports. If you purchased a configuration that includes SFP modules, the *n*TAP transmits the analyzer signal through 1000BaseSX, LX, or LZ media. If desired, you can supply your own SFP modules, allowing the *n*TAP to function with virtually any analysis device that includes a dual-receive interface.

Although analyzer access to the data stream is dependent on the external power supply, the link itself remains unaffected by the TAP if power is interrupted.

The security and convenience of TAPs makes them preferable to inline connections for network analysis and intrusion detection and prevention (IDS/IPS) applications. Because a TAP has no address on the network, it cannot be the target of a hack or virus attack. *n*TAPs (unlike analyzers or IDSs) are

economical to install, allowing you to leave them permanently deployed. This allows you to connect and disconnect the analysis device as needed without breaking the full-duplex signal.

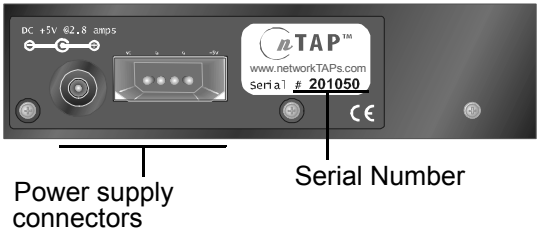
A TAP is also preferable to using a switch's SPAN or port mirror capability to capture the data stream. Unlike the port SPAN mechanism on a switch, a TAP does not drop packets or filter any errors from the data stream. Also, because a SPAN port itself is a standard full-duplex link (i.e., it has a transmit port and a receive port for two-way communication with a NIC, rather than being designed to interface with a dual-input capture card like a TAP), it has the capacity to transmit only one half of a fully-saturated link. An additional advantage is that a TAP does not use any of the switch's CPU resources.

Connectors, Ports and LED Indicators

Take a minute to become familiar with the *n*TAP's connectors, ports, and LED indicators. For a a description of LED startup and error codes, see "Interpreting the Link and Speed LED Indicators" on page 4.

Back Panel

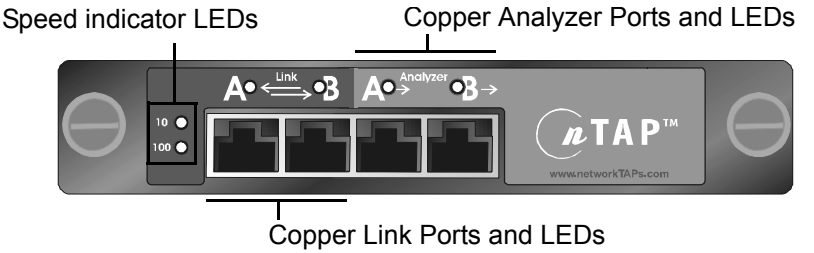
Both power connectors are located on the back panel, along with the model information and serial number.



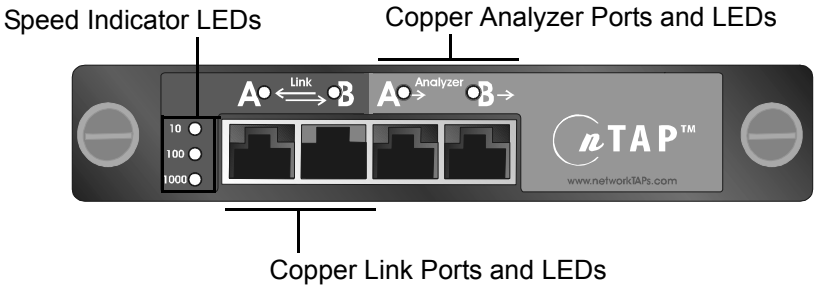
Front Panel

The front panel will differ slightly depending on which model of *n*TAP you have purchased.

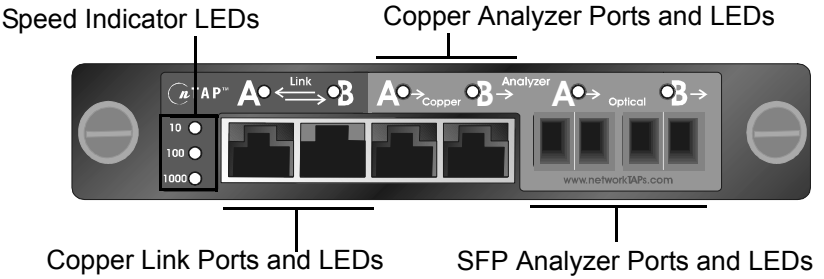
10/100



10/100/1000



10/100/1000 with SFP Conversion



Installing the TAP

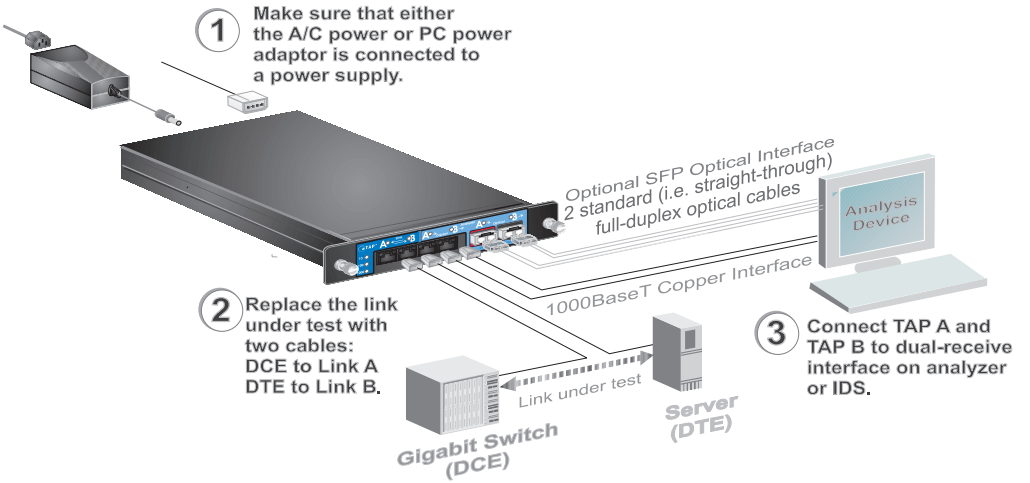
Depending on the application, do one of the following:

- Use the TAP Cable Kit to complete the connection between the device of interest and the network. See the diagram on page 4.
- Physically mount the TAP in your network's 19-inch rack system, if desired. Note that for single-channel TAPs, rack mounting is optional via a three-TAP 19-inch mount (sold separately).

Cabling the TAP

The diagram below shows the *n*TAP cabled to analyze the link between a server and a gigabit switch. This is just one application; the *n*TAP can replace the link between *any* DCE (Data Circuit-terminating Equipment) and DTE (Data Terminal Equipment) device or connection.

Which device is connected to Link A or Link B is unimportant, unless the link under test is part of a failover redundancy arrangement. In this case, connect the device that controls the failover to Link A. For a technical explanation of this, see page 5.



Note that the *optical* analyzer interface option requires the installation of SFP modules into the sockets provided on the TAP. These modules are sometimes referred to as “Mini-GBIC” modules because they provide the same functionality of a GBIC (Gigabit Interface Converter), but in a smaller form factor to deliver much higher port densities.You must use standard (i.e. straight through) full-duplex cables to connect the TAP SFP ports to the dual-receive ports on your capture card or analysis device. With SFP modules installed and connected to a live interface, the copper analyzer interface is disabled.

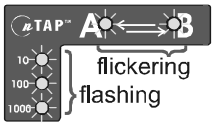
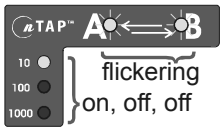
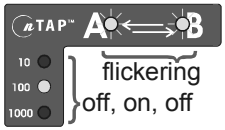
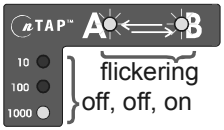
Interpreting the Link and Speed LED Indicators

When the *n*TAP is powered up and correctly connected to functioning devices, the Speed LED indicators simply show the connection speed. The Link LED indicators are either lit steadily (idle) or flicker (data transfer) depending on whether there is any traffic present.

Connection Sequence

When powered up, the *n*TAP performs a sequence of steps to determine whether its link ports are connected to any devices, and what speeds and other capabilities those devices have. The blinking pattern of the LEDs indicate which step of the connection process the TAP is performing.

The duration of each state depends on the type of equipment attached to each port of the *n*TAP. Here are the connection steps, listed in the order they occur:

Connection Step	LED Pattern
Capabilities Search - Both links are attempting to attach to devices and determine a common set of speed and other capabilities.	
Connecting - The links are attempting to re-connect to their partner at the common speed determined in state.	 or  or 
Connected - Both links are connected to the link partners at a common speed.	Speed LED indicators show connection speed. Link port LEDs light steadily (idle) or flicker depending on whether there is any traffic present. If a port LED is unlit, there is no device connected.

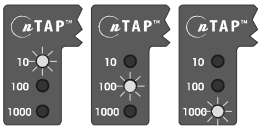
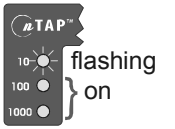
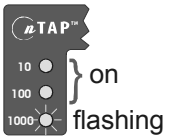
Note: When the device on Link B fails, the *n*TAP shuts down Link A so that the device on Link A can initiate its native failover redundancy procedure. The *n*TAP then restarts the Search phase. Until the Link B device is working again, the *n*TAP repeats the following steps:

1) Search;
2) Determine if Link A is up; if not, keep searching;
3) If Link B is up, re-establish connection; if still down, shut down Link A;
4) Go to step 1.

This maintains the transparency of the connection state itself (or lack thereof), to the device connected to Link A.

Errors

Error conditions are shown by the Speed LED indicators for approximately 10 seconds, after which the *n*TAP resets itself (goes back to the **Search** connection step).

Error Condition	LED Pattern
No Common Speed - There is no common speed capability between the devices attached to Link A and Link B.	Repeats the following sequence: 
Timed Out - The *n*TAP software has timed out waiting for some event.*	
Wrong Speed - One of the Links has connected at the wrong speed.*	The expected speed's LED is lit steadily, while the actual speed's LED flashes.
Logic Error - this error occurs when the link partner capabilities are ambiguous.*	

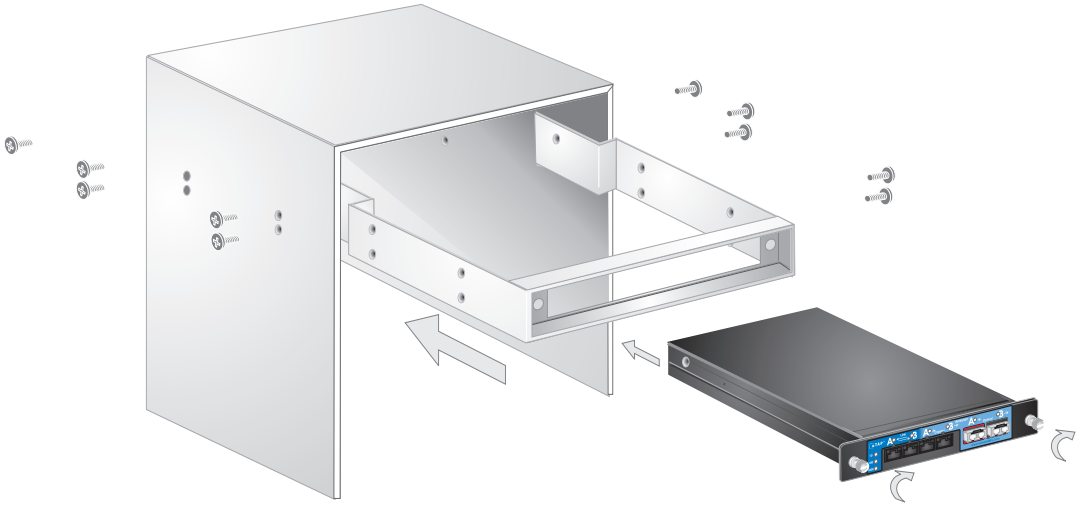
*****These errors will generally be the result of a cable being moved between different port types while the *n*TAP is initializing.

Installing the TAP in a Rack Mount Adapter

You can install up to three *n*TAPs into the optional rack mount hardware:.

Installing the TAP in a Drive Bay

To install the *n*TAP in a PC chassis drive bay, you must first mount the *n*TAP in the optional drive bay adapter (sold separately). Install the adapter and *n*TAP as you would install a hard disk drive, as shown in the illustration:



Connect power via the standard PC power supply socket provided on the back panel of the *n*TAP.

Technical Specifications

Dimensions

Power Requirements

Specification	Measurement/Value
Maximum Power Dissipation	14 Watts
Maximum Power Consumption	5V @ 2.8 amps
Voltage Tolerance	5V +/- 5%
Ripple	Maximum 100 mV
Operational Current	5V @ 2.8 amps

Supported Media

Interface	Media
Link A/Link B (Link under test)	Depending on model purchased, 10/100BaseT or 10/100/1000BaseT Copper
Copper Analyzer Interface	Depending on model purchased, 10/100BaseT Copper or 10/100/1000BaseT Copper
SFP Conversion Analyzer Interface	Depending on SFP module purchased: 1000BaseSX, 850-nm, MultiMode (MM), LC connector; 62.5 micrometer fiber 50.0 micrometer fiber 1000BaseLX, 1310-nm, Multi or Single Mode (MM/SM), LC connector; 8.3 micrometer fiber 62.5 micrometer fiber 50.0 micrometer fiber 1000BaseLZ, 1550-nm, Single Mode (SM), LC connector.

Environmental Requirements

Specification	Operational Range
Temperature range	32^{o} - 120^{o} F
Humidity	20-65% (non-condensating)

Regulatory Compliance

Specification	Certification
Emissions	FCC Part 15 Class B
CE Mark	EN61000-3-2, EN55024, EN55022A

FCC Compliance Statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notes