



PoE Solutions from Black Box

Put technology wherever you need it—  
without running power.



# PoE Solutions

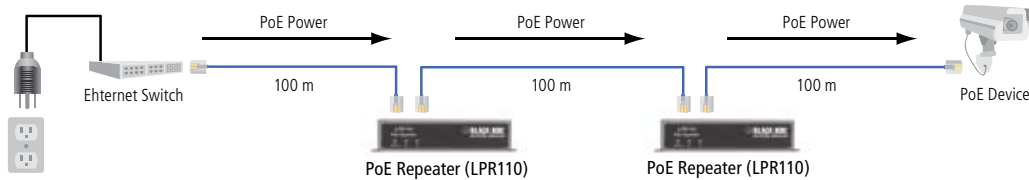
## What is PoE?

The seemingly universal network connection, twisted-pair Ethernet cable, has another role to play, providing electrical power to low-wattage electrical devices. Power over Ethernet (PoE) was ratified by the Institute of Electrical and Electronic Engineers (IEEE) in June 2000 as the 802.3af-2003 standard. It defines the specifications for low-level power delivery—roughly 13 watts at 48 VDC—over twisted-pair Ethernet cable to PoE-enabled devices such as IP telephones, wireless access points, Web cameras, and audio speakers.

Recently, the basic 802.3af standard was joined by the IEEE 802.3at PoE standard, ratified in September, 2009, which supplies up to 25 watts to larger, more power-hungry devices. 802.3at is backwards compatible with 802.3af.



LPR110



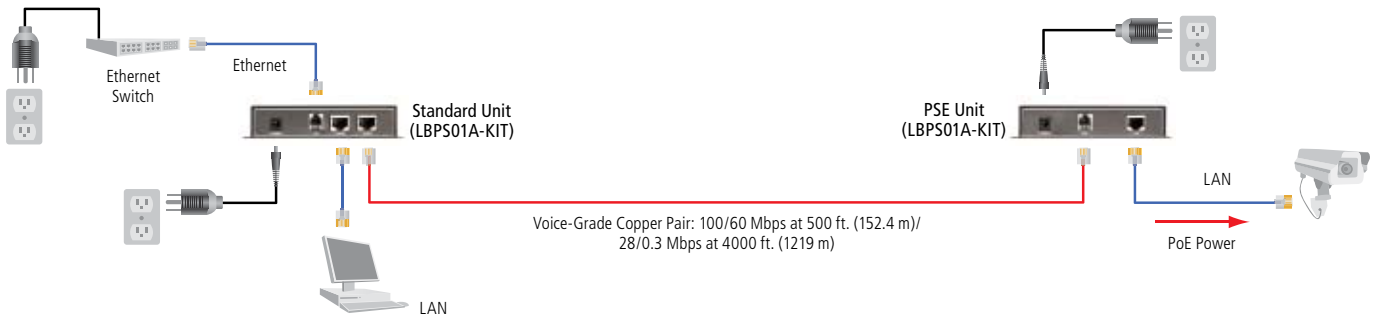
## How does PoE work?

The way it works is simple: Ethernet cable that meets CAT5 (or better) standards consists of four twisted pairs of cable, and PoE sends power over these pairs to PoE-enabled devices. In one method, two wire pairs are used to transmit data, and the remaining two pairs are used for power. In the other method, power and data are sent over the same pair.

When the same pair is used for both power and data, the power and data transmissions don't interfere with each other. Because electricity and data function at opposite ends of the frequency spectrum, they can travel over the same cable. 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.



LBPS01A-KIT



## Basic structure.

There are two types of devices involved in PoE configurations: Power Sourcing Equipment (PSE) and Powered Devices (PD).

PSEs, which include end-span and mid-span devices, provide power to PDs over the Ethernet cable. A PoE PD access point derives its power from the PSE Ethernet backhaul link. PDs are pieces of equipment like surveillance

cameras, sensors, wireless access points, and other devices that receive power via PoE.

When a PD is plugged in, it identifies itself as a PoE device with a 25-kilo-ohm resistor between the powered pairs. If the PSE detects 25-kilo-ohm resistance, it sends power; if it detects higher or lower

resistance, it doesn't send power. This keeps power from accidentally going to devices that don't support PoE.

An end-span device is often a PoE-enabled network switch that's designed to supply power directly to the cable from each port. A mid-span device is inserted between a non-PoE device and the network, and it supplies power from that juncture. Power injectors, a third type of PSE, supply power to a specific point on the network while the other network segments remain without power.

### PoE applications and benefits: Save money and time.

PoE is a technology that works well for wireless access points, video surveillance, building management, retail video kiosks, smart signs, and retail point-of-information systems, making it possible to easily move a device with minimal disruption. Additionally, if your LAN is protected from power failure by a UPS, the PoE devices connected to your LAN are also protected from power failure.

Using PoE can save hundreds of dollars per Wi-Fi access point (AP) location compared to a non-PoE solution.

In a non-PoE installation, in addition to the Ethernet backhaul link, power must be wired to the access point. Depending on factors such as AP location, distance from the AC circuit, and local safety codes, the savings from using a PoE solution can be \$250-\$500 per AP. In harsh, outdoor, or industrial environments, you can save \$750-\$1500 per AP by using PoE.

PoE Mid-Span Injectors add power to Ethernet for powering PoE powered devices ranging from wireless access points to IP cameras. PoE enables you to easily move equipment from room to room without costly, time-consuming rewiring.

PoE is the answer if you're doing a high-density phone conversion from keyed phones to VoIP phones. There's a much lower installation cost—all you need to do is provide the Ethernet connection. Black Box has a variety of PoE PSE equipment including switches, media converters, and injectors.

Plus, using PoE can improve VoIP phone system availability. PoE PSE gear can be located in data centers with uninterruptible power supplies and battery backup. This arrangement means that your PD VoIP phones will remain working if there's a power failure. On the other hand, wall-powered phones will stop working when the power goes out.

Our 802.3af injectors provide up to 15.4 watts of safe power to PoE devices. Our 802.3at injectors provide up to 25.5 watts per port to support more high-powered devices such as multiradio wireless access points, PTZ security cameras, IP phones containing streaming video displays, and LCDs.

### Smart Path Enterprise Wireless System.

Combines the stability, security, and speed of a wired network with the versatility and adaptability of a wireless network. Unlike ordinary wireless, in which access points function as accessories to the wired network, Smart Path is designed as



an equal partner to the wired network, making it a practical solution to providing wireless at an enterprise level.

### PoE Mid-Span Injectors and PoE Repeaters.

PoE Mid-Span Injectors are the quick, safe, and effective way to add PoE to your network without the cost and hassle of installing AC power at remote cameras, door scanners, etc. Use them to power various VoIP phones, security system cameras, wireless network access points, Bluetooth® access points, and other 802.3af- or 802.3at-compatible equipment. Add a Repeater to extend PoE connections beyond the 100-meter limit to access faraway PoE devices. See the chart on the back cover.

### PoE Switches.

Compact **PoE PD Switches** receive their power from a PoE switch or mid-span injector, eliminating the need to find a nearby power outlet and simplifying installation. Each switch features one PoE PD port that receives power and one VoIP port for high-priority VoIP packets. Use **PoE PD Switches** with fiber ports to extend your network up to 100 kilometers (62.1 miles). Single-strand fiber models transmit and receive on a single fiber, enabling you to maximize use of your fiber infrastructure. **10/100 PSE Web Smart Switches** can be configured and managed with any Web browser. Use **Gigabit PSE Web Smart Switches** to inject power into Ethernet cable for PoE devices such as wireless access points and security cameras.

**PoE L2 Managed Switches** have extensive management features that can ensure your PoE VoIP phones get network priority.

### PoE Media Converters.

**PoE PSE Media Converters** not only enable you to connect copper cables to long-distance fiber data links, they also safely power compatible PoE devices on the copper side. And with Gigabit Ethernet as well as single-strand fiber models, you have more versatility than ever in installing PoE devices.



Compact, copper-to-fiber **PoE PD Media Converters** bridge long-distance Fast Ethernet fiber optic segments with Ethernet or Fast Ethernet copper cabling—without a local power supply.

**PSE Compact Media Converters** are ideal for use with PoE access points or other PoE devices, such as IP cameras or entry control systems. Use them as PSE for your wireless equipment. Because these media converters only require one electrical outlet to power both the converter and a PoE device, you can position access points up to 30 meters (98.4 ft.) from the nearest power outlet.

### VDSL PoE Ethernet Extender Kits.

These kits extend 10BASE-T/100BASE-TX Ethernet across ordinary voice-grade copper wire.

### PoE Testers.

Test PoE to ensure adequate power for powered devices such as VoIP phones.

# PoE Solutions

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## Buyer's Guide | PoE Injector Chart

PoE Type	Ports	DC Output Voltage (Max.)	Available PoE Power	List Price	Code	Product Name
802.3af	1	48 VDC 0.32 A	15.4 W	\$39.95	LPJ000A-F	802.3af PoE 10-/100-Mbps Injector
	1	56 VDC 0.35 A	19.6 W	\$49.95	LPJ001A-F	802.3af PoE Gigabit Injector, 1-Port
	8	48 VDC 0.32 A	125 W	\$399.95	LPJ008A-F	802.3af PoE Gigabit Injector, 8-Port
	8	48 VDC 0.32 A	125 W	\$579.95	LPJ008A-FM	802.3af PoE Gigabit Managed Injector, 8-Port
	16	48 VDC 0.32 A	250 W	\$549.95	LPJ016A-F	802.3af PoE Gigabit Injector, 16-Port
	16	48 VDC 0.32 A	250 W	\$699.95	LPJ016A-FM	802.3af PoE Gigabit Managed Injector, 16-Port
	24	48 VDC 0.32 A	370 W	\$679.95	LPJ024A-F	802.3af PoE Gigabit Injector, 24-Port
	24	48 VDC 0.32 A	370 W	\$829.95	LPJ024A-FM	802.3af PoE Gigabit Managed Injector, 24-Port
802.3at	1	56 VDC 0.60 A	33.6 W	\$59.95	LPJ001A-T	802.3at PoE Gigabit Injector, 1-Port
	8	56 VDC 0.60 A	269 W	\$679.95	LPJ008A-T	802.3at PoE Gigabit Injector, 8-Port
	8	56 VDC 0.60 A	269 W	\$899.95	LPJ008A-TM	802.3at PoE Gigabit Managed Injector, 8-Port
	16	56 VDC 0.60 A	538 W	\$829.95	LPJ016A-T	802.3at PoE Gigabit Injector, 16-Port
	16	56 VDC 0.60 A	538 W	\$1099.95	LPJ016A-TM	802.3at PoE Gigabit Managed Injector, 16-Port

## Let Black Box help you build a complete PoE solution to suit your specific needs.

We can help you use PoE devices to expand your network for:

- VoIP phones
- Retail video kiosks
- Video surveillance
- Smart signs
- Wi-Fi access points
- Point-of-information systems
- Building management

If you're ready to start saving money and time with PoE, contact one of our infrastructure specialists at 888-245-6215.

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