

Power over Ethernet (PoE) technology simplifies network connectivity by delivering both power and data over a single CAT5e (or higher) twisted-pair Ethernet cable. The [PoE switch](#) is commonly used to connect network-powered devices (PDs) such as IP security cameras, wireless access points (WAPs), and IP phones.

[PoE technology](#) is cost-effective, easy to install, and enables network devices to be located almost anywhere because there is no need for electrical outlets.

When considering whether to adopt PoE into your network, it is important to understand that the [PoE switches](#) come in two versions: active PoE switches and passive PoE switches. Choosing the wrong type of switch could result in severe hardware destruction.

To begin our discussion about active and passive PoE, let's start with a brief explanation of PoE standards.

PoE Types and Power Levels

The Institute of Electrical and Electronics Engineers (IEEE) has ratified three PoE standards that define four types of PoE. These PoE types are charted in the table below:

	Type 1	Type 2	Type 3	Type 4
Name	PoE	PoE+	PoE++ UPoE	High Power PoE
PoE Standard	IEEE 802.3af	IEEE 802.3at	IEEE 802.3bt	IEEE 802.3bt
Max. Power Per Port	15.4W	30W	60W	100W
Power to PD	12.95W	25.5W	51W	71.3W
Twisted Pair Used	2-Pair	2-Pair	4-Pair	4-Pair
Supported Cables	Cat5e	Cat5e	Cat6A	Cat6A
Typical Application	IP Phone	Video Phone	MGMT Device	LED Lighting

What is an active PoE switch?

An active PoE switch (also known as a standard PoE switch) is 48 volt and complies with conventional IEEE PoE standards 802.3af, 802.3at, and 802.3bt. The word "active" refers to the fact that the switch negotiates the correct voltage between the PoE switch and the PoE-compatible device.

The voltage negotiation works like this: Before full power is delivered down the Ethernet cable, the active (standard) PoE switch uses a low amount of power to initiate a "handshake" that tests its connection to the PD to ensure that the power (voltage) is compatible. If the handshake is successful, the amount of voltage is negotiated, and the PD will power up fully.

In contrast, if the voltage compatibility test fails, the handshake does not succeed, and the PoE switch will not deliver power to the PD. This active negotiation process safeguards the PD from potential damage due to voltage incompatibility between the switch and the PD.

What is a passive PoE switch?

A passive PoE switch does NOT comply with IEEE 802.3af/at/bt standards. There is no negotiation, no communication process, and no handshake. Passive PoE DOES deliver power over an Ethernet cable; however, it is always "on" and is a raw power source that supplies a specific voltage whether or not the device supports PoE. As a

result, non-compatible PDs are in danger of being damaged or obliterated.

There are certain applications that are suitable for passive PoE. These include CCTV cameras and radio antennas that run on 24-volt PoE or older Ubiquiti UniFi WiFi access points that require a passive 24-volt power source. Please note that not all PoE device requirements are clearly marked; however, it is vital to make sure that all devices are suitable for your specific setup.

Active vs. Passive PoE: More Differences

There are three other things to consider when choosing what type of PoE you need.

1. Power Supply Method

PoE switches provide power in three ways: Mode A, Mode B, and Four-pair PoE. Here's a quick overview:

- Mode A delivers power over pins one, two, three, and six.
- Mode B utilizes “spare” pins four, five, seven, and eight.
- Four-pair PoE transports power over all eight pins.

An active PoE switch supports Mode A, Mode B, and Four-pair PoE, while passive PoE switches support Mode B only.

2. Ethernet Support

Active PoE switches support 10/100/1000 Mbps Ethernet up to a distance of 100 meters (328) and are used in traditional 10/100BASE-T PoE networks and more contemporary 1000BASE-T PoE networks.

In most cases, passive PoE switches are utilized in older 10BASE-T and 100BASE-T PoE networks and have a maximum distance of 100 meters.

3. Cost

As active PoE switches have built-in safety features not found in passive PoE switches, an active PoE switch will be more expensive.

Conclusion

The differences between active and passive PoE switches are pretty obvious—and so are the benefits of using Power over Ethernet to power your network. However, if you are looking for a cost-effective, safe, flexible system that is easy to install—PoE is the solution.