

# NEOXPacketRaven 10/100/1000Base-T Copper TAPs

## QUICK USER GUIDE



Copper TAPs are active decoupling elements for the secure and reliable tapping of network data in copper-based networks. These TAPs are looped into the network line to be monitored and route out all data traffic while maintaining data integrity, without interruption and without packet loss.

Our copper TAPs have redundant power supplies, but also allow power supply via PoE or 12-48V DC, which guarantees a high level of fail-safety.

They do not have a MAC or IP address, but work on OSI Layer 1, and are therefore undetectable in the network without expensive measuring equipment. Hackers and other attackers therefore have no chance, and since the integrity of the outgoing data remains unaltered due to this tapping method, Network TAPs are increasingly used in the areas of network forensics, security and monitoring.

Using conventional SPAN ports, on the other hand, can falsify the result because this technique operates in store-and-forward mode and discards FCS/CRC errors at the OSI Layer 2 level instead of outputting them on the mirror port. In contrast, TAPs pass out these critical CRC errors without affecting the original data.

Furthermore, a copper Network TAP works like a Data Diode and does not allow access to the network via the monitoring ports for security reasons. Therefore, professional network analysis can only be guaranteed by using TAPs.

These models in the PacketRaven Network TAPs product family were designed as portable TAPs, but can also be installed in a 19" mounting frame in data centers using a mounting kit or on a DIN rail using a DIN rail clip.

Our portable copper TAPs support network speeds of 10Mbps, 100Mbps and 1Gbps (10Base-T, 100Base-Tx and 1000Base-T).

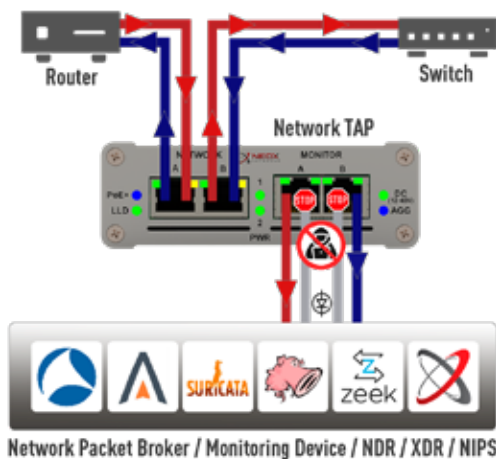
- Full Network Transparency
- No Impairment of Data Traffic
- 100% Network Data
- Invisible for Attackers
- No Network Access via Monitoring Port
- Flexible to Use
- Plug-n-Play
- Failure Protection on Power Loss
- PoE+ Power over Ethernet
- Redundant Power Supply
- Fast and Precise
- Support Jumbo Frames
- Made in Germany

## 1. More Highlights

- Plug-n-Play, no complex configuration necessary
- Data diode function, does not allow access to the network via the monitoring ports
- Our portable Network TAPs support MDI/MDIX auto-determination.
- This means you can use both straight-through/patch cables and crossover cables.
- Support for up to 16k Jumbo Frames
- Support for PoE/PoE+ IEEE802.3af passthrough and power supply via PoE IEEE802.3af
- Mirrors 100% of the data traffic including FCS/CRC erroneous packets that may be discarded by SPANs
- Can be powered by redundant AC/DC power supplies (5V)
- Various mounting options available
- Designed, assembled, certified and tested in Germany

## 2. Data Diode Function

Data diodes guarantee unidirectional communication and ensure that data traffic can only flow in one direction.



Unidirectional network devices are typically used to provide information security or protection of critical digital systems, such as industrial control systems or production networks from cyber-attacks.

Our TAPs work like a diode and, for security reasons, do not allow access to the network via the monitoring ports.

By adding this further security layer, it is thus not possible to compromise the network connection and the productive network.

## 3. PoE - Power over Ethernet Functions

The TAP supports both passive PoE and active PoE for passing through the power supply to a PoE-capable device:

- PoE/PoE+ pass-through according to IEEE802.af - the maximum power consumption that an end device can draw via the TAP is 12.95W
- Power supply of the TAP via PoE according to IEEE802.af (active/passive)



### 3.1 TAP Power Supply via PoE

To connect the TAP to a PoE port according to IEEE802.af, please follow the installation steps below:

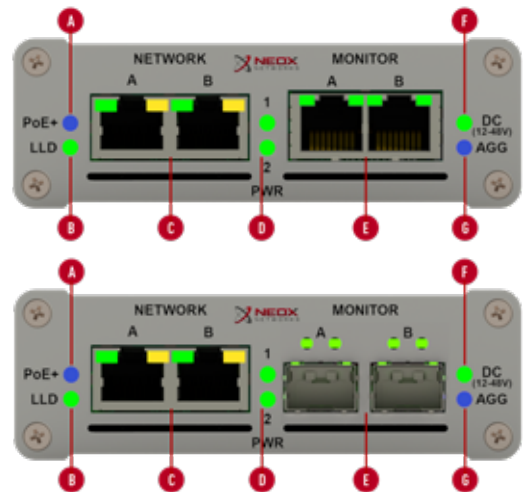
- First connect the TAP to the PSE (Power Sourcing Equipment) device and make sure that the PoE+ LED lights up.
- As soon as this lights up, the PSE and the TAP have negotiated the power supply and you can now connect your PoE end device to the TAP.

This sequence must be followed so that the TAP can properly establish power supply via a PSE device per IEEE802.af.

All other power supply inputs on the TAP can still be used; the PoE power supply increases the redundancy in this case.

### 4. Front View - Ports and LEDs

- (A)** Power over Ethernet (PoE+) LED  
If PoE voltage is fed in via the connected network device, this LED lights up.
- (B)** Link Loss Detection (LLD) LED *(see section 4.1):*  
LLD detects a non-existent link on one of its network ports and then shuts down the other network port.  
This state is indicated by the LLD LED lighting up.
- (C)** RJ45 Network port and status LEDs *(see section 4.1)*
- (D)** 2 power LEDs for AC/DC 5V *(see section 5.)*  
It is possible to connect up to 2 power supply units to ensure power supply redundancy.
- (E)** RJ45 or SFP Monitoring port and status LEDs *(see section 4.1)*
- (F)** DC power LED for 12-48V DC *(see section 5.)*  
If power is supplied via the 12-48V DC connection or via PoE, this LED lights up.
- (G)** Aggregation mode LED *(see section 6.2)*  
If the Aggregation mode is activated instead of the standard Breakout mode, this LED lights up.



### 4.1 Front View - Meaning of the LEDs

Depending on the configuration of the TAP speed *(see section 6.3)*, the LEDs light up in different combinations.

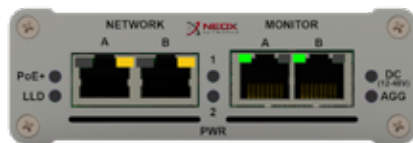
For the copper TAP with RJ45 monitoring port, it must be ensured that all devices connected to the NETWORK port have the same network speed set when configuring the TAP speed.

As soon as the TAP displays the desired or configured link speed via the LEDs, proper operation of the TAP is ensured.

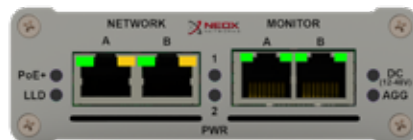
On the copper TAP with SFP monitoring port, however, the network speed on the monitoring port is always 1000M or 1G.

#### RJ45/RJ45 TAP - Breakout/Regeneration mode:

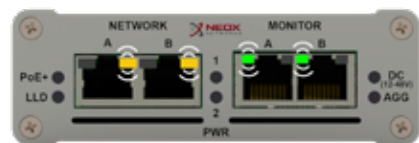
**10Base-T**



**100Base-TX**



**1000Base-T**



**During commissioning:**

The respective LEDs highlighted in the graphic light up permanently.

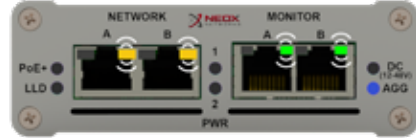
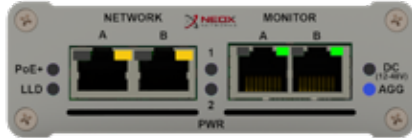
**In operation:**

The previously permanently lit LEDs flash when network traffic is present.

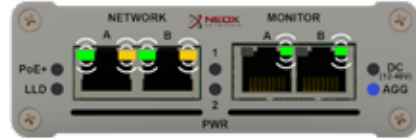
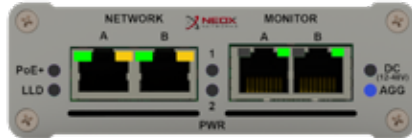
**RJ45/RJ45 TAP - Aggregation mode:**

**Monitoring port speed is determined via Autoneg!**

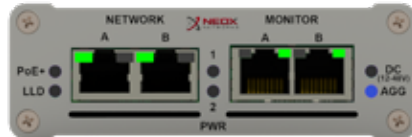
**10Base-T**



**100Base-TX**



**1000Base-T**



**During commissioning:**  
The LEDs highlighted in the respective graphic light up permanently

**In operation:**  
The previously permanently lit LEDs flash when network traffic is present.

**RJ45/SFP TAP - Breakout/Aggregation /Regeneration mode:**

**SFP Monitoring port always in 1G mode!**

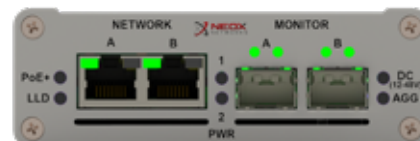
**10Base-T**



**100Base-TX**



**1000Base-T**



**During commissioning:**  
The LEDs highlighted in the respective graphic light up permanently

**In operation - without network traffic:**  
Link present on all ports; left SFP port LED lights up permanently in each case

**In operation - with network traffic:**  
Link and traffic present on all ports; left SFP port LED lights up continuously and right SFP port LED flashes in each case

## 5. Back View

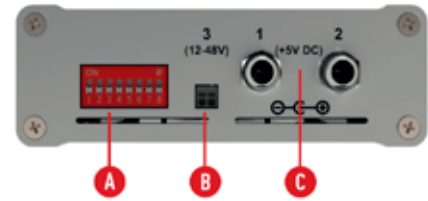
**(A)** DIP switch for LLD on/off, TAP mode and speed  
(see section 6.)

**(B)** Connection for 12-48V DC voltage.

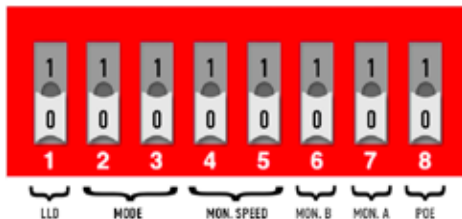
The polarity at the DC connection does not matter, as the TAP automatically detects the live line and passes the power supply to the TAP accordingly in the required form!

**(C)** Redundant connections for AC/DC power supplies (5V)

For reasons of compatibility and EMC protection, our TAPS may only be operated with the supplied power supplies certified together with the TAP. If the TAP is nevertheless operated with power supplies other than those supplied, any warranty claim granted for the TAP will be voided!



## 6. Configuration via DIP switch



As shown in the illustration on the left, the first switch is used as the LLD on/off switch, the second and third are used to select the operating mode, the fourth and fifth are used to select the speed, the sixth and seventh for activating/deactivating the monitoring ports and the eighth for activating/deactivating PoE passthrough.

The desired configuration should be set before plugging in the mains cable.

If an invalid configuration has been selected, all LEDs on the unit light up and the relay switches will not be activated. In this case, switch off the unit and check the DIP switches.

When changing the configuration via DIP switches, it is always necessary to perform a restart by disconnecting the power supply so that the new settings are activated!

In Breakout and Regeneration mode, the speed of the monitoring ports must match the speed of the network ports. In aggregation mode, the monitoring ports are set to Autoneg.

Make sure that the monitoring ports have the same autoneg speed. Otherwise, please deactivate the second monitoring port using switch 6.

Aggregation in which the speed of the monitoring ports is lower than the speed of the network ports cannot be realised.

### 6.1 Link Loss Detection (LLD)

Link Loss Detection is a function that checks whether the link has failed on either network port A or network port B. If the link has failed on network port A when LLD is activated, the TAP also shuts down the link on network port B, and vice versa. When the LLD function is selected (**switch 1**), the configuration is as follows:

• Activate LLD: Switch value **1**






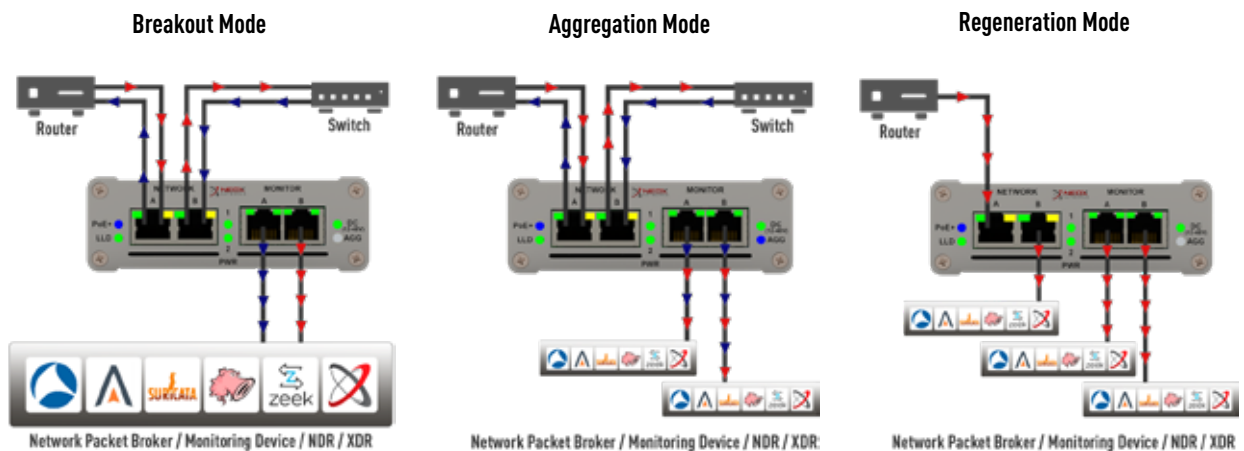
• Deactivate LLD: Switch value **0**



## 6.2 Operating Mode Configuration (may not be modifiable in the case of fixed pre-configured models!)

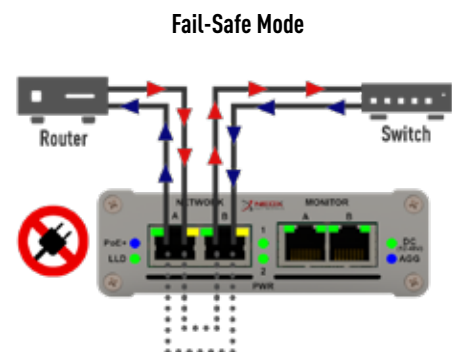
When selecting the operating mode (**switches 2 & 3**), the configuration is as follows:

- Breakout:** Each Ethernet packet transmitted via the network line is mirrored separately in this mode while maintaining data integrity in the TAP. The send and receive directions are output separately on the two monitoring ports so that the network traffic can be analysed per data direction in this case. Another great advantage of the Breakout mode is the visibility of the network traffic even with a fully loaded network connection. In this mode, the set network speed is transferred to the monitoring ports. For example, if the TAP is configured for 100Base-T, then both monitoring ports will also communicate on 100Base-T accordingly. **Switch value 00**

- Aggregation:** In this mode, the data streams are bundled and output aggregated on both of the monitoring ports. This allows you to evaluate the network data of a full duplex line simultaneously with a single network interface on your analyzer. Due to the aggregation in hardware (FPGA), faulty packet sequences during recording are a thing of the past in this mode. For example, you can analyse the entire data traffic aggregated in 100Base-Tx lines without loss. The monitoring port speed is always negotiated via Autoneg. **Switch value 01**

- Regeneration:** Regeneration is used to capture 100% full duplex traffic that can be sent to multiple monitoring devices (up to 3 in this case) for analysis of your network. In this mode, the network speed settings are synchronised as in Breakout mode and the setting on the DIP switch is applied to all ports. **Switch value 10**







**Fail-Safe Mode:** Since Network TAPs are usually installed in critical network lines, it must be ensured that TAPs do not affect the line in any way.

By means of fail-safe, the TAP behaves like a cable bridge in the event of a failure or arbitrary deactivation and ensures that the active network connection is not interrupted or at least continues to function without the TAP function and thus does not negatively affect the active line.




## 6.3 Speed Configuration

The following constellation results for the speed selection (**switches 4 & 5**):


- |                                     |                    |   |                       |  |                     |   |
|-------------------------------------|--------------------|---|-----------------------|--|---------------------|---|
| <b>Regeneration &amp; Breakout:</b> | 10Base-T (10Mbit): |  | 100Base-TX (100Mbit): |  | 1000Base-T (1Gbit): |  |
|                                     | Switch value 00    |   | Switch value 01       |  | Switch value 10     |   |

**Aggregation:**


NET 10Base-T (10Mbit)  
MON Autoneg:  
Switch value **00**



NET 100Base-TX (100Mbit)  
MON Autoneg:  
Switch value **01**



NET 1000Base-T (1Gbit)  
MON 1000Base-T:  
Switch value **10**



**6.4 Configuration of the Monitoring ports**

If the MON-B switch (**switch 6**) is in the upper position, we deactivate monitoring port B in aggregation and regeneration mode.

If the MON-A switch (**switch 7**) is in the upper position, we deactivate monitoring port A in regeneration mode.

- Disable MON-B:  Switch value **1**
- Activate MON-B:  Switch value **0**
- Disable MON-A:  Switch value **1**
- Activate MON-A:  Switch value **0**

**6.5 Power over Ethernet (PoE)**

The device can only be supplied with power via Network port B if PoE (passive or active) is connected. Network port A cannot be used to power the device!

If the PoE switch (**switch 8**) is in the lower position, we activate PoE passthrough. In this case, we forward the voltage from network port B to network port A.

Network port A can then serve as a new PoE source and we can supply a new PoE device via Network port A.

- Disable PoE-Passthrough:  Switch value **1**
- Enable PoE-Passthrough:  Switch value **0**

**7. Technical Specifications**

TAP		Power Supply**	
Dimensions:	10.6 cm x 3.5 cm x 16.4 cm	Input voltage:	110V-240V AC 50-60Hz
Weight:	460g	Output voltage:	5V DC
Consumption:	max. 3 Watt at 5V/0.6A	Output current:	2A
Storage temperature:	-40° to 70°C	Power:	max. 10 Watt
Operating temperature:	0° to 55°C	Power plug:	with interchangeable plug head
Relative humidity in operation:	20% to 80%, non-condensing	5V Cable	with ferrite ring
Certifications:	CE, FCC, RoHS, WEEE, EN 55032 KL. A/B, EN 55035, EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 50121-4:2016*, EN 50129*, EN 50129*, IEC 62443-4-2:2019*	5V Connector	- Screwable hollow plug - 5.5 mm outer diameter - 2.1 mm inner diameter

\* Hardened TAPs

\*\* Optional power supply units available for connection via C13-C14 cable (s. accessories)

**8. Mounting Options**

 TAPs with rack mount frame bracket or DIN rail clip can of course also be used in mobile applications!

**1. Mobile Use**

These standard models are designed for mobile use (without additional accessories), but can also be installed in a server rack using an additional server rack mounting frame (PRP-1U3-V2) and rackmount frame mounting kit (PRP-1U3-CLIP), or mounted on a DIN top-hat rail using a DIN top-hat rail clip (PRP-DIN-CLIP).



## 2. Server Rack Mounting

To install our portable TAPs in a server rack, you need our server rack mounting frame with item number **PRP-1U3-V2**, as well as a rackmount frame mounting kit (item number **PRP-1U3-CLIP**) for the TAP.

The server rack mounting frame PRP-1U3-V2 provides space for up to 3 portable PacketRaven Network TAPs.

Both components are available as accessories.



Server rack mounting frame PRP-1U3-V2 for up to 3 PacketRaven portable Network TAPs



TAP with rack mounting kit for server rack mounting frame PRP-1U3-V2

## 3. DIN Rail Mounting

As a further alternative, we also offer a top-hat rail clip for our TAPs for mounting on a TS35/7.5 DIN top-hat rail. This clip can be rotated by 180° so that the connections of the TAP can be aligned according to the respective requirements. This DIN rail clip, available as an accessory, has the item number **PRP-DIN-CLIP**.



TS35/7.5 DIN rail



Network TAP with DIN rail clip

## 9. Advanced functions of the Hardened TAPs



Preconfigured

Our Network TAPs with RJ45 monitoring output work like a data diode and thus physically isolate the monitoring ports from the network ports. This ensures that, for security reasons, access to the network via the monitoring ports is prevented on the hardware side.



Secure Boot

PacketRaven Network TAPs are therefore already in the standard version among the network components through which an attack vector is excluded.



Security Seal

For high-security areas according to IEC 62443 and critical infrastructures (CRITIS), however, even this is sometimes not sufficient, which is why NEOX Networks now also offers a specially hardened version of its TAPs.



Safety Screws

If desired, these TAPs can be delivered pre-configured and then do not allow any subsequent configuration changes.

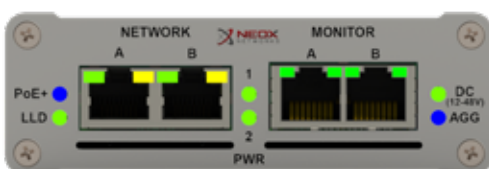
In addition, they are secured against unwanted or unnoticed opening by special screws and security seals.

And to round it all off, these TAPs also have a specially secured and encrypted firmware. Secureboot checks each time the TAP is started whether the firmware to be executed has a valid signature and an authorised public key. If this is not the case, the TAP cannot be put into operation.



To use the Network TAP in full compliance with IEC 62443, it must be operated in an IEC 62443-compliant environment.

## TAP MODELS



PRP-SCC-16x



PRP-SCS-16Ax





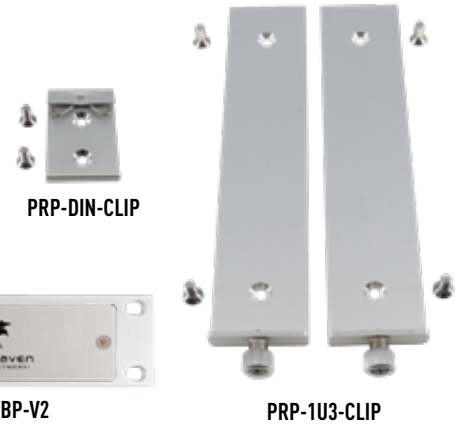
ITEM NO.	STANDARDS	NETWORK	INTERFACE NET. / MON.		OPERATING MODES
PRP-SCC-1GA*	10/100/1000Base-T	10M/100M/1G	RJ45	RJ45	Aggregation, Breakout, Regen.
PRP-SCC-1GAO*	10/100/1000Base-T	10M/100M/1G	RJ45	RJ45	Aggregation
PRP-SCC-1GBO*	10/100/1000Base-T	10M/100M/1G	RJ45	RJ45	Breakout
PRP-SCS-1GA*	10/100/1000Base-T	10M/100M/1G	RJ45	SFP	Aggregation, Breakout, Regen.

If you need a TAP with DIN rail mounting clip, please additionally order the mounting clip **PRP-DIN-CLIP**! If you need a TAP with rackmount frame front panel, please order the **PRP-1U3-CLIP** front panel additionally! (see *„Mounting Options“*)!

\* „-S“ for an IEC62443 Hardened TAP (see 9.)

## ACCESSORIES

INSTALLATION & MOUNTING	
ITEM NO.	DESCRIPTION
PRP-1U3-V2	Server rack mounting frame for 3 portable TAPs
PRP-1U3-BP-V2	Blank plate for mounting frame PRP-1U3-V2
PRP-1U3-CLIP	TAP rackmount frame bracket for server rack mounting frame PRP-1U3-V2
PRP-DIN-CLIP	TAP DIN rail mounting clip



POWER SUPPLIES & ACCESSORIES	
ITEM NO.	DESCRIPTION
PRP-PS-INT	PSU with EU, UK, and US plug head
PRP-PS-*A	Plug head *EU, *UK or *US
PRP-PS-EU	Power supply unit with EU plug (head)
PRP-PS-UK	Power supply unit with UK plug (head)
PRP-PS-US	Power supply unit with US plug (head)
PRP-PS-C14-25W	Power supply unit with C14 socket - connected to PSU via C13-C14 cable



ITEM NO.	SFP TRANSCEIVER
NX-SFP-TX-1G	10/100/1000Base-T SFP transceiver, supports connection lengths of up to 100 m
NX-SFP-FX-100M	100Base-FX SFP transceiver, Multimode, 1310nm, supports connection lengths of up to 2 km
NX-SFP-SX-1G	1000Base-SX SFP transceiver, Multimode, 850nm, supports connection lengths of up to 550 m
NX-SFP-LX10-1G	1000Base-LX SFP transceiver, Singlemode, 1310nm, supports connection lengths of up to 10 km
NX-SFP-LX20-1G	1000Base-LX SFP transceiver, Singlemode, 1310nm, supports connection lengths of up to 20 km
NX-SFP-LX40-1G	1000Base-LX SFP transceiver, Singlemode, 1310nm, supports connection lengths of up to 40 km
NX-SFP-ZX80-1G	1000Base-ZX SFP transceiver, Singlemode, 1550nm, supports connection lengths of up to 80 km
NX-SFP-ZX120-1G	1000Base-ZX SFP transceiver, Singlemode, 1550nm, supports connection lengths of up to 120 km
NX-SFP-ZX160-1G	1000Base-ZX SFP transceiver, Singlemode, 1550nm, supports connection lengths of up to 160 km





PACKETRAVEN

Modular, portable and virtual  
**NETWORK TAPS** for up to 400G



PACKETHAWK

Inline **BYPASS TAP** for up to 100G



PACKETROO

**DATA DIODE** for Secure File Transfer



PACKETFALCON

Portable & Compact **PACKET CAPTURE** Solutions



PACKETGRIZZLY

Modular & Scalable **NETWORK FORENSICS** Solution



PACKETLION

High-End HD **NETWORK PACKET BROKER** for up to 400G



PACKETTIGER

Cost Efficient Next-Gen **NETWORK PACKET BROKER**  
as Appliance or Virtual



Centralised  
**NETWORK MANAGEMENT SYSTEM**



PACKETWOLF

Advanced **PACKET PROCESSING** for up to 400G

