VIGITRON

High Power PoE Considerations

DESIGN

INSTALL

VERIFY

IEEE 802.3bt PoE Considerations

Background:

The IEEE 802.3bt is the latest IEEE standard for PoE transmission. It addresses PoE sources greater than 30W of IEEE 802.3at.

While this level of PoE is relatively new, the demand for higher PoE values that preceded it resulted in the application of other formats of PoE. These formats were non-standard and offered under many names such as PoE++ and UPoE. Only UPoE had some bases as it was introduced and applied by CISCO.

The problem is that IEEE 802.3bt is not compatible with these previous PoE formats. The difference exists in the way the connected device, which is referred as the Powered Device (PD), acknowledges the PoE signals it is receiving from the Power Source Equipment (PSE). This is often referred to as the PoE Signature which are different between previous high PoE versions and IEEE 802.3bt standard.

How do I know How Much PoE my System Requires?

Evaluating PoE is often limited to just the amount of PoE power. In reality this is not sufficient. PoE compatibility is based on three factors.

- PoE Power Level
- Number of wire pairs power is transmitted over
- PoE Signature Format

A good starting point for PoE power levels is reviewing the IEEE PoE standards

Class	IEEE PoE Standard	PSE - Max Power Delivered (W)	PSE Voltage Range	PD - Power Available	PD Voltage Range
0	IEEE 802.3af, PoE (2 Pair)	15.4	44 - 57 V	12.95	37 - 57 V
1		4	44 - 57 V	3.84	37 - 57 V
2		7	44 - 57 V	6.49	37 - 57 V
3		15.4	50 - 57 V	12.95	37 - 57 V
4	IEEE 802.3af, PoE+ (2 Pair)	30	50 - 57 V	25.5	(42.5 - 57 V)
5	IEEE 802.3af, PoE 3 (4 Pair)	45	50 - 57 V	40	(42.5 - 57 V)
6		60	50 - 57 V	51	(42.5 - 57 V)
7	IEEE 802.3af, PoE 3 (4 Pair)	75	50 - 57 V	62	41.1 - 57 V
8		90	50 - 57 V	71.3	41.1 - 57 V

Due to the power capacity limitations of wires' for higher than 30W all 4 pairs of category wires used.

Before IEEE 802.3bt standard, the need to meet PoE requirements of connected devices was met in 2 ways:
A) A single PSE providing power over all 4 pairs of UTP to a powered device based on a Proprietary system.
B) The PoE source includes two separate IEEE 802.3at PSEs one on each 2 pairs. The Powered device includes two IEEE 802.3at PDs.
While IEEE 802.3bt still maintains using 2 PSEs but they are working together intelligently and there is only a single 802.3bt PD on the Power Device side. Therefore, the IEEE 802.3bt is not completely compatible with the above PoE systems (such as PoE ++, UPoE and LTPoE).

What types of high PoE are available?

IEEE standard PoE formats

The IEEE 802.3bt is defined by PoE Classes 5-8 and as previously noted has a specific signature that must be transmitted from the PoE source to the connected and acknowledged by the PoE device in order for PoE power to flow.

Non standard PoE formats

As noted, these include terms such as PoE+, PoE++, UPoE and LTPoE++. In general but not always:

PoE+ is applied to PoE sources greater than 15.4W
PoE++ is applied to PoE sources greater than 30W
UPoE is generally applied to PoE sources 60-90W
LTPoE++ is the 90W PoE format by Analog Devices

How can I tell which product is compatible with which PoE format?

The only guide you have is the product specification sheet which must be read in detail. If the connected device specification sheet, which most often will be a camera, states .bt then you need an IEEE 802.3bt PoE source.

Exceptions

Many cameras will require different PoE power levels based on performance. Cameras with heaters and blowers powered by PoE will often operate at Class 4 for only the camera and PTZ functions. The need for PoE might be limited to only heater and blower functions. If these are not required for your application .bt level power will not be required or a factor. Some cameras will require .bt power for the maximum distance of IR lighting, If these distances are not required the camera can operate at Class 4 levels.

The Bottom Line

Read product specifications carefully and match your PoE sources with the PoE requirements of your powered devices.

Vigitron's High Power PoE Solutions

The need for IEEE 802.3bt compatible devices can be divided into the following areas:

- PoE sources such as PoE switches and Midspans.
- Transmission devices for standard distances up to 328 feet (100m)
- Transmission devices for longer distances than 328 feet (100m)
- PoE test and installation devices

PoE Sources

PoE Switches

Vigitron has two advanced PoE switches that are IEEE 802.3bt compatible. Both of these are called Industrial Network Switches (INS) which can operate at a wide temperature range of -40C to +70C providing up to 90W per port. These switches are designed to operate in harsh environment and transportation environments.

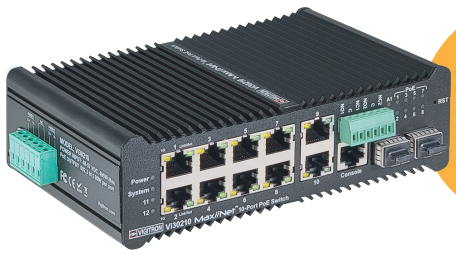
These switches can be used as the main switch or in IDF to MDF configurations

PoE Midspans

The Vi22401U and Vi22601U can provide up to 60W PoE while Vi22001U provides up to 90W at 10/100/1G bandwidth. They are compatible with IEEE 802.3bt PoE standard.

Vi30208
90W PoE

The Vi30208 is a unique 4+2+2 L2+ managed PoE switch that its 6 ports can provided PoE. The 2 fiber ports provide 2.5G bandwidth. All 8 ports can be used independently.



Vi30210
90W PoE

The Vi30210 is a 8+2 L2+ managed PoE switch. All 8 copper ports can provide a maximum 90W PoE. The 2 fiber ports provide 2.5G bandwidth.

Vi22401U
60W PoE
(Q3, 2022)

Vi22601U
60W PoE
(Q3, 2022)

Vi22001U
90W PoE
(Q3, 2022)

Vi22001
90W PoE

Vi2208A
36/74W PoE

Vi2216A
36/74W PoE

Vigitron High Power PoE Sources

Part No.	PoE Format	PoE Level	Description
Vi30208	IEEE 802.3bt	90W	Managed 4+2+2 L2+ PoE switch, 2.5G Uplink
Vi30210	IEEE 802.3bt	90W	Managed 8+2 L2+ PoE switch, 2.5G Uplink
Vi22401U	IEEE 802.3bt	90W	Single port PoE Midspan with built in power supply
Vi22601U	IEEE 802.3bt	60W	Single port PoE Midspan with DC input
Vi22001	UPoE	90W	Single port PoE Midspan with built in power supply
Vi22001U	IEEE 802.3bt	90W	Single port PoE Midspan with built in power supply
Vi2208A	UPoE	36/72W	Managed 8-port PoE Midspan with built in power supply
Vi2216A	UPoE	36/72W	Managed 16-port PoE Midspan with built in power supply

Transmission Devices

Vigitron offers several Ethernet and PoE repeaters that can handle PoE Classes from 0 to 7 up to 74W. Some versions can use DC power inputs to provide up to 60W. The weatherproof versions are also available with IP67 and Salt protection.

The Vi30002U and Vi30602 can provide bandwidth up to 1G. They are compatible with all types of PoE sources and can pass through up to 90W PoE.

Vi3002
60W PoE

Vi3002WP
60W PoE

Vi30602U
90W PoE

Vi2308A
74W PoE

Vi2316A
74W PoE

Vi2300A
(74W PoE)

Vi2301AU
(90W PoE)

Vi2301A
(74W PoE)

Vi2304A
(74W PoE)

Vi2300WP
(74W PoE)

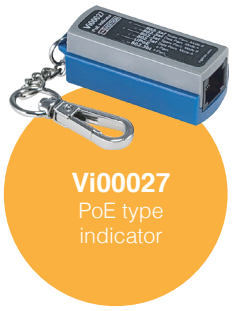
Vi30002U
90W PoE

Vigitron High Power Transmission Devices

Part No.	PoE Format	PoE Level	Description
Vi3002	IEEE 802.3bt, UPoE, LTPoE++	60W	Ethernet and 60W PoE Repeater
Vi3002WP	IEEE 802.3bt, UPoE, LTPoE++	60W	Weatherproof Ethernet and 60W PoE Repeater
Vi30002U	IEEE 802.3bt, UPoE, LTPoE++	90W	Ethernet and 90W PoE Repeater
Vi30602U	IEEE 802.3bt, UPoE, LTPoE++	90W	Ethernet and 90W PoE Repeater
Vi2300A	IEEE 802.3bt, UPoE, LTPoE++	74W	Single port Ethernet and PoE UTP Extender
Vi2300WP	IEEE 802.3bt, UPoE, LTPoE++	74W	Weatherproof Single port Ethernet and PoE UTP Extender
Vi2301A	IEEE 802.3bt, UPoE, LTPoE++	74W	Single port Ethernet and PoE UTP Extender
Vi2301AU	IEEE 802.3bt, UPoE, LTPoE++	90W	Single port Ethernet and PoE UTP Extender
Vi2304A	IEEE 802.3bt, UPoE, LTPoE++	74W	4-port Ethernet and PoE UTP Extender
Vi2308A	IEEE 802.3bt, UPoE, LTPoE++	74W	8-port Ethernet and PoE UTP Extender
Vi2316A	IEEE 802.3bt, UPoE, LTPoE++	74W	16-port Ethernet and PoE UTP Extender

PoE Test and Installation Devices

Vigitron test equipment series help to save time in installation of new PoE cameras and also debugging existing installations. The devices provide a method for focusing and adjusting the view of IP cameras in the field while displaying the power and voltage at the camera end. The Vi0019 and Vi0021 provide wired connection for viewing camera images while Vi00022, Vi00023L and Vi00023 offer both wired and wireless access to camera images. The Vi00024 can measure the maximum available PoE power at any point of a network.



Vi00027
PoE type indicator

Vi00023L
36W PoE

Vi00023
36W PoE

Vi00024
(74W PoE)
802.3bt

Vi0019
60W PoE

Vi0021
36W PoE

Vi0022
36W PoE

Vi00021U
90W PoE
Q3, 2022

Vigitron Installation and PoE Test Equipment

Part No.	PoE Level	PoE Format	Application
Vi0019	60W	IEEE 802.3bt, UPoE, LTPoE++	View Camera Image (wired Connection), Indicate PoE
Vi0021	30W	IEEE 802.3af/at	View Camera Image (wired Connection), PoE Voltage & Power
Vi00021U	90W	IEEE 802.3bt, UPoE, LTPoE++	View Camera Image (wired Connection), PoE Voltage & Power
Vi00022	36W	IEEE 802.3af/at	View Camera Image (wired/Wireless Connection), PoE Voltage & Power
Vi00027	90W	IEEE 802.3 af/at/bt and UPoE	Indicate PoE type
Vi00024	74W	IEEE 802.3bt, UPoE, LTPoE++	Measure Maximum PoE
Vi00023L	36W	IEEE 802.3af/at	View Camera Image (wired/Wireless Connection), PoE Voltage & Power Built-in PoE power bank
Vi00023	36W	IEEE 802.3af/at	View Camera Image (wired/Wireless Connection), PoE Voltage & Power Built-in PoE power bank

About Vigitron Inc.

Vigitron is a leading global manufacturer of innovative complete infrastructure transmission solutions for analog and IP CCTV systems. Vigitron performance is supported by complete certified testing along with integration with world-leading IP-based security products. We offer free and without obligation Infrastructure Design Services staffed by trained system engineers. Vigitron provides the industry's longest warranty. Vigitron is based in San Diego with local and worldwide sales and manufacturing facilities.

For more information on PoE and Vigitron products contact: support@vigitron.com