NVT PHYBRIDGE
CLEER24-10G
DATASHEET

Layer 3 Enterprise Grade Switch with Fast Ethernet and PoE++ over Coax up to 6,000ft (1,830m) Reach.

CLEER24-10G Managed Switch

The NVT Phybridge CLEER24-10G Layer 3 Enterprise Grade switch is designed to make IP/IoT deployments simple, secure, and cost-effective. **The CLEER24-10G switch delivers up to 50 Watts of power (PoE++) and 10/100 Mbps symmetrical, full-duplex, over coax cabling with up to 6,000ft (1,830m) reach.***

The CLEER24-10G switch enables Modern LAN principles and comes standard with 2 x SFP+ 10Gb/s uplink ports, dedicated management and console ports, 24 x 10/100 downlink ports, a 1,000 Watt hot-swappable power supply, power sharing, and power redundancy. The CLEER24-10G switch also comes with a new and intuitive GUI interface, ideal for any cloud or premise-based managed service offering. The new and improved CLI (Command Line Interface) is very similar to the Cisco offering for ease of use.

Benefits Include:

- Accelerate your return on investment by reducing infrastructure costs.
- Simplify your IP modernization, collapsing planning and deployment time.
- Eliminate infrastructure barriers, risks, disruption, and costs.
- Create a robust, secure IP platform that is easy to deploy and manage.
- Be environmentally responsible during your IP upgrades.

Speed, Reach and Power

CLEER24-10G switch delivers Fast Ethernet speeds and PoE++ (50W) over Coax with 6,000ft (1830m) reach. It is designed to support the most demanding IP endpoints with plenty of bandwidth to spare. The CLEER24-10G switch provides robust network performance at any distance.

Industry Leading PowerWISE® Technology

The NVT Phybridge CLEER24-10G switch is built with PowerWISE Technology, providing power sharing for redundancy, hot-swappable power supply, and auto-sensing 100-240 VAC delivering 1,000 Watts of power. The CLEER24-10G switch is one of the most energy efficient switches on the market, consuming 38 Watts of power to operate.

**See Technical Specifications for more details*

AT A GLANCE

(NV-CLR-024-10G)

Connectivity
- 24-port managed long reach PoE++ Layer 3 switch
- 10/100 symmetrical (full-duplex) and PoE++ (50W) over Coax with 6,000ft (1830m) reach
- 2 x SFP+ 10Gb/s uplink ports, modules not included
- Dedicated management and console RJ45 ports

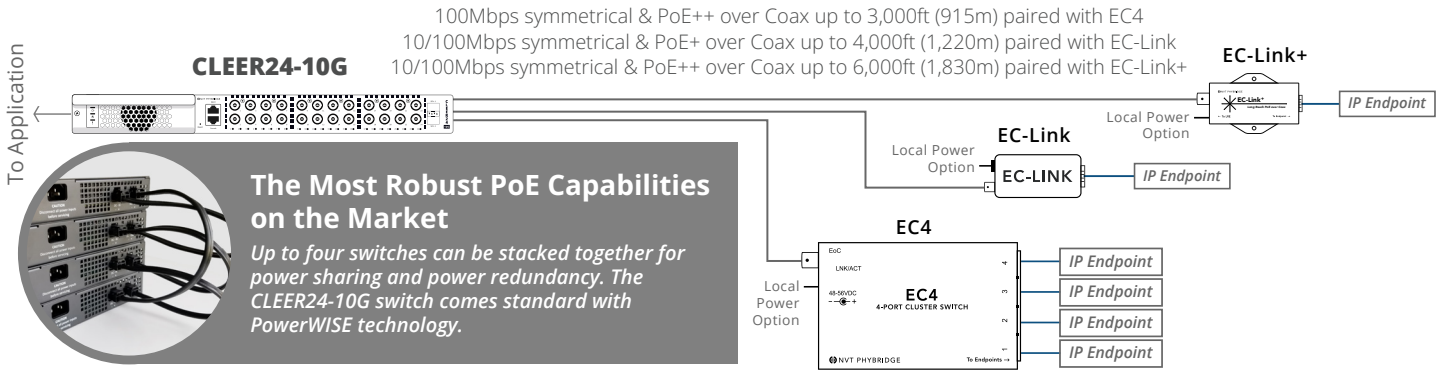
Power
- 1,000W (100VAC / 240VAC) auto-sensing power supply
- Hot-swappable power supply
- Power redundancy available
- Power management by port
- User configurable PoE voltage

Security
- 802.1x port-based authentication, with supported EC adapter only*
- MAC security - static MAC locking per port
- Authentication, Authorization, and Accounting (AAA) with TACACS+ or RADIUS
- Remote monitoring
- SSH/SSL
- Multi-level user privilege controls
- Multi-layer access control lists

Management
- In-band and out-of-band management available
- Intuitive, simple management GUI
- Industry adopted Command Line Interface
- SNMP v1,v2c,v3
- Multi-switch management
- Serial console-based management

Other
- EN 50121-4 standard for railway/subway environments
- Enables long reach deployments of IP cameras, IP phones, wireless access points, IPTV terminals, and any other IEEE-compliant IoT devices

CHARIOT by NVT Phybridge



The Most Robust PoE Capabilities on the Market

Up to four switches can be stacked together for power sharing and power redundancy. The CLEER24-10G switch comes standard with PowerWISE technology.

CLEER24-10G Technical Specifications

Model	CLEER24-10G
Part Number	NV-CLR-024-10G
Dimensions	19 inches x 1U without rack ears: • 11.22" x 17.13" x 1.73" (LxWxH) • 28.49 cm x 43.51cm x 4.39 cm (LxWxH)
Weight	8 lb. (3.63 kg)
Mounting	Standalone, rack or shelf-mountable; 2 brackets included for installation
Processor	MIPS32 24KEc, 500MHz
Interface: Ethernet Uplink	Maximum 2 uplinks, each 10Gb/s (full-duplex): 2 SFP+ ports: 1000 Base-T/TX/SX/LX/EX/ZX, 10GBase-T/CU/SR/LR/ER/ZR (determined by SFP or SFP+ transceiver module installed), Ethernet IEEE 802.3z, fiber optic cable/UTP *Note: The management port can be configured to be used as an uplink port, please see the admin guide for additional details.*
Interface: Downlink (PoE and IP to Adapter)	24 x BNC Jacks Speed: 10/100Mb/s (full-duplex) PoE Power: 50 Watts Maximum per port **Maximum Distance:** **Cable** / **Data Rate** / **Reach** RG59 Coax cable / 100Mb/s / 1,500ft (457m) RG59 Coax cable / 10Mb/s / 4,000ft (1,220m) RG6 Coax cable / 100Mb/s / 2,000ft (610m) RG6 Coax cable / 10Mb/s / 6,000ft (1,830m) RG11 Coax cable / 100Mb/s / 3,000ft (915m) RG11 Coax cable / 10Mb/s / 6,000ft (1,830m) 24 x Status LEDs: Configuration options: Link Activity / Link / Off
Management	1 LAN port (MGMT): RJ45, 10/100/1000 Base-T auto-sensing, IEEE 802.3 1 RS-232 console port: RJ45 to DB9 cable; Baud rate 115200/8/N/1 *Note: The management port can be configured to be used as an uplink port, please see the admin guide for additional details.*
Power Supply*	Hot-Swappable Power Supply Unit Auto-sensing 100-240VAC, 50/60 Hz
Power Output	1000W max at 100VAC 1000W max at 240VAC
Power Consumption	Idle power draw: 38W
Power Injection (PoE)	DC voltage: 48VDC to 58VDC
PowerWISE® Power Sharing	2 male connectors (rear) DC IN and DC OUT: 48VDC to 58VDC
Operating Temperature	1000W Load: 14°F to 122°F (-10°C to +50°C) 500W Load: 14°F to 140°F (-10°C to +60°C)
Humidity	10% to 95% (non-condensing) at 95°F (35°C)
Ambient Temperature	Minimum ambient temperature for cold start-up is 32°F (0°C)
MTBF	20 years

** No DC power unless supplied by NVT Phybridge power supply units*

CLEER24-10G Extended Technical Specifications

Operating System	Linux
Layer 2 Features	• High performance Store and Forward architecture, runt/CRC filtering that eliminates erroneous packets to optimize the network bandwidth • VLANs - IEEE 802.1Q tagged VLAN - Maximum 4095 VLANs per switch - MAC-Based VLANs - Voice VLANs - VLAN Translation - Private VLAN and Port Isolation - DDMI - Multicast VLAN • Spanning Tree Protocol - STP (Spanning Tree Protocol) - RSTP (Rapid Spanning Tree Protocol) - MSTP (Multiple Spanning Tree Protocol) • Loop Protection • UDLD (Unidirectional Link Detection) • Link Aggregation - Ether-channel (static trunk) - LACP (Link Aggregation Control Protocol) • Jumbo Frames: Max 4K • Automatic Media-Dependent Interface Crossover (MDIX) • IPv4/IPv6 Transport • MLD Snooping • Layer 2 Access Control Lists • ARP Inspection • sFlow • MVRP/GVRP • Quality of Service (QoS)
Switch Bandwidth	44Gbps
Packet Forwarding Rate	32.6Mpps
Priority Queueing	DRR
Number of Priority Queues	8
MAC Address Table Size	32,000
Number of VLANs	4K
Number of Multicast Entries	1K
Layer 3 Features	• Layer 3 Routing, Inter-VLAN routing • Layer 3 Access Control Lists • DHCP Server Functionality • IP-Based VLANs • IPv4/IPv6 Source Guard • Quality of Service (QoS)
Max Static Routes	128 (Shared between IPv4 and IPv6)
Max SVI Routes	4,000 (Shared between IPv4 and IPv6)
Layer 4 Features	Protocol-Based VLANs
Multicast	Supports IGMP snooping v1, v2, and v3
Security	• Authentication, Authorization, and Accounting (AAA) - Built-in RADIUS client to co-operate with the RADIUS servers - RADIUS / TACACS+ login user access authentication • Remote Monitoring (RMON) • MAC Security • SSH / SSL • 802.1x port-based authentication
Management	• Management interface - Web GUI switch management (HTTPS is supported) - Command line interface (CLI) - Serial console port - SNMP v1, v2c, v3 - SSH support • Multi-Switch management software is available • User privilege levels control • System maintenance - Firmware upload via CLI or GUI - Configuration upload/download via CLI or GUI - Hardware reset button for system reboot or reset to factory default • Network Time Protocol (NTP) • Link Layer Discovery Protocol (LLDP) • Link Layer Discovery Protocol Media Endpoint Discovery (LLDP-MED) • SNMP trap for interface linkup and linkdown notification • Event message logging to remote Syslog server

CLEER24-10G Compliance & Agency Approval

EMC	Emissions: FCC Part 15, ICES-003, EN 55032:2015, EN 50121-4:2016 Class A Immunity: EN 55035:2017, EN 50121-4:2016
Safety	UL 60950-1 2nd Ed 2014-10-14, CAN/CSA C22.2 No. 60950-1-07 2nd Ed 2014-10 IEC 62368-1:2014, EN 62368-1:2014, AS/NZS 62368.1:2018
Environment	RoHS Directives 2011/65 and 2015/863

Power & Distance Table

The below is the available data rates and PoE budget (Watts) for IP endpoints at the stated distances based on different cable types.

CLEER24-10G used with EC-Link+												
	300ft (92m)	600ft (183m)	900ft (275m)	1,200ft (365m)	1,500ft (457m)	2,000ft (610m)	2,500ft (762m)	3,000ft (915m)	3,500ft (1,067m)	4,000ft (1,219m)	5,000ft (1,524m)	6,000ft (1,830m)
RG11 14AWG	52	48	45	41	38	32	26	21	18	16	13	10
RG6 18AWG	45	35	25	19	15	11	9	6	6	5	4	3
RG59 20AWG	40	25	16	12	9	7	5	4	3	3		
CLEER24-10G used with EC-Link												
RG11 14AWG	32	30.54	29.24	28	27	25	22	20	18	16		
RG6 18AWG	29	25.79	22	19	15	11	6	7	6	5		
RG59 20AWG	27	22	16	12	9	7	5	4	3	3		
CLEER24-10G used with EC4												
RG11 14AWG	52	48	45	41	38	32	26	21				
RG6 18AWG	45	35	25	19	15	11						
RG59 20AWG	40	25	16	12	9							

100Mbps **10Mbps**

Power & Distance is based on the following cable specs:

Cable Spec	Core Type	AWG	Diameter	Wire Resistance (m)	Wire Resistance (ft)
RG-11	Solid Copper	14 AWG	1.63 mm	1.21 Ω/100m	0.37 Ω/100ft
RG-6	Solid Copper	18 AWG	1.01 mm	3.60 Ω/100m	1.10 Ω/100ft
RG-59U	Solid Copper	22 AWG	0.64 mm	7.87 Ω/100m	2.40 Ω/100ft

SFP Transceivers: *Accessory Product Details*

NVT Phybridge offers the below industry standard SFP+ modules for use with the CLEER24-10G. These modules have been produced and tested for 100% compatibility by NVT Phybridge. They are the recommended modules NVT Phybridge suggests be used with our managed switches. Please see www.nvtphybridge.com for full technical specifications. ***Please note to use the CLEER24-10G you must have a compatible SFP+ module (not included), this allows for uplink connection to your network.***

NV-GLC-SX-MMD
- Speed: 1.25 Gb/s
- Wavelength: 850nm VCSEL
- Distance: up to 550m on 50/125µm MMF
- Operating temperature: 0°C to 70°C (32°F to 158°F)

NV-GLC-LH-SMD
- Speed: 1.25 Gb/s
- Wavelength: 1310nm FP
- Distance: up to 20km on 9/125µm SMF
- Operating temperature: 0°C to 70°C (32°F to 158°F)

NV-GLC-EX-SMD
- Speed: 1.25 Gb/s
- Wavelength: 1310nm DFB
- Distance: up to 40km on 9/125µm SMF
- Operating temperature: 0°C to 70°C (32°F to 158°F)

NV-SFP-RJ45
- Speed: 1.25 Gb/s
- Rate category: 10/100/1000 Base
- Distance: up to 100m
- Operating temperature: 0°C to 70°C (32°F to 158°F)

NV-SFP-10G-SR-LC
- Speed: 10 Gb/s
- Wavelength: 850nm DFB
- Distance: up to 300m on 50/125µm MMF
- Operating temperature: 0°C to 70°C (32°F to 158°F)

NOTE: This module is SFP+ and is only compatible with the 10G line of switches

Note: The management port can be configured to be used as an uplink port, please see the Administration Guide for additional details.

CLEER FAMILY ADAPTER OPTIONS

EC Adapter Options

There are three media converter options available to pair with the CLEER family of switches to extend PoE over Coax. The EC-Link and EC Link+ are single endpoint solutions and the EC4 enables 4 IP endpoints from a single long run Coax cable.

EC-Link

EC-Link+

EC4

	EC-Link	EC-Link+	EC4
Power	• Maximum 30W, delivered on 2 pairs (spare pairs) • Local power option • Does not negotiate power requirements with IP device • Device must be IEEE 802.3 af/at compliant	• Maximum 50W delivered on 4 pairs • Local power option • Adapter is IEEE 802.3 af/at compliant and will negotiate power requirements with IP device	• Receives and delivers PoE power (up to 30W) from EC10, CLEER24-10G, or EC-Base • EC4 enables IEEE 802.3 af/at compliant IP endpoints • Can be locally powered (optional) and deliver up to 50 Watts per port with a maximum overall power budget of 165W
Casing	Plastic	Metal	Plastic
EN 50121-4 Standard	Yes – approved to operate in a railway/subway environment		

EC Adapters Technical Specifications

Model	EC-Link	EC-Link+	EC4
Part Number	NV-ECLK	NV-ECLK-PLS	NV-EC-04
802.1x Support	Supported	Supported	Not Supported
Dimensions	8.8cm x 3.2cm x 2.1cm (LxWxH); 3.46" x 1.23" x 0.83" (LxWxH)	10.09cm x 5.03cm x 2.57cm (LxWxH); 3.97" x 1.98" x 1.01" (LxWxH)	11cm x 7cm x 2.5cm (LxWxH); 4.3" x 2.75" x 0.98" (LxWxH)
Weight	42g (1.48oz.)	108g (3.81oz.)	96g (3.38oz.)
Interface: Network Infrastructure side (CLEER)	1 BNC port: Coax cable (RG59, RG6, RG11)	1 BNC port: Coax cable (RG59, RG6, RG11)	1 BNC port: Coax cable (RG59, RG6, RG11)
Line Speed	10/100Mbps full duplex	10/100Mbps full duplex	100Mbps full duplex
Interface: IEEE Side (IP Device)	1 RJ45 port; device must be IEEE 802.3af/at compliant	1 RJ45 port; adapter is IEEE 802.3af/at compliant and will negotiate power requirements with IP end device.	4 RJ45 ports: devices must be IEEE 802.3af/at compliant
Power Supply	PoE from the CLEER / EC switch or from EC-Base, maximum 30W over 2 pairs (spare pairs)	Maximum 50W from CLEER / EC switch (If locally powered and 30W if power provided from switch) delivered on 4 pairs.	PoE from the CLEER / EC switch or external power supply; maximum 50W (over 4 pairs) each port
DC IN	Optional (sold separately) 48V – 56VDC via an external AC/DC Power Adapter with phoenix connector (IEC Class II isolated only) NOTE 1: Local power supply used must have its output isolated from Earth potential. NOTE 2: If voltage of local power supply is lower than the power voltage provided from the PoE switch, then power on the PoE switch should be turned off.	Optional (sold separately) 48V – 56VDC via an external AC/DC Power Adapter (IEC Class II isolated only) with barrel connector NOTE 1: Local power supply used must have its output isolated from Earth potential. NOTE 2: If voltage of local power supply is lower than the power voltage provided from thePoE switch, then power on the PoE switch should be turned off.	Optional (sold separately) 48V – 56VDC via an external AC/DC Power Adapter (IEC Class II isolated only) with barrel connector NOTE 1: Local power supply used must have its output isolated from Earth potential. NOTE 2: If voltage of local power supply is lower than the power voltage provided from thePoE switch, then power on the PoE switch should be turned off.
Power Consumption	0.9W	1.1W	1W
Operating Temperature	-58°F to +158°F (-50°C to +70°C) *Tests conducted against international safety standard at maximum ambient temperatures of 50°C*	-58°F to +158°F (-50°C to +70°C) *Tests conducted against international safety standard at maximum ambient temperatures of 60°C at 30W and 55°C at 50W*	-58°F to +158°F (-50°C to +70°C) *Tests conducted against international safety standard at maximum ambient temperatures of 50°C*
Mean Time Before Failure (MTBF)	20+ years	20+ years	20+ years
Humidity	10% to 95% (non-condensing) at 35° C	10% to 95% (non-condensing) at 35° C	10% to 95% (non-condensing) at 35° C

EC Adapters Compliance and Agency Approval

EMC	Emissions: FCC Part 15, ICES-003, EN 55032:2015, EN 50121-4:2015 Class A (EC4) Class B (EC-Link and EC-Link+) Immunity: EN 55035:2017, EN 50121-4:2015
Safety	UL 60950-1 2nd Ed 2014-10-14, CAN/CSA C22.2 No. 60950-1-07 2nd Ed 2014-10 IEC 62368-1:2014, EN 62368-1:2014, AS/NZS 62368.1:2018
Environment	RoHS Directives 2011/65 and 2015/863