The most versatile IoT-enabling PoE switch on the market

FLEX24-10G Managed Switch

The NVT Phybridge FLEX24-10G switch is the most versatile Power over Ethernet (PoE) switch on the market, designed to make IP/IoT deployments simple, secure, and cost-effective. **The FLEX24-10G switch delivers up to 50 Watts of power (PoE++) and 10/100/1000 Mbps symmetrical, full-duplex, over 2 or 4 pair UTP (unshielded twisted pairs) cabling with up to 2,000ft (610m) reach.***

The FLEX24-10G switch enables Modern LAN principles and comes standard with 2 x SFP+ 10Gb uplink ports, dedicated management and console ports, 24 x 10/100/1000 downlink ports, a 1,000 Watt hot-swappable power supply, power sharing, and power redundancy. The FLEX24-10G 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

FLEX24-10G switch delivers Gigabit speeds to standard reach and 10/100Mbps symmetrical (full-duplex) and PoE++ (50W) over 4-pair UTP or PoE+ (30W) over 2-pair UTP with 2,000ft (610m) reach. It is designed to support the most demanding IP endpoints with plenty of bandwidth to spare. The FLEX24-10G switch provides robust network performance at any distance.

Industry Leading PowerWISE® Technology

The NVT Phybridge FLEX24-10G 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 FLEX24-10G switch is one of the most energy efficient switches on the market, consuming 20 Watts of power to operate.

See Technical Specifications for more details

AT A GLANCE

(NV-FLX-024-10G)

Connectivity
· 24-port managed long reach PoE++ switch with Layer 2, Layer 3, and Layer 4 capabilities
· 10/100/1000Mbps symmetrical (full-duplex) and PoE++ (50W) over 4-pair UTP or PoE+ (30W) over 2-pair UTP with 2,000ft (610m) reach
· 2 x SFP+ 10 Gb uplink ports
· 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 FLEX 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
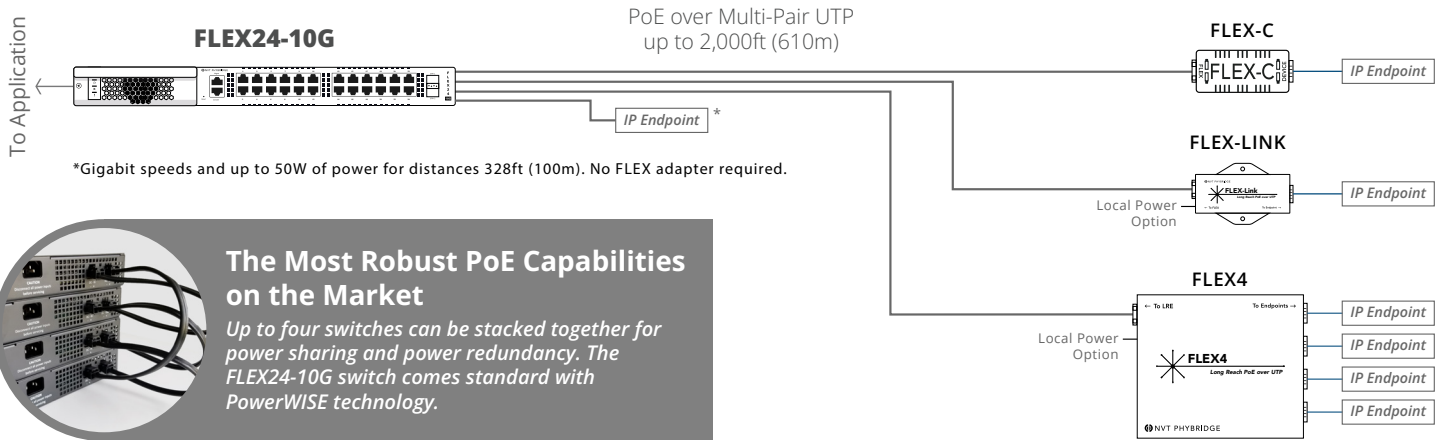· Multi-layer access control lists

Management
· In-band and out-of-band management available
· Intuitive, simple management GUI
· Industry adopted Command Line Interface
· SNMP v1,v2,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

PoE over Multi-Pair UTP
up to 2,000ft (610m)

FLEX24-10G

To Application

*Gigabit speeds and up to 50W of power for distances 328ft (100m). No FLEX adapter required.

IP Endpoint *

FLEX-C

FLEX-C → IP Endpoint

FLEX-LINK

Local Power Option

FLEX-Link → IP Endpoint

FLEX4

Local Power Option

← To LRE   To Endpoints →

FLEX4
Long Reach PoE over UTP

IP Endpoint
IP Endpoint
IP Endpoint
IP Endpoint

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 FLEX24-10G switch comes standard with PowerWISE technology.

FLEX24-10G Technical Specifications

Model	FLEX24-10G
Part Number	NV-FLX-024-10G
Dimensions	19 inches x 1U without rack ears: • 10.45" x 17.13" x 1.73" (LxWxH) • 26.54cm x 43.51cm x 4.39cm (LxWxH)
Weight	7.35 lb. (3.33 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
Interface: Downlink (PoE and IP to Adapter)	24 x RJ45 Jacks Speed: 10/100/1000Mb/s (full-duplex) PoE Power: 50 Watts Maximum per port **Maximum Distance:** Mode Cable Data Rate Reach Standard CAT5e or better 10/100/1000Mbps 325ft (100m) Long Reach 1-4 pairs UTP 10/100Mbps 2,000ft (610m) **Note:** *Single-Pair requires local power.*
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
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	20W
Power Injection (PoE)	DC voltage: 48VDC to 58VDC IEEE 802.3af/at
PowerWISE® Power Sharing	2 male connectors (rear) DC IN and DC OUT: 48VDC to 58VDC
Operating Temperature	14°F to 113°F (-10°C to 45°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

FLEX24-10G Extended Technical Specifications

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 size @ 610m
	    - Max 10K size @ 100m
	• 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)

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)
Layer 4 Features	• Protocol-Based VLANs
Multicast	• 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
	    - Static MAC locking per port
	• 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.
	• Built-in FTP, SFTP, SCP, and TFTP clients to backup configuration files.
	• System maintenance
	    - Firmware upload via FTP or GUI.
	    - Configuration upload/download through Web interface.
	    - 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.

FLEX24-10G 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 for IP endpoints at the stated distances based on different cable types and number of pairs.

Switch Voltage 58V									
FLEX24-10G used with no adapter									
	20ft (6m)	150 (46m)	300ft (92m)	650ft (200m)	1,000ft (305m)	1,250ft (381m)	1,500ft (457m)	1,750ft (533m)	2,000ft (610m)
Cat6 4-Pairs	50W	49	48	x	x	x	x	x	x
Cat6 2-Pairs	33W	33	32	x	x	x	x	x	x
Cat5e 4- Pairs	50W	49	47	x	x	x	x	x	x
Cat5e 2-Pairs	33W	32	30	x	x	x	x	x	x
FLEX24-10G used with FLEX-Link & FLEX4									
Cat6 4-Pairs	50W	49	48	45	42	39	37	35	33
Cat6 2-Pairs	33W	32	31	28	25	24	22	20	18
Cat5e 4- Pairs	50W	48	46	42	38	35	33	30	27
Cat5e 2-Pairs	33W	32	30	27	23	20	18	15	12
FLEX24-10G used with FLEX-C									
Cat6 4-Pairs	33W	32	31	30	29	28	28	27	26
Cat6 2-Pairs	33W	32	31	28	25	24	22	20	18
Cat5e 4- Pairs	33W	32	31	30	28	27	25	24	23
Cat5e 2-Pairs	33W	32	30	27	23	20	18	15	12

■ **1000Mbps** ■ **100Mbps** □ **10Mbps**

SFP Transceivers: Accessory Product Details

NVT Phybridge offers the below industry standard SFP+ modules for use with the FLEX24-10G. 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.

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

FLEX FAMILY ADAPTER OPTIONS

FLEX Adapter Options

There are three media converter options available to pair with the FLEX family of switches and extend PoE over Multi-Pair UTP. The FLEX-C and FLEX-Link are single endpoint solutions and the FLEX4 enables 4 IP endpoints from a single long run Multi-Pair UTP cable.

FLEX-C

FLEX-Link

FLEX4

	FLEX-C	FLEX-Link	FLEX4
Power	• Maximum 30W, delivered on 2-pairs (spare pairs) • No local power option available • Does not negotiate power requirements with IP device • Device should be IEEE compliant	• Maximum 50W, delivered on 4-pairs • Local power option to support greater power delivery to IP device • Adapter is IEEE-compliant and will negotiate power requirements with IP device	• Maximum 30W, delivered on 2-pairs • Local power option to support greater power delivery to IP device • Adapter is IEEE-compliant and will negotiate power requirements with IP device
Casing	Plastic	Metal	Metal
Single-pair Supported	No	Yes (needs local power)	Yes (needs local power)
EN 50121-4 Standard	Yes – approved to operate in a railway/subway environment		

FLEX Adapters Technical Specifications

Model	FLEX -C	FLEX -Link	FLEX4
Part Number	NV-FLXLK-C	NV-FLXLK	NV-FLX-04
802.1x Support	Supported	Supported	Not Supported
Dimensions	8.1cm x 3.8cm x 2.3cm (LxWxH); 3.19" x 1.50" x 0.90" (LxWxH)	8.8cm x 5.0cm x 2.5cm (LxWxH); 3.46" x 1.97" x 0.98" (LxWxH)	9.8cm x 9.6cm x 2.5cm (LxWxH); 3.86" x 3.78" x 0.98" (LxWxH)
Weight	44g (1.5oz.)	106g (3.74oz.)	214 g (7.6 oz.)
Interface: Network Infrastructure Side (FLEX)	1 RJ45 port: UTP/STP cable (2-pair or 4-pair)	1 RJ45 port: UTP/STP cable (1-pair, 2-pair or 4-pair)	1 RJ45 port: UTP/STP cable (1-pair, 2-pair or 4-pair)
Line Speed	10/100Mbps full duplex	10/100Mbps full duplex	10/100Mbps full duplex
Interface: IEEE Side (IP Device)	1 RJ45 port; device must be IEEE 802.3af/at compliant, 10/100Mbps connection to IP end device	1 RJ45 port; device must be IEEE 802.3af/at compliant, 10/100Mbps connection to IP end device	4 RJ45 ports: device must be IEEE 802.3af/at compliant, 10/100Mbps connection to IP end device
Power Supply	PoE from the FLEX switch or from FLEX-Base; maximum 30W (over 2-pairs)	PoE from the FLEX switch or external power supply; maximum 50W (over 4 pairs) or 30W (over 2-pairs)	PoE from the FLEX switch or external power supply; maximum 30W (over 2-pairs) each port
DC IN (Barrel Connector)		Optional (sold separately) 48V – 58VDC via an external AC/DC Power Adapter (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 – 58VDC via an external AC/DC Power Adapter (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.
Power Consumption	1.3W	1.5W	1.5W
Operating Temperature	-40°C to 70°C *Tests conducted against international safety standard at maximum ambient temperatures of 60°C at 15W and 50°C at 30W*	-40°C to 70°C *Tests conducted against international safety standard at maximum ambient temperatures of 60°C at 30W and 50°C at 50W*	-40°C to 70°C *Tests conducted against international safety standard at maximum ambient temperatures of 60°C at 64W and 55°C at 120W*
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
Ambient Temperature	Minimum ambient temperature for cold startup is 32°F (0°C)	Minimum ambient temperature for cold startup is 32°F (0°C)	Minimum ambient temperature for cold startup is 32°F (0°C)

FLEX Adapters Compliance and Agency Approval

EMC	Emissions: FCC Part 15, ICES-003, EN 55032:2015, EN 50121-4:2015 Class A (FLEX4), Class B (FLEX-C and FLEX-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