



NVT Phybridge enables our customers to transform their existing infrastructure and migrate to IP with confidence. NVT Phybridge products offer technologically advanced features including power over long reach Ethernet over single pair or multi pair UTP and COAX, robust power and power management, PowerWISE power sharing and quick and easy migration to IP end points and IoT. Complete switch solutions include PoLRE, CLEER and FLEX products. Complete adapter solutions include PhyLink, EC-Link, EC-04, FLEX-Base, FLEX-Link, FLEX-C and FLEX4 media converters and cable extenders.

For additional information, contact:

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POWER OVER LONG REACH UTP NETWORK SWITCH

DIVISION 27 – COMMUNICATIONS

27 20 00	Data Communications
27 21 00	Data Communications Network Equipment
27 21 29	Switches & Hubs

Notes to Specifier:

1. Where several alternative parameters or specifications exist, or where, the specifier has the option of inserting text, such choices are presented in **<bold text>**.
2. Explanatory notes and comments are presented in **coloured** text.

POWER OVER LONG REACH UTP NETWORK SWITCH

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes an 8-port 10/100Mbps Ethernet-over-UTP switch with power capability on each port.
- B. Product – The FLEX8 data switch delivers Ethernet and Power over UTP cable with multiple times the reach of traditional data switches.
- C. Related Requirements
 - (1) 27 10 00 Structured Cabling
 - (2) 27 16 00 Communications Connecting Cords, Device, and Adapters
 - (3) 27 16 16 Communications Media Converters, Adapters, and Transceivers
 - (4) 27 30 00 Voice Communications
 - (5) 27 31 23 IP Voice Switch

1.02 REFERENCES

- A. Abbreviations
 - (1) DVR – Digital Video Recorder
 - (2) GbE – Gigabit Ethernet
 - (3) GBIC – GigaBit Interface Converter
 - (4) GUI – Graphical User Interface
 - (5) IoT – Internet of Things
 - (6) IP – Internet Protocol
 - (7) LAN – Local Area Network
 - (8) LLDP – Link Layer Discovery Protocol
 - (9) Mbps – Megabits per second
 - (10) NTP – Network Time Protocol
 - (11) NVR – Network Video Recorder
 - (12) PoE – Power over Ethernet
 - (13) PoLRE – Power over Long Reach Ethernet
 - (14) SFP – Small Form-factor Pluggable
 - (15) SNMP – Simple Network Management Protocol
 - (16) STP – Spanning Tree Protocol
 - (17) UPoE – Cisco Ultra PoE standard
 - (18) UTP – Un-Twisted Pair wiring
 - (19) VLAN – Virtual LAN
- B. Reference Standards
 - (1) Network
 - (a) IEEE – 802.3 Ethernet Standards
 - (2) EMC
 - (a) Emissions
 - (i) FCC Part 15 Class B
 - (ii) IECS-003
 - (iii) EN 55032:2012

- (iv) EN 50121-4:2015
- (b) Immunity
 - (i) EN 55024:2010
 - (ii) EN 50121-4:2015
- (3) Safety
 - (a) UL 60950-1 2nd Ed 2014-10-14
 - (b) CAN/CSA C22.2 No. 60950-1-07 2nd Ed 2014-10
 - (c) IEC 60950-1:2005 + A1 + A2
 - (d) EN 60950-1:2006 + A11 + A12 + A1 + A2
- (4) Environment
 - (a) EU RoHS Directive 2011/65

1.03 SUBMITTALS

- A. Product data
 - (1) Data sheets
 - (2) Installation and operation manuals
 - (3) DoC (declaration of conformity)
 - (4) Warranty documentation

1.04 QUALIFICATIONS

- A. Manufacturer shall have a minimum of five years' experience in producing Ethernet switch equipment.
- B. Installers shall be trained and authorized by the Manufacturer to install, integrate, test and commission the system.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver the switch in the manufacturer's original, unopened, undamaged container with identification labels intact.
- B. Store the switch in a temperature environment of -40°C to 85°C (-104°F to 185°F), protected from mechanical and environmental conditions as designated by the manufacturer.

1.06 WARRANTY AND SUPPORT

- A. Manufacturer shall provide a limited 5-year warranty for the product to be free of defects in material and workmanship.

END OF SECTION

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Manufacturer: NVT Phybridge, Inc.
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Oakville, ON, Canada L6L 0C4
Phone: +1 905 901-3633
Web: www.nvtphybridge.com
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- B. Models NV-FLX-08 series
- C. Alternates: None

2.02 GENERAL DESCRIPTION

- A. The FLEX 8 switch shall provide Ethernet and PoE over UTP cable with up to six times the reach of traditional data switches.
- B. The FLEX shall possess the following characteristics:
 - (1) capable of delivering up to 50W of PoE per port with an aggregate of 190W
 - (2) capable of operating in IEEE mode supporting standard Ethernet cable lengths (100m) directly connected to end-points (no adapter required)
 - (3) capable of operating in FLEX mode supporting extended UTP cable lengths when paired with a FLEX-Link, FLEX-C or FLEX4 adapter
 - (4) converts conventional Ethernet to a signal that can be carried by various types of UTP cable
 - (5) uses previously installed UTP cable to connect IP network end-points such as IP cameras, IP phones, network switches, DVR/NVRs, PCs, and printers
 - (6) capable of switching each downlink port from 10/100 Auto to forced 10Mbit LRE mode with the use of a toggle switch

2.03 INTERFACES

- A. Ethernet (Combo Ports)
 - (1) Two Ethernet RJ45 connectors labelled GbE1 and GbE2. These connections support a standard Ethernet cable: patch or crossover Cat5e/Cat6.
 - (2) The RJ45 shall support 10/100/1000 BaseT full or half duplex and auto-negotiation of the transmission rate.
- B. Ethernet (Downlink)
 - (1) The FLEX8 shall have an RJ45 connector for each of the 8 downlink ports. It supports 1-Pair, 2-pair or 4-pair UTP cable with a nominal characteristic impedance of 100 ohms.
 - (2) Maximum cable distances are specified as:
 - (a) 4-Pair UTP/STP – 100Mbps to 610m (2000ft)
 - (b) 2-Pair UTP/STP – 100Mbps to 305m (1000ft)
 - (c) 2-Pair UTP/STP – 10Mbps from 305m (1000ft) to 610m (2000ft)
 - (d) 1-Pair UTP/STP – 100Mbps to 305m (1000ft) [FLEX adapter must be locally powered]
 - (e) 1-Pair UTP/STP – 10Mbps to 610m (2000ft) [FLEX adapter must be locally powered]

- (3) The maximum data through-put shall be 200Mbps (total up plus down) and shall auto adapt to the cable conditions. This will support 100Mbps communication in both directions.
- (4) Each Ethernet Downlink port shall support either 10Mbps or 100Mbps (cable & distance dependant) with no bandwidth sharing between ports.
- (5) There shall be no signal degradation from 0m to the maximum supported distances.

2.04 INDICATORS

A. Power

- (1) The FLEX8 shall have one LED power indicator: On (green).
- (2) The power LED indicates the following status: Off – power is off, On – power is on.

B. Ethernet Uplink

- (1) Each Ethernet RJ45 connector shall have two LEDs to indicate network connection status: Connection status (LEFT, Green) and activity status (RIGHT, Green).
- (2) The connection status LED indicates the following: Off – no connection, On – link good.
- (3) The activity status LED indicates the following: Off – no activity, Flashing – network activity.

C. Ethernet Downlink

- (1) Each of the 8 downlink ports shall have two LEDs to indicate network connection status: Connection status (LEFT, Orange) and activity status (RIGHT, Green).
- (2) The connection status LED indicates the following: Off – no connection, On – link good.
- (3) The activity status LED indicates the following: Off – no activity, Flashing – network activity.

2.05 PoE

- A. The FLEX shall provide up to 50 watts of power over the UTP connection to each end-point device.
- B. The FLEX shall follow standard PoE power negotiation. Non-PoE end-points are supported.
- C. The end-point device must be IEEE 802.3af, 802.3at compliant or Cisco UPoE compatible in order to be powered using PoE.

2.06 ELECTRICAL

A. Power

- (1) Sources
 - (a) Single external power supply AC-DC PSU with a rated input voltage of 100 to 240VAC, Output 55VDC @ 190W
- (2) Power consumption
 - (a) 6W (not including PoE end-points)
- (3) Power injection (PoE)
 - (a) -55VDC, 50W – end-point devices must be IEEE 802.3af/at compliant or Cisco UPoE compatible to use the power injection

B. Connectors

- (1) Ethernet
 - (a) RJ45 (2) – Ethernet port
 - (b) RJ45 (8) – long reach Ethernet + power connection
- (2) External power

(a) AC power: External 48-56VSC 190W power supply

2.07 MECHANICAL AND ENVIRONMENTAL

- A. Housing material: Powder coated aluminum
- B. Mounting: Desk, Wall or 1U rack (mounting kit supplied)
- C. Dimensions (H x W x D): 1.45in. x 4.53in. x 7.09in. (36.8mm x 115mm x 180mm)
- D. Weight: 590g
- E. Thermal: Air cooled
- F. Temperature
 - (1) Operating: -10°C to 65°C (14°F to 149°F)
 - (2) Storage: -40°C to 85°C (-104°F to 185°F)
- G. Humidity: 10 – 95%, non-condensing @ 35°C
- H. MTBF (Mean Time Between Failure): 20+ Years (175,200+ Hours)

END OF SECTION

PART 3 EXECUTION

3.01 INSTALLERS

- A. Contractor personnel

3.02 PREPARATION

- A. The network design and configuration shall be verified for compatibility and performance with the camera(s)
- B. Network configuration shall be tested and qualified by the Contractor prior to camera installation.

3.03 INSTALLATION

- A. Before permanent installation of the system, the system shall be factory tested in conditions simulating the final installed environment
 - (1) A report indicating successful test results shall be produced.

3.04 STORAGE

- A. The product shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

END OF SECTION