

Power over Ethernet Chassis and Modules

Installation and User's Guide



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Using This Guide

Purpose of Guide

This document provides information and procedures for the product installation and operation of the LP2403 PoE 3 Slot Chassis, LP2401 PoE 1 Slot Chassis and Rack mount Kit, LP2408 8 Port Module, LP2404 4 Port High Wattage Module and LP2411 Cover Plate.

Who Should Use this Guide

This document is intended for technical personnel responsible for installing and operating Power over Ethernet products in a Local Area Network (LAN) environment.

To use this document effectively, you should have a working knowledge of Local Area Networking (LAN) concepts and hardware installation. In addition, you should be familiar with the following:

- Connection of Patch Cables with RJ45 connectors
- LAN addressing map for your particular Network
- Mounting of Network hardware in a 19" equipment rack
- Local practices for power cord connections

If You need Help

For additional support related to the contents of this document, pre-installation of product or post installation support, please contact LPS using one of the following methods:

Phone	1-510-275-4572
Fax	1-510-661-0855
Email	support@lan-power.com
Web Address	www.lan-power.com
Mail	LAN Power Systems 47835 Westinghouse Drive Fremont, CA 94539

Before contacting LPS for technical support, please have the following information ready:

- Your LPS product model number and unit serial number
- A description of the failure or symptoms of problem
- A description of any action(s) already taken to resolve the problem (e.g., changing ports , rebooting the unit, etc...)
- The type of End device being powered including Manufacturer name and part number
- Powering requirements of the End device
- A description of your Network environment (layout, Ethernet switch description, cable type, etc...)
- The unit history (i.e., have you returned the unit before, is this a recurring problem, etc...)

Functions and Features

The LPS 1 Slot and 3 Slot Chassis and Modules support powering applications in which AC Power is difficult or costly to access, such as VoIP Phones, Wireless LAN Access Points, Internet Security Cameras, or other Network devices.

The Chassis and Modules act as a “patch panel” and add ~48 VDC to unused (non-data) wires in a standard Category 5, 5e, or 6 Ethernet cable. The unit delivers both data and power over a single standard Ethernet cable to an End device designed to receive both Data and Power through its RJ45 connector.

Key features of the Chassis and Modules include:

- Exceeds IEEE 802.3af Power over Ethernet Standards
- Supports Data links at 10Mbps, 100Mbps or 1000Mbps
- 8 Port Module provides output wattage up to 18 Watts on all ports simultaneously as needed
- 4 Port High Wattage Module provides output wattage up to 36 Watts on all ports simultaneously as needed
- Chassis allows for Hot-Swapping of Modules
- Use any Module or Module Combination
- Over Voltage current and Short Circuit protected
- Each individual Module port is micro-fused

Functions and Features continued

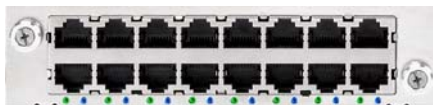
- Removable Power Cord w/IEC-320-C13 connector
- Data and Power carried on same Ethernet cable
- 19" Rack mount tabs included and installed on 3 Slot Chassis
- 19" Rack mount Kit included with 1 Slot Chassis

LED indicators and functions

Each Module port has its own LEDs which display:

- Green-ON-Solid: Power available from Chassis
 - Green-OFF: No Power available from Chassis
- Blue-Flashing: No Device connected to that port
 - Blue-ON-Solid: Device connected and power flowing to the device
 - Blue-OFF: Device connected - No power flowing to the device (incorrect match between device power requirement and 48V IEEE 802.3af PoE)

See Section 3, Troubleshooting, if Ethernet and Power cords are properly attached and if both LED's are not on in a steady GREEN and BLUE condition.



Installation and Connection



Electrical Hazard: Only qualified personnel should install this unit. Read instructions before attempting to install this unit.

Verifying Contents of Package

Unpack the Chassis and Modules and verify that you have all of the following items:

- 3 Slot PoE Chassis with Rack mount tabs OR
- 1 Slot PoE Chassis with Rack mount Kit
- Power Cord for Chassis
- Correct number of Modules and/or Cover Plates for your particular application and Chassis size

Technical Considerations

Before you mount the Chassis and Modules in a fixed location, consider all of the following:

- Determine optimal placement, check patch cord routing to Ethernet Switch and AC outlet location.
- Collect and document Network information as required.
- Ensure the cable length from the Ethernet Network Switch to the Powered End device does not exceed 100 meters total length, including patch cables.

Note: The Chassis and Modules are not a repeater and do not amplify the Ethernet data signal. The Chassis and Modules must be used in conjunction with an Ethernet Switch.

CAUTION: Observe the following considerations when installing the Chassis and Modules.

- Connect the Chassis to a grounding type AC outlet (100-240 VAC), with a maximum 15A circuit breaker, using the standard power cord supplied.
- Allow for easy access to disconnect the unit power cord from the AC outlet or UPS, if necessary.
- Do not cover the unit or block airflow with any other objects. Keep the unit away from excessive heat, humidity, vibration and dust.
- The Chassis is designed for installation in a wiring closet.
- Installation must at all times conform to local regulations.
- There are no user serviceable parts inside the Chassis or Modules. If support is needed, refer to "If You need Help" on page V.
- SELV - Safety Extra Low Voltage (Connect only to PoE Networks without routing to the outside plant).



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Technical Considerations continued

Rack Mount Considerations

- Elevated Operating Ambient - If installed in a closet or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Safety Instructions: The means of connection to the mains supply is the detachable power cord of the equipment. The equipment disconnect device is the appliance inlet. The AC socket outlet shall be installed near the equipment and shall be easily accessible.

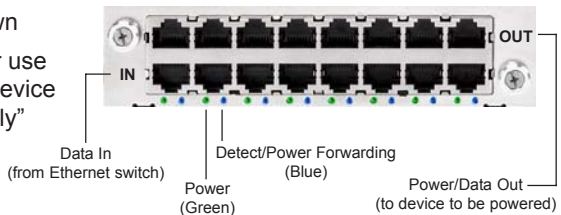
Powering Up the Chassis and Modules

Plug one end of the power cord into the chassis and the other end into a grounded AC power source. Units are typically connected to a power strip or other power outlet that may be cycled on and off. An uninterruptible power supply (UPS) may be used. This assures uninterrupted power to the End devices should there be a loss of building power.

Next, install Module(s) into Chassis slot(s). Any slot may be used. Carefully align card edges of Module with the card guide slots of the Chassis. Slide Module in almost all the way until resistance is met. Push each side of Module with equal pressure until Module seats into backplane connector. LED's will light when connected. Tighten Module thumbscrews until snug. Do NOT overtighten thumbscrews or they will break or the Chassis threads will become stripped. Install cover plates over any unused slots with provided screws.

LP2408 8 Port Module shown

“This product is intended for use in a UL Listed Networking Device models LP2403, LP2401 only”

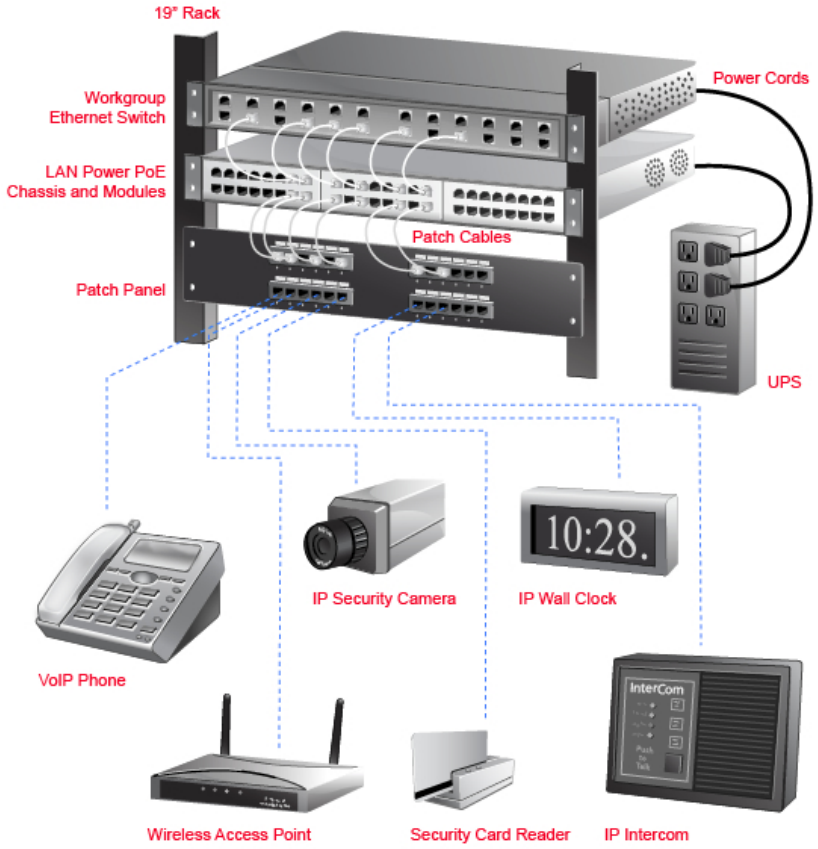


Check to make sure each module installed has its power LEDs lit Green.
Make sure any module without lit power LEDs is installed snugly into the chassis backplane and the thumbscrews are tight.

Next, attach a LAN data cable patch cord of minimum Cat5 cable grade from the Ethernet Switch port to the RJ45 connector on a Module Port marked “IN”. Then attach a second patch cable from the “OUT” RJ45 connector on the same Module port to the structured wiring connection leading to the device to be powered. Turn on power source. The “IN” LED on the Module will glow “GREEN”. If End device to be powered is already installed on Network, the “OUT” LED will glow “BLUE”. The Chassis and Modules are now correctly installed and operating.

Typical Installation of Chassis and Modules

(3 Slot Chassis shown)



Troubleshooting

Refer to the Troubleshooting Checklist for a list of problems and recommended actions to resolve the problem. If additional support is needed, refer to “If You need Help” on page V.

Following the Troubleshooting procedures below will usually resolve a Power over Ethernet Installation problem. The LAN Power Support Team has found that these are the most often encountered trouble items when adding a Modular PoE Chassis to an existing Ethernet Network.

Modular PoE Chassis Troubleshooting Checklist:

Problem 1:

The Modular PoE Chassis is plugged in but “Power In” LED is not lit (Green) on some or all modules or module ports.

Recommended Actions:

Verify the power cord is plugged in all the way into the PoE Chassis.

Verify the AC connection is “hot” by plugging in some other device and making sure there is actually power at the outlet. Input voltage must be from 90-264 VAC and 50-60Hz.

Verify that all modules are installed correctly, pushed in and seated fully into backplane connectors and thumbscrews are snugly tightened (Caution: Do NOT over tighten thumbscrews or they will break) then check again for all “Power In” LEDs to be lit (Green). If any module “Power In” LEDs are not lit (Green) please call or write to LAN Power Systems for Technical Support.

- Troubleshooting Checklist continued on next page -

Troubleshooting Checklist (continued)

Problem 2:

The Modular PoE Chassis is plugged in and all “Power In” LEDs are lit (Green). But the “Power Out” LEDs are not lit solid (Blue) and End devices are not being powered.

Recommended Actions:

Verify use of working patch cables of at least Category 5 grade. Verify they are Straight-through patch cables and NOT Cross-over cables. Verify connection of good patch cable from Ethernet Switch port to “IN” RJ-45 connection on PoE Chassis module. Verify connection of good patch cable from “OUT” RJ-45 connection on PoE Chassis module to Patching panel connection linking to End device to be powered. Make certain “IN” and “OUT” connections are from SAME module port (any port on module may be used).

IF “OUT” LED on PoE Chassis module is still not lit solid (Blue), continue with these steps.

Bring End device to be powered into the same room (wiring closet or lab) where you are working and connect it directly to the patch cable already attached to “OUT” RJ-45 Connector on PoE Chassis module. If “OUT” LED lights up solid (Blue) and power light is now lit on the End device, the PoE Chassis module port is working fine.

The problem must be then in the Cable link going out to where the End device was first located. PoE requires the use of all 8 wires in the LAN Data cable. It is possible not all 8 wires are available or terminated in that particular link in the Structured Cabling System. Try using a different Cable link to a nearby or similar location and see if the PoE Chassis module can now power the End device remotely using that Cable link. OR the patch cord from the end of the Cable link to the End device could be bad, try replacing with another known good patch cable.

- Problem 2 continued on next page -

Troubleshooting Checklist (continued)

If You have the End device to be powered connected locally to the PoE Chassis, with known good patch cords, and the “OUT” LED on the PoE Chassis does not light up (Blue) and power the End device, check the following. Verify that the Make and Model of End device you are trying to power is actually made from the Manufacturer to accept PoE. If so, verify that the style of PoE (protocol) that the End device wants to receive is the same style that the PoE Chassis is putting out.

Example: the PoE Chassis is putting out IEEE 802.3af PoE. The End device must be built ready to accept IEEE 802.3af PoE. Some products in the marketplace are not, some accept other PoE styles like legacy Cisco CDP style PoE (see Support section, Compatible Products listing at www.lan-power.com). Others need 24v or 12v or 5 volts input. LAN Power Systems has Voltage Adapters and Power Pin and Data cables available for these low voltage PoE applications (see Products section of LAN Power Website at www.lan-power.com).

- Troubleshooting Checklist continued on next page -

Troubleshooting Checklist (continued)

Problem 3:

PoE Chassis module port has Input and Output LEDs both lit (Green and Blue), End device is being powered, but End device has no Data link from the Ethernet Switch (is not responding to the Network).

Recommended Actions:

Verify Ethernet Switch port is good, turned on, and not being blocked for traffic forwarding by either a hard set or soft set in Network Management Software.

Check or change out patch cord from Switch port to PoE Chassis, making sure a Straight-through patch cord is being used and NOT a Crossover cable.

Verify Cable link to End device is at least Category 5 and has a distance of no more than 100 meters total length, including patch cables. If a Cable testing unit is available, wring out the data link to make sure there are no hidden breaks or damage to any of the cable's 8 wires and that all RJ-45 connection points along the data link are good.

Try using a different End device. If the new End device works and the Data link works correctly, the problem is with the End device. Speak with that Manufacturer for Technical support or return of the problem End device.

If these actions have all been taken and you still are not getting a functional Power and Data link to your End device, please call or write to LAN Power Systems for additional support and troubleshooting ideas.

Hardware Specifications

This appendix lists the LP2403 PoE 3 Slot Chassis, LP2401 PoE 1 Slot Chassis and Rack mount Kit, LP2408 8 Port Module and LP2404 4 Port High Wattage Module hardware and electrical specifications.

Regulatory Compliance Standards

This equipment meets the following safety and electromagnetic compatibility (EMC) requirements:

Safety	UL 60950-1, CSA C22.2 No. 60950-1-03
Electromagnetic Compatibility (EMC)	VCCI 2001 ClassB, 47 CFR Parts 2 and 15, EN55022, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11

Safety Approvals

The equipment meets the following safety approvals:



Physical / Environmental Specifications

Chassis Type: **Modular, 3 Slot, all metal construction**

Height: 1.75" (44.5mm)

Width: 17.5" (444.5mm)

Depth: 16.25" (412.8mm)

Chassis Weight: 10 lbs. (4.5 kg)
(with three 8 Port Modules installed)

Chassis Mounting: Rack mount tabs included for 19" rack mounting. Add approx. 3" to depth for power cord exit

Chassis Type: **Modular, 1 Slot, all metal construction**

Height: 1.75" (44.5mm)

Width: 12.0" (304.8mm)

Depth: 10.25" (260.4mm)

Chassis Weight: 3.5 lbs. (1.6 kg)
(with one 8 Port Module installed)

Chassis Mounting: Shelf mount or use included Rack mount Kit. Add approx. 3" to depth for power cord exit

Module Types Insert or Remove while Chassis is powered (Hot-Swappable)

8 Port Module: 8 Female RJ45 Data Input ports
8 Female RJ45 Data+PoE Output ports

4 Port HW Module: 4 Female RJ45 Data Input ports
4 Female RJ45 Data+PoE Output ports

Cover Plate: Metal, covers one empty Chassis slot, attaches with 2 screws (included with Cover Plate)



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Physical / Environmental Specifications continued

LED Indicators (built into Module ports)

2 for each port on Module

Left hand side(IN): Power available to forward (Green)

Right hand side(OUT): Detect and power forwarding (Blue)

Environmental Specifications

Operating Temperature: 32° to 105° F / 0° to 40° C

Storage Temperature: 14° to 140° F / -10° to 60° C

Relative Humidity: 10% to 90% non-condensing

Operating Altitude: -1,000 to 10,000 feet above Sea level

-305 to 3,048 meters above Sea level

Ethernet Data Throughput Speeds

10 Mbs Ethernet, 100 Mbs Fast Ethernet

or 1000 Mbs Gigabit Ethernet supported

Connector Type

Shielded RJ-45, meets EIA 568A and 568B

Electrical Specifications and Properties

AC Power Input

Power Cord type:	Removable with IEC 320-C13 connector on Chassis end, North American 3-Pin grounded connector on outlet end
Power Supply:	Triple, 150W each for 3 Slot Chassis Single, 150W for 1 Slot Chassis
Voltage Range:	90 - 264 VAC
Voltage Rating:	100 - 240 VAC
Frequency Range:	47 - 63 Hz
Frequency Rating:	50 - 60 Hz
Input Current:	5 A (rms) Max. @Voltage Range and Voltage Rating

Maximum Thermal Outputs

LP2403 Chassis with three 8 Port modules installed (24 Ports), performing at max. output (18 watts per port) with all ports active, the total heat output dissipated from the Chassis and modules is 352 BTUs per hour into the local wiring closet.

LP2401 Chassis with one 8 Port module installed (8 Ports), performing at max. output (18 watts per port) with all ports active, the total heat output dissipated from the Chassis and module is 118 BTUs per hour into the local wiring closet.

Electrical Specifications and Properties continued

DC Power Output

PoE Protocol:	IEEE 802.3af Standard
Power on Data Pins:	4 & 5 (+), 7 & 8 (-) (unused pairs)
Output Voltage:	48VDC (+10%-0)
Max. Power on Port:	18W (exceeds PoE Standard)(LP2408) 36W (LP2404)
Load:	0A (Min.) 0.35A (Max.)
Regulation (Line/Load):	± 4%
Efficiency:	>75%
Hold-up Time:	20mS Min. @ 240VAC Input
Module to Module Isolation:	1500 Vrms
Overload Protection:	If current reaches 400-450 mA for 300-400 ms, then the port shuts down

Ripple and Noise*	Vp-p*
<500Hz	0.50
500Hz-150KHz	0.15
150KHz-500KHz	0.15
500KHz-1MHz	0.10

*As per IEEE802.3af Table 33-5



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