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PoE switch on the same line

Overview

Standards-based Power over Ethernet is implemented following the specifications in IEEE 802.3af-2003 (which was later incorporated as Clause 33 into IEEE 802.3-2005) or the 2009 update, IEEE 802.3at. The standards require Category 5 cable or better for high power levels but allow using Category 3 cable if less power is required.

Key Takeaways

A PoE switch can transmit both data and electrical power over the same Ethernet cable, allowing PoE-capable devices to operate without separate power lines.How PoE Works on the Same Cable

Power over Ethernet (PoE) allows electrical power to be sent alongside data on standard Ethernet cables, such as Cat5e or Cat6, using either the same pairs as data (Mode A) or separate pairs (Mode B) for 10/100 Mbps networks, or all four pairs for higher power delivery (4PPoE) . The switch detects whether a connected device supports PoE and only supplies power if the device is compatible, preventing damage to non-PoE devices . This is known as an active PoE switch.

Mixing PoE and Non-PoE Devices

You can connect both PoE and non-PoE devices to the same PoE switch. Non-PoE devices will receive only data, while PoE devices receive both data and power . Passive PoE switches, which supply constant voltage regardless of device type, can damage non-PoE equipment, so active PoE switches are recommended for mixed environments.

Extending PoE to Non-PoE Devices

If you need to power a non-PoE device, a PoE splitter can separate the power from the data, providing the appropriate voltage to the device while still using a single Ethernet cable . Conversely, a PoE injector can add power to a non-PoE network line, enabling PoE devices to operate without replacing the existing switch .

Standards and Power Levels

PoE standards define the maximum power delivered over Ethernet:

• IEEE 802.3af (PoE): up to 12.95 W per device

• IEEE 802.3at (PoE+): up to 25.5 W per device

• IEEE 802.3bt (PoE++/4PPoE): up to 60–90 W per device These standards ensure safe and reliable power delivery while maintaining data integrity .
Summary

Using a PoE switch on the same line simplifies network deployment by combining power and data in a single cable. Active PoE switches safely support both PoE and non-PoE devices, while PoE injectors and splitters provide flexibility for legacy or non-PoE equipment. Proper selection of PoE standards ensures devices receive adequate power without interfering with network communication.

Article Content

Power over Ethernet

OverviewStandard implementationTechniquesStandards developmentUsesTerminologyPower management features and integrationNon-standard implementations

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