I/O Modules Overview

Use these instructions to set up the I/O modules supported in your TippingPoint security devices.

Before You Begin

- Review the release notes for your product for any late-breaking changes to the installation instructions.
- Read and follow all safety information listed in documentation that shipped with your product.
- Complete the installation of your TippingPoint security device.

ESD Requirements

Damage from Electromagnetic Static Discharge (ESD) can occur when electronic components are improperly handled. Improper handling can result in complete or intermittent system failures. Proper ESD protection is required whenever you handle equipment. The following general grounding guidelines apply:

- Always use an ESD wrist strap when adding or removing components from the chassis.
- Avoid touching the circuit boards or connectors on all cards and modules.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body. ESD voltages on clothing can still cause damage.

Place a removed component board-side-up on an antistatic surface or in a static-shielding container that is also grounded to the same point as the device. If you plan to return the component to the factory, immediately place it in a static-shielding container.

I/O Module Options

TippingPoint devices with module slots support both standard I/O modules and bypass I/O modules (refer to the following table) for fiber and copper components.

Important: Only optical transceiver modules (including SFP, SFP+, and QSFP+) available from TippingPoint have been validated to achieve optimal performance with TippingPoint products. Other vendor devices are not supported and could be detrimental to proper operation of the TippingPoint system.

Bypass I/O modules are zero-power high-availability (ZPHA) modules that permit network traffic and services while bypassing the device entirely when the device loses power.

Note: For TX Series devices, consider the following I/O module restrictions:

- Fiber modules do not support auto-negotiation.
- If you use a 1000-BaseT copper SFP in the 6-Segment GbE SFP module, auto-negotiation will be available at 1000 Mbps.
- 10 GbE SFP+ modules support both SFP and SFP+ transceivers. If you plug SFP transceivers into SFP+ ports, only 1 Gbps speed will be available. Both 1 Gbps and 10 Gbps speeds can be configured with a multispeed SFP+ transceiver.

All standard I/O modules and all bypass I/O modules are hot-swappable on devices running TippingPoint Operating System (TOS) v3.6.0 or higher (*except where indicated).

For more information on I/O modules, refer to the product hardware documentation for your device.

Standard I/O Modules

6-Segment Gig-T

Ports: 12 Fixed RJ-45 copper ports

Port speed: 10/100/1000 Mbps

Part number: TPNN0059/TPNN0196

6-Segment GbE SFP

Ports: 12 SFP ports

Port speed: 1 Gbps

Part number: TPNN0068

Bypass I/O Modules

4-Segment Gig-T Bypass Module

Ports: 8 copper ports

Port speed: 10/100/1000 Mbps

Part number: TPNN0070

2-Segment 1G Fiber SR/LR Bypass Module

Ports: 4 Multi-Mode (SR)/Single-Mode (LR) Fiber (LC type)

Port speed: 1 Gbps

Part number: TPNN0071/TPNN0072

4-Segment 10GbE SFP+

Ports: 8 Fiber SFP+ ports

Port speed: 10 Gbps

Part number: TPNN0060

2-Segment 10G Fiber SR/LR Bypass Module

Ports: 4 Multi-Mode (SR)/Single-Mode (LR) Fiber (LC type)

Port speed: 1/10 Gbps

Part number: TPNN0073/TPNN0074

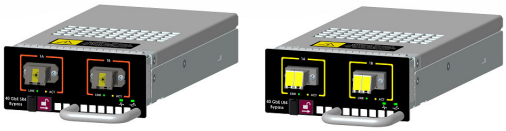
1-Segment 40 GbE QSFP+

Ports: 2 Fiber QSFP+ ports

Port speed: 40 Gbps

Part number: TPNN0069

1-Segment 40GbE Fiber SR4/LR4 Bypass Module*



Ports: 2 Multi-Mode (SR)/Single-Mode (LR) Fiber (LC type)

- 40 GbE-SR4 – 2 SR4 Multimode Ports (MPO Type)
- 40 GbE-LR4 – 2 LR4 Singlemode Ports (LC Type)

Port speed: 40 Gbps

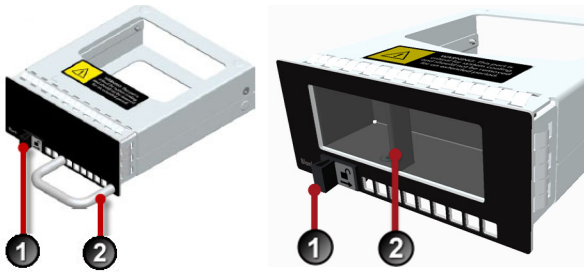
Part number: TPNM0131 (SR4)/TPNM0132 (LR4)

*Not supported on NX devices. For TX-Series devices, ensure that you upgrade to TOS v5.2.0 or later before inserting the 40 GbE bypass module.

Important: Handle all I/O modules with care. The bypass modules contain mechanical switches that are very delicate and can cause network disruption if handled improperly. For more information about deploying bypass modules, refer to the product hardware documentation for your TippingPoint security device.

Add I/O Modules

TippingPoint devices come with blank modules inserted into module slots.



To remove the blank module, slide the slide latch (**1**) to the right and pull on the handle (**2** on left module) or grab point (**2** on right module).

CAUTION: Never lift your device using the module handles.

To insert an I/O module, slide the module into the empty module slot. When the module is in the correct position, the slide latch automatically slides into position.

Warning: Do not leave slots empty for an extended period of time. Insertion of a blank module or I/O module ensures that the device is correctly cooled.

Module LEDs

The following table describes the module LEDs.

Feature	LED	Color	Description
Fixed RJ45 copper port	Link	Green	Link is active.
	Activity	Blinking amber	Data traffic passing.
Optical transceiver port	Link	Green	Link is active.
	Activity	Amber	Data traffic passing.
Module Health 	Status	Green	The module is configured, in service, and in good health.
		Blinking amber	The module has been inserted and powered up, but is not yet recognized by the software.
		Solid amber	The module is experiencing a fault.
Bypass 	Status	Off	Module in bypass.
		Green	Module in normal mode (not in bypass).

Hot-Swapping I/O Modules

On devices running TOS v3.6.0 or higher, I/O modules can be installed or removed while the device is in the normal operating state. *Hot-swapping I/O modules during system initialization is not supported.* There are several slot and port configuration factors to consider when hot-swapping I/O modules. For detailed guidelines and procedures, refer to the product hardware documentation for your TippingPoint security device.

Supported Transceivers and Cables for TippingPoint I/O Modules

I/O module & part number	Transceiver part number	Transceiver name
6-Segment GbE SFP (TPNN0068)	TPNN0054	TippingPoint X126 1G SFP RJ45 Transceivers (Copper)
	TPNN0055	TippingPoint S126 1G SFP LC SX 550m 850nm Transceiver
	TPNN0056	TippingPoint X126 1G SFP LC LX 10km 1310nm Transceiver
4-Segment 10GbE SFP+ (TPNN0060)	TPNN0057	TippingPoint S136 10G SFP+ LC SR Transceiver
	TPNN0058	TippingPoint S136 10G SFP+ LC LR Transceiver
1-Segment 40 GbE QSFP+ (TPNN0069)	TPNN0067	TippingPoint S146 40G QSFP+ SR4 850nm Transceiver
	TPNN0327	TippingPoint S146 40G QSFP+ LR4 1310nm Transceiver

I/O module part number	Cable part number	Cable name
TPNN0069*	TPNN0212	TippingPoint 40G QSFP+ Active Optical Cable (AOC)

*When this I/O module is used with this cable, transceivers TPNN0067/TPNN0327 are not needed. The cable has the transceiver attached.

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