



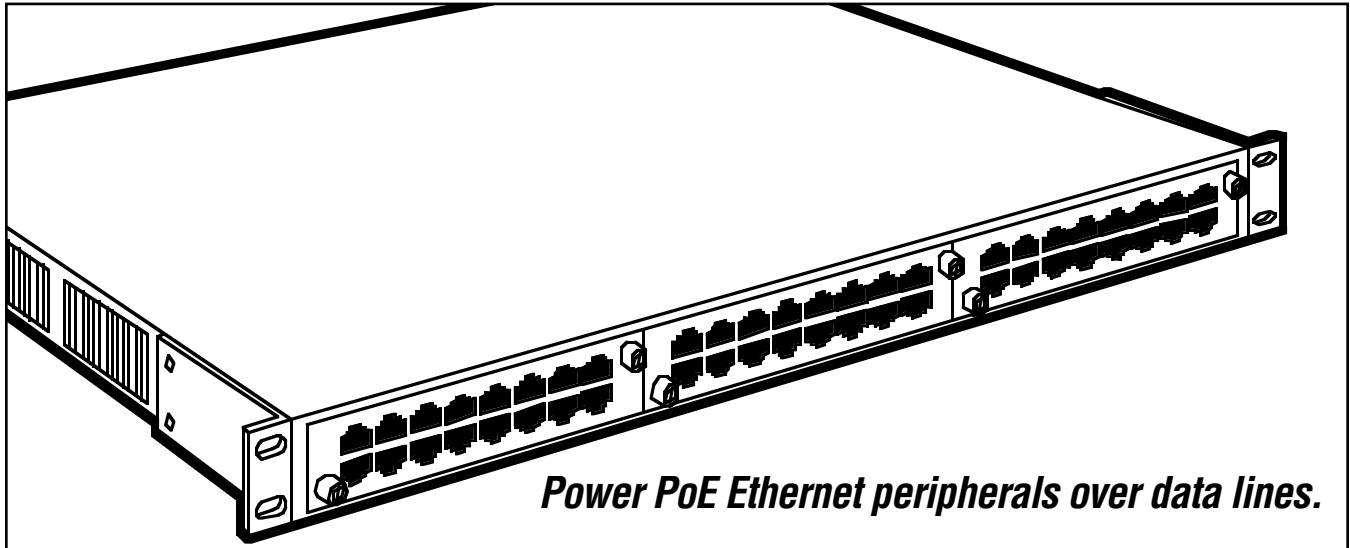
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BLACK BOX[®]

NETWORK SERVICES

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PoE HUB



Key Features

- ▶ **Send data and power over Ethernet cabling to power all your PoE devices.**
- ▶ **Available in modular 24-port and single-port models.**
- ▶ **24-port model features hot-swappable modules.**
- ▶ **Overvoltage protection.**
- ▶ **Use a single uninterruptible power supply (UPS) to provide continuous power to all connected devices.**

Power over Ethernet (PoE) offers easy single-wire plug-and-play connectivity for low-power Ethernet peripherals. Power over Ethernet does for Ethernet devices what USB did for serial devices—just plug in your 10BASE-T or 100BASE-T UTP cable, and you're set to go!

BLACK BOX[®] PoE Hubs are mid-span 802.3af compatible Power-Sourcing Equipment (PSEs) that make it easy to supply power to PoE-compatible IP network cameras, Voice over IP (VoIP) phones, wireless access points, and other peripherals.

PoE Hubs require no recabling. They provide power through your existing unshielded twisted-pair 10BASE-T or 100BASE-T network.

The hubs automatically detect your network speed and the power requirements of connected

devices for transparent plug-and-play operation.

To eliminate the need to install a separate UPS for each network device, use a PoE Hub with a UPS to provide continuous uninterruptible power to all attached devices.

The hubs are safe, too, and don't send power to devices that aren't PoE compatible. If current reaches 400–450 mA for 300–400 milliseconds, device detection circuitry shuts down the port. This way, attaching an incorrect device, like a laptop, does no damage to the device or your network.

For providing power to a single piece of equipment, order a Single-Port PoE Hub, which you install inline. It's available for either standard IEEE 802.3af Power over Ethernet or proprietary Cisco Power over

Ethernet. The plug-and-play Single-Port PoE Hubs are pre-configured to minimize setup time.

For multiport applications on the front end of a switch or router, order the PoE Hub 24-Port Chassis, IEEE 802.3af.

This modular chassis accommodates up to three PoE Hub 8-Port Modules to support up to 24 devices. The modules are completely hot-swappable and fully voltage insulated from each other.

The 24-Port Chassis occupies only a single rack unit (1U) in any standard 19" rack. If the chassis is only partially filled with modules, you may order the Single-Slot Blank Slot Cover to improve the chassis appearance in your data centre.

About Power over Ethernet (PoE)

Power over Ethernet (PoE), sometimes also called Active Ethernet, provides a way for your network devices to be powered by their data cables rather than by separate power cords.

Power over Ethernet works much like serial USB—just plug in one cable and your device works. In many applications, particularly in the installation of wireless access points, PoE can significantly reduce installation costs.

PoE benefits

Power over Ethernet is suitable for use with low-power peripherals such as IP telephones, wireless access points, Web cameras, and audio speakers. PoE is ideal for applications such as video surveillance, building management, retail video kiosks, smart signs, vending machines, and retail point of information systems.

The primary advantage of Power over Ethernet is that you only have to run one cable—the data cable—to each peripheral. This simple elimination of a separate power cable provides a wide range of benefits.

- Save money by eliminating the need to run electrical wiring. By eliminating the need to install separate outlets for data and power, users can save up to 50% in installation costs.
- Easily move peripherals with minimal disruption.
- If your LAN is protected from power failure by a UPS, the PoE devices connected to your LAN are also protected from power failure.
- As PoE becomes more common, the 8-pin modular connector will become the industry-standard power jack.
- Central management—by adding your low-voltage peripherals to your Ethernet network, everything from security cameras to the ventilation system can be accessed and controlled over your network.

- Inexpensive to implement. Power over Ethernet is an extension of the Ethernet standard, meaning it's universal and inexpensive.
- It's easy—most people already know how Ethernet works!

IEEE 802.3af

The most popular PoE standard is the IEEE 802.3af specification adopted in 2003, which describes Ethernet Power-Sourcing Equipment (PSEs) and Powered Devices (PDs). 802.3af calls for 48 volts of AC power over unshielded twisted-pair (UTP) cabling. It works with any grade of UTP wire, including Category 3, 5, 5e, and 6. The specification is compatible with standard Ethernet UTP hardware, including patch panels and outlets, without requiring modification.

Before the official IEEE 802.3af specification was adopted in 2003, many pre-standard versions of PoE were in use, most notably a Cisco PoE standard introduced in 2000. Although these older standards still have an installed base, newer PoE products usually follow the IEEE 802.3af standard.

How 802.3af works

Very simply, CAT5 Ethernet cable consists of four twisted pairs of cable. Two pairs are used for 10BASE-T and 100BASE-T Ethernet data transmission; the remaining pairs are “free” pairs which can be used for other purposes.

IEEE 802.3af PoE can use *either* the spare pairs or the data pairs in UTP cable to transmit power. It adds DC power to the wires using signal transformers, and picks off power at the far end the same way.

Although sending power over the data pairs rather than the spare pairs would seem to be counterintuitive, data and power transmissions don't interfere with each other because electricity has a low frequency of 60 Hz or less, and data transmissions have frequencies that can range from 10 million to 100 million Hz. Because data and electricity are

at opposite ends of the frequency spectrum, they can travel over the same cable without interference.

The 802.3af standard calls for the maximum power available to any powered device to be 12.95 watts with a voltage range of 36 VDC to 57 VDC. This is more than enough to power typical PoE devices such as wireless access points.

802.3af equipment contains a detection mechanism to prevent sending power to noncompliant devices. Only devices that present a PoE signature receive power. If a non-PoE device is accidentally plugged in, it won't receive power and won't be damaged. This power detection mechanism also provides an optional means of identifying the amount of power required by each device.

The equipment

Power over Ethernet requires Power-Sourcing Equipment (PSE), sometimes called an injector or source device, to put power onto the UTP cable and a Powered Device (PD) to pick the power off the data cable. Both the PSE and the PD can be either built into a network device or exist as a freestanding device that's added onto an ordinary network device.

The 802.3af PoE standard offers three options for adding power to UTP cabling.

The first two options are for endpoint power sourcing equipment—a transmitting device such as a switch or a router that has PoE built into it. One option sends the electrical power through the spare pair of wires. The second uses the data pairs, leaving the spare pairs free.

The third option is for a midspan PSE—a device that's added to a standard Ethernet device to add power to data cable, essentially converting an ordinary switch or router into a PoE device. Midspan PSEs support power over the spare pairs only.

All PDs in the 802.3af standard can accept power over *either* the spare pairs or the data pairs,

enabling you to use any powered device with any power sourcing equipment.

PoE switches and routers are not yet commonly available, so the most common way to implement PoE today is to use a midspan PSE in a hub arrangement resembling the hub arrangement commonly used for USB: PoE power sourcing equipment is installed in front of an Ethernet switch or router and adds DC power to one or more data lines. Each of those connect to a PoE compatible peripheral device.

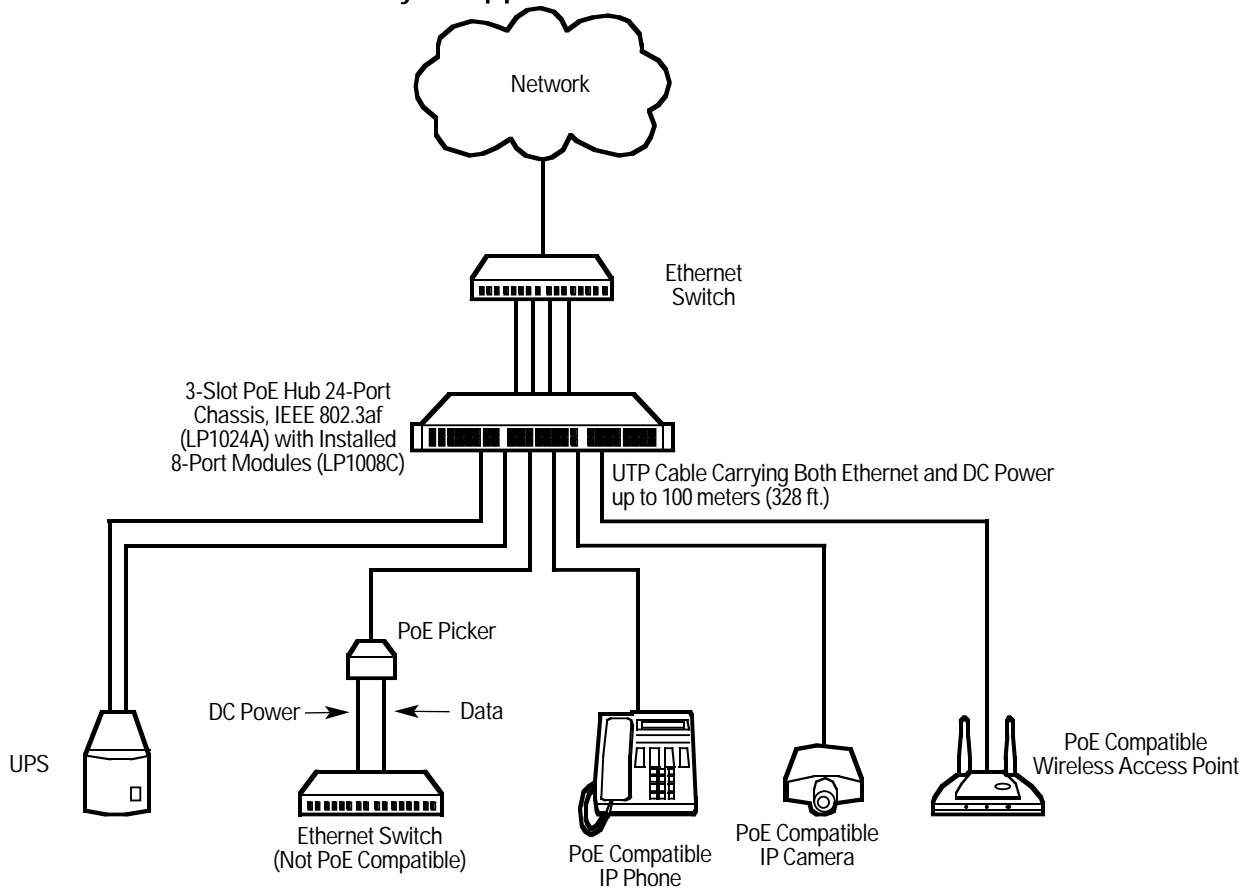
802.3af does not have provisions for mid-span devices on the PD end, and most low-power peripherals such as IP cameras and wireless access points are now readily available in an 802.3af PoE compatible version. However, it is possible to use incompatible peripherals by adding a device called a picker (sometimes also called a tap or an active Ethernet splitter), which “picks” off DC voltage from the UTP cable and supplies it to the peripheral through its regular DC power jack. Although this is not, strictly speaking, within the 802.3af standard, it is a way to bring PoE to equipment that's not available in a PoE version or that's too expensive to replace with a PoE version.

The 802.3af specification will often work with many older proprietary and even homebrew PoE standards. However, mixed networks are strictly a hit-or-miss proposition, so we recommend that you call Tech Support before attempting to mix different kinds of PoE.

The up and coming standard

802.3af is already widely adopted in the marketplace, particularly for VoIP and wireless applications. Because of its extraordinary savings in installation costs, 802.3af PoE promises to quickly become the dominant standard for connecting low-voltage, Ethernet compatible peripherals.

PoE is suitable for a wide variety of applications



Specifications

Compliance: Safety: UL[®] 1950; cUL;
Emissions: FCC Class A EN55022 and EN55024

DC Port Power Output:

Power enabling:
IEEE models: IEEE 802.3af;
Cisco model: Cisco Detection Protocol (CDP);

Power pins: Unused pairs on Pins 4, 5 (+) and Pins 7, 8 (-);
Maximum power per port:
15.6 watts;

Maximum power per a LP1024A chassis loaded with (3) LP1008C modules: 312 watts;

Port-to-port isolation:
LP1008C: 1500 V RMS;
LP1001A, LP2001A: 1000 V RMS;

Overload protection: Port shuts down if current reaches
400–450 mA for 300–400 milliseconds

Distance (Maximum): 328 ft. (100 m)

Connectors: (1) or (8) RJ-45 (data in);
(1) or (8) RJ-45 (power and data out)

Indicators:

LP1008C: Per-port LEDs:
(1) Detect/Power Forwarding;
(1) Power;

LP1001A, LP2001A: (4) LEDs:
Detect, Fuse Blown, Power from Chassis, Power Forwarding

Power: Input: LP1024A: Internal
90–264 VAC, 46–63 Hz, autosensing;
LP1008C: From the LP1024A chassis;
LP1001A, LP2001A: External
110 VAC, 60 Hz

Size: LP1024A:
1.75"H (1U) x 17.5"W x 16.25"D
(4.4 x 44.5 x 41.3 cm);
LP1001A, LP2001A:
1"H x 3"W x 6"D
(2.5 x 7.6 x 15.2 cm)

Weight: LP1024A: 10 lb. (4.5 kg);
LP1001A, LP2001A: 0.9 lb. (0.4 kg)

Ordering Information

ITEM	CODE
<i>For up to 24 PoE ports, order a hub chassis and up to 3 modules...</i>	
3-Slot PoE Hub 24-Port Chassis, IEEE 802.3af	LP1024A
8-Port Module	LP1008C
<i>For any unused slots in the 3-slot chassis, order...</i>	
Single-Slot Blank Slot Cover	LP0000A
<i>Or for inline PoE connections, order a single-port hub...</i>	
Single-Port PoE Hubs	
IEEE 802.3af	LP1001A
Cisco	LP2001A