Industrial Power over Ethernet Products
PoE Overview

Power over Ethernet (PoE) is a technology that utilizes an RJ-45 copper port to support connections up to 100 meters and speeds up to 10mbps, 100mbps, and 1,000mbps over a single twisted pair Ethernet cable. A PoE port provides data transmission and utility just like any standard Ethernet port, but it also supplies electrical power over the same cable. Antaira’s industrial PoE switches meet IEEE standards 802.3af (PoE), 802.3at (PoE+), and 802.3bt (PoE++). The more recent PoE standards are backwards compatible with the older standards. These PoE standards create a regulated level playing field for productization allowing more product options and companies to be compatible with one another.

PoE devices can be one of two types - one where the device injects or transmits power (Power Sourcing Equipment (PSE)) and the other where a device requires power to be drawn (Powered Device (PD)). Typically, PSEs are industrial networking switches and common PDs are VoIP phones, wireless access points, and IP cameras. The PSE and PD devices are networked/powered together by a sub-standard of IEEE 802.3af called Mode A (Endspan) and Mode B (Midspan). Mode A utilizes an Ethernet switch as the PSE and combines data and power onto an Ethernet cable while only utilizing pins 1,2(+ voltage) and 3,6(- voltage). Mode B is used in the design of injectors to add PoE power to an Ethernet cable connecting a PD device to a non-PoE network device. Mode B only utilizes pins 4,5(+ voltage) and 7,8(- voltage) which are also known as “spare pairs”. In Mode B, the PSE supplies the positive and negative voltage for the pin assignments. In order for a PD to be compliant with IEEE 802.3af/at, it must be able to accept Mode A or Mode B. Keep in mind, IEEE 802.3bt does not have a Mode A or Mode B, because it uses electrical power over twisted pair Ethernet cable. A PoE port provides data transmission and speeds up to 10mbps, 100mbps, and 1,000mbps over a single twisted pair Ethernet cable. A PoE port provides data transmission and utility just like any standard Ethernet port, but it also supplies electrical power over the same cable. Antaira’s industrial PoE switches meet IEEE standards 802.3af (PoE), 802.3at (PoE+), and 802.3bt (PoE++). The more recent PoE standards are backwards compatible with the older standards. These PoE standards create a regulated level playing field for productization allowing more product options and companies to be compatible with one another.

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PoE Patents

Antaira Technologies is proud to have been granted patented technology features on our industrial equipment. These patents were issued for select models on our industrial PoE switches. To learn more about what each patent does, visit our website www.antaira.com/patented-technology

Active vs Passive PoE

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Active PoE utilizes IEEE 802.3af/at/bt providing 48VDC in outgoing power and will automatically do a “handshake” to negotiate the correct power between the switch and Powered Device (PD). Passive PoE is not compatible with IEEE standards and it provides 24VDC of constant outgoing power regardless of the voltage requirements at the end device. Passive PoE is proprietary to manufacturers who create their own PoE standard. Antaira only offers active PoE switches to support the industry standard for higher security. Implementing active PoE switches into applications allows for better networking communication with other PoE devices that follow the same standards.

Low Voltage Technology

(Look for model names with a -24)

The powering of Power over Ethernet (PoE) devices is critical. Since most PoE networking applications utilize DC power due to its reliability, the typical voltage supported is 48V. Sometimes an obstacle arises when a Powered Device (PD) only has 12V, 24V, or 36V of power available but needs 48V of PoE power to operate equipment in an application. This issue typically requires a switch and booster to be installed for the networking connectivity to function properly. Antaira Technologies specializes in an industrial PoE low voltage input range of 12-36VDC line with an internal voltage booster to support a standard 48VDC PoE power output.

Antaira’s industrial low voltage PoE unmanaged and managed switches are the most economical and efficient solution. Antaira offers a wide array of low voltage (12-36VDC) PoE switches that will accept low voltages between 12 to 36 volts to power on and supply the full IEEE 802.3 af/at/bt PoE in a single device. This eliminates the need for a separate step-up transformer and saves the much-needed networking space in an enclosure by using just one small form factor device.

- **Internal voltage booster**
- **Low power input (12-36VDC)**
- **Adheres to active PoE standards**

**Unmanaged models available in 5, 7, 8, 10, and 12 ports**

**Managed models available in 5, 6, 7, 8, 10, and 12 ports**
Managed PoE

Managed Ethernet switches enable network managers to remotely access a wide range of capabilities to configure, manage, and monitor a local area network. Antaira offers a wide range of Power over Ethernet (PoE) models that provide light layer 3 network management software and fiber connection support. Built-in event handling functions allow users to have immediate event notices to improve remote monitoring and management. Antaira’s industrial-grade managed PoE switches are ideal for harsh environments where real-time performance is critical.

- 10/100/1000TX Ethernet speed options
- High power PoE IEEE 802.3af/at/bt compliant
- Layer 2 network management support: PoE Ping Alive, SNMP, VLAN, IGMP, and QoS
- Wide operating temperature (-40°C to 75°C)

**Models available in 5, 6, 7, 8, 10, 12, 16, 18, 20, and 26 ports**

Persistent PoE

The convenience of PoE power has spread from simple cameras to much more complicated devices such as PLCs and complex cameras. These more complicated devices often take a longer time to reboot which can possibly be detrimental to their function when randomly rebooted. In instances where switches may need to reboot during a firmware upgrade, Persistent PoE keeps providing power to the PoE devices connected when the switch is rebooted.

Power Remote Reset Technology

Connecting to remote devices, whether 10 feet in the air or 10 miles away has been made possible through the use of fiber optic. Budgets often drive the features of a remote device, resulting in an unmanaged switch or media converter possibly being used. If the PoE device connected remotely needs to be rebooted, Power Remote Reset Technology can be turned on. This allows a link disconnect on the fiber to turn power off on the twisted pair of the remote unit, effectively power cycling the remote device.

iPoE Budget Control

The PoE power budget determines the total watts that can be drawn through the PoE system to power remote devices. This power budget changes depending on the voltage being supplied to the switch. iPoE Budget Control automatically adjusts the amount of power being allowed to be drawn by the PoE devices to avoid any damage that may occur if too much power is allowed to be used.

Unmanaged PoE

Unmanaged Ethernet switches are basic plug-and-play devices with no remote configuration, management, or monitoring options. These switches are cost-effective and typically are used in field level or small networks where management is unnecessary. Antaira offers a wide range of Power over Ethernet (PoE) plug-and-play models that boast a variety of port counts, fiber connectivity, and wide temperature ratings perfect for industrial PoE applications.

- 10/100/1000TX Ethernet speed options
- High power PoE IEEE 802.3af/at/bt compliant
- Wide operating temperature (-40°C to 75°C)
- Compact layer 2 industrial Ethernet switches
- Surge and ESD protection
- Plug-and-play functionality

**Models available in 5, 6, 7, 8, 10, 12, 16, 18, 20, and 26 ports**

Unmanaged PoE
While the transition from 802.3af PoE (15 watts per port) to 802.3at PoE (30 watts per port) is somewhat simple to implement, the transition to 802.3bt requires quite a bit more engineering, especially on the part of the PSE designer. In order to achieve 30 watts per port from the original 15 watts per port, we need to increase the minimum voltage from 44VDC to 50VDC and to increase the maximum current from 350 mA to 600 mA. Both the 802.3af and 802.3at standards only require two of the four pairs available on a CAT 5 cable to be used for power injection, so the PSE supplier is free to choose to support Mode A (endspan) or Mode B (midspan). This makes the migration from 802.3af to 802.3bt seamless.

This is not the case with the new 802.3bt standard. To start, there are two different versions manufacturers can choose to support. One will allow for up to 60 watts to be supplied by a port and the other will allow for up to 90 watts to be supplied by a port. As with the previous standards, the actual power available will depend on the losses in the cable, so PD suppliers will need to consider this when deciding which standard to follow. The major difference is that PSE manufacturers will no longer be able to only use two of the four pairs of conductors in a CAT 5 cable, but will need to use all four pairs. Effectively, the power is being split between what was Mode A and Mode B, so that both channels can carry half the power. In order to achieve the full power that the specification allows, the minimum supply voltage has been raised to 52VDC and the maximum current has been raised to 960 mA.

The other great feature of the new 802.3bt specification is the ability for each power channel to request different levels of power. For example, an IP camera with PTZ control, heater/blower, and also an IR source can have the camera and PTZ controller powered from one channel, and the heater/blower and IR source powered from the other channel.

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**802.3bt Products**

- **Ethernet Switches, Injectors & Media Converters**

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**LMP-0702G Series**

- 7-Port Industrial Gigabit IEEE 802.3bt PoE++ Light Layer 3 Managed Ethernet Switches

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**INJ-C200G Series**

- Industrial Gigabit IEEE 802.3bt PoE++ Injectors with 1 PoE PSE Port

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**IMP-C1000 Series**

- Compact Industrial Gigabit IEEE 802.3bt Ethernet-to-Fiber Media Converters

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**LMP-1204G Series**

- 12-Port Industrial Gigabit IEEE 802.3bt PoE++ Unmanaged Ethernet Switches

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**LNP-0500G Series**

- 5-Port Industrial Gigabit IEEE 802.3bt PoE++ Unmanaged Ethernet Switches

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**LNP-C501G Series**

- 5-Port Industrial Gigabit IEEE 802.3bt Ethernet-to-Fiber Media Converters

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**LMP-C602G Series**

- 6-Port Industrial Gigabit IEEE 802.3bt PoE++ Managed Ethernet Switches

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**LMP-0702G Series**

- 7-Port Industrial Gigabit IEEE 802.3bt PoE++ Light Layer 3 Managed Ethernet Switches

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**INJ-C201G Series**

- Industrial Gigabit IEEE 802.3bt PoE++ Injectors with 1 PoE PSE Port

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**Supported Modes**

- Mode A, mode B, 4-pair mode

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**Property**

- **802.3af (802.3at Type 1)**
  - "PoE" 12.95 W
  - "PoE+" 25.50 W
  - "4PPoE" 51 W

- **802.3at Type 2**
  - "PoE+" 15.40 W
  - "4PPoE" 30.0 W

- **802.3bt Type 3**
  - "4PPoE" 51 W

- **802.3bt Type 4**
  - "4PPoE" 71 W

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**Power Available at PD**

- 12.95 W

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**Maximum Power Delivered by PSE**

- 15.40 W

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**Maximum Power**

- 25.50 W

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**Voltage Range (at PSE)**

- 44.0–57.0 V

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**Voltage Range (at PD)**

- 37.0–57.0 V

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**Maximum Current Imax**

- 350 mA

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**Maximum Cable Resistance Per Pairs**

- 20 Ω (Category 3)

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**Power Management**

- Three power class levels (1-3) negotiated by signature

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**Operating Temperature**

- 5 °C (41 °F) with one mode (two pairs) active

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**Supported Modes**

- Mode A, mode A, mode B

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The latest standard for PoE can send over 90 watts of power across an Ethernet cable terminated with RJ45 connectors. The Safe PoE Disconnect prevents sparking when disconnecting the cable, as it safely turns off the power before the connection is made. Safe PoE allows the PoE to be safely turned off before disconnecting the cable, preventing any damage to the cable or socket.
**Law Enforcement**

License Plate Recognition

Application

As the budgets of local law enforcement agencies are stretched thin, there is a need to operate more efficiently. Investing in a license plate recognition system can assist in many areas including providing enhanced security, fighting crime, enforcing toll collection, comparing license plates to a list, providing parking revenue management, providing access control, and more. Because of the nature of the deployment, ruggedized equipment is necessary for a system to be successful.

Application Requirements

- Wide operating temperature equipment to withstand environmental conditions
- PoE switches/injectors to power surveillance cameras and network other equipment like PCs and modems
- Ability to power from a 12VDC solar battery and still be IEEE 802.3af/at/bt compliant on the power output

Key Product

**LNP-0500G-bt-24**

5-Port Industrial Gigabit IEEE 802.3bt PoE++ Unmanaged Ethernet Switch

**Solution**

**LNP-0500G-bt-24**: Industrial bt switch capable of powering the newer surveillance cameras that use 60 watts or more. It also has the ability to power from a 12VDC solar battery and still inject 802.3bt compliant power to the devices. The wide operating range of -40°C to 75°C allows it to withstand any environment.

**Surveillance**

Public Bus

Application

More and more municipal transit agencies are upgrading their fleets with modern technology such as IP cameras for better security and with automated fare collection systems. The security aspect typically involves installing a number of IP cameras along with a DVR for storage, while the fare collection system will often require various types of card or token readers to log each rider. All of this equipment requires networking by a ruggedized PoE switch that can power from 12VDC or 24VDC.

Application Requirements

- Minimum 8 port Gigabit PoE switch to power cameras and network entire system together
- Serial device server to allow card reader to communicate via IP network
- 802.11AC Wi-Fi client to allow for fast downloads when the bus comes back into the depot
- All equipment must be able to withstand shocks and vibration and power from 12VDC

Key Products

**LNP-0800G-24**: PoE switch capable of powering the IP cameras and has enough ports to also network the other devices on the bus.

**STE-501C**: Serial to Ethernet device server that can allow the card reader to communicate over an IP network.

**ARS-7235**: High-speed 802.11AC radio that will automatically connect to the depot’s wireless network once the bus comes within range.

**ARX-7235-AC-PD-T**: IP67 rated outdoor 802.11AC access point that can act as the high-speed wireless network for the depot.

**Key Products**

**LNP-0800G-24**: 8-Port Industrial PoE+ Unmanaged Ethernet Switch

**STE-501C**: 1-Port RS-232/422/485 To Ethernet Device Server

**ARS-7235**: Industrial Outdoor 802.11a/b/g/n/ac Dual Radio Wireless AP/Client/Bridge/Repeater/Router with PoE PD; EOT: -45°C to 70°C

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**Application**

Processing plants often require filling bottles to specified levels. To verify that the criteria are being met, special cameras are used to view these levels at high speeds. The images from the cameras are transferred back to a processor that can determine if a bottle has not been filled enough for maybe too much.

**Application Requirements**

- PoE power may be needed to deliver power to the vision cameras.
- High-speed data is required to transfer data from the cameras to the processor.
- The need to communicate across a wide variety of media and tie in the latest communications with existing legacy devices.

**Solutions**

- **LMP-1002G-10G-SFP-24**: These industrial switches not only provide PoE power to the vision cameras but also have a 10gig high-speed fiber backbone that can be used to transfer large amounts of data being generated by the vision cameras.
- **STE-501C**: Provides connectivity between serial and Ethernet networks to allow modern Ethernet-based products to work with legacy serial devices. A high-speed Ethernet network is required for the machine vision cameras to get the data to the processor.
- **AMS-2111**: When cabling isn’t an option, wireless devices can be used to make connections quickly and economically.

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**Application**

Public transportation entry and exit points where ticket transactions occur, are often places where safety is a critical concern. Modern surveillance systems are capable of comprehensive coverage of an area at a fraction of the cost of older systems. Industrial Ethernet switches and wireless devices are found at the heart of these modern surveillance systems.

**Application Requirements**

- PoE power may be needed to deliver power to the surveillance cameras and wireless access points.
- Wireless communication for systems where it may be more convenient and economic than traditional twisted pair communications.
- Fiber optic cable can transport the information collected in an area back many kilometers/miles to a control room.

**Solutions**

- **LMP-1002G-SFP-T**: This ruggedized industrial switch is capable of powering all the cameras and wireless access points but also allows the engineers to remotely restart any PoE device connected if needed.
- **AMS-2111**: Having a small economical wireless device will give wireless capabilities to devices that would not ordinarily have that feature. Here it allows the data collected from the entry gate to be connected to the wireless network.
- **ARY-7235-AC-PD**: Enclosed in a plastic housing, this wireless access point is impervious to damage that can be caused by the buildup of dust, often seen in train stations.
Unmanaged PoE Switches

**Standard Voltage (48-55VDC)**

- **INJ-C201G** Series: Industrial Gigabit IEEE 802.3bt PoE++ Injectors with 1 PoE PSE Port
- **LNP-0500** Series: 5-Port Industrial PoE+ 10/100TX Switches
- **LNP-0500G** Series: 5-Port Industrial PoE+ Gigabit Switches
- **LNP-0501** Series (SC/ST Connector): 5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port
- **LNP-0602** Series (SC/ST Connector): 6-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports
- **LNP-0702C-SFP** Series: 7-Port Industrial PoE+ 10/100TX Switches w/ 2 Gigabit SFP Ports
- **LNP-0702G-SFP** Series: 7-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports
- **LNP-0800** Series: 8-Port Industrial PoE+ 10/100TX Switches w/ 2 Gigabit Ports
- **LNP-0800G Series**: 8-Port Industrial PoE+ Gigabit Switches
- **LNP-1002C-SFP** Series: 10-Port Industrial PoE+ 10/100TX Switches w/ 2 Gigabit RJ45/SFP Ports
- **LNP-1002G-SFP** Series: 10-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports
- **LNP-1202G-SFP** Series: 12-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports
- **LNP-2602G-SFP** Series: 26-Port Industrial PoE+ Gigabit Switches w/ 2 8G SFP Ports

**LNP-0800-24** Series: 8-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports

**LNP-1002C-SFP-24** Series: 10-Port Industrial PoE+ Gigabit Switches w/ 2 Gigabit RJ45/SFP Ports

**LNP-1002G-10G-SFP Series**: 10-Port Industrial PoE+ Gigabit Switches w/ 2 10G SFP Ports

**LNP-1002G-24 Series**: 8-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports

**LNP-1202G-SFP Series**: 12-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports

**LNP-2602G-SFP Series**: 26-Port Industrial PoE+ Gigabit Switches w/ 2 8G SFP Ports

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**Low Voltage (12-36VDC)**

- **INJ-C201G-24** Series: Industrial Gigabit IEEE 802.3bt PoE++ Injectors with 1 PoE PSE Port
- **LNP-0500-24** Series: 5-Port Industrial PoE+ 10/100TX Switches
- **LNP-0501 Series (SC/ST Connector)**: 5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port
- **LNP-0500G Series**: 5-Port Industrial PoE+ Gigabit Switches
- **LNP-0800-24 Series**: 8-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports
- **INJ-C201G-24 Series**: Industrial Gigabit IEEE 802.3bt PoE++ Injectors with 1 PoE PSE Port
- **LNP-0501-24** Series: 5-Port Industrial PoE+ 10/100TX Switches w/ 2 Gigabit SFP Ports
- **LNP-1002C-SFP-24 Series**: 8-Port Industrial PoE+ Gigabit Switches w/ 2 Gigabit Ports
- **LNP-1002G-24 Series**: 8-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports
- **LNP-0500G-24 Series**: 5-Port Industrial PoE+ Gigabit Switches
- **LNP-0501-S3-24 Series**: 5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port; SC Connector
- **LNP-0501-ST-M-24 Series**: 5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port; ST Connector
- **INJ-0200G-60-24-T Series**: Industrial IEEE 802.3bt Gigabit Type 3 4PPoE Injector
- **LNP-0501-S3-24 Series**: 5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port; SC Connector
- **LNP-0800G-24 Series**: 8-Port Industrial PoE+ Gigabit Switches
- **LNP-0800G-24-T-CC Series**: 8-Port Industrial PoE+ Gigabit Switches w/ Conformal Coating
- **LNP-0800G-24 Series**: 8-Port Industrial PoE+ Gigabit Switches
- **INJ-0200G-60-24-T Series**: Industrial IEEE 802.3bt Gigabit Type 3 4PPoE Injector
- **LNP-0802-M-24 Series**: 8-Port Industrial PoE+ 10/100TX Switches
- **LNP-0802G-10G-SFP Series**: 10-Port Industrial PoE+ Gigabit Switches w/ 2 10G SFP Ports

* Antaira offers conformally coated products to prevent corrosion from gases, moisture, and debris found in toxic environments.
Managed PoE Switches
Standard Voltage (48-55VDC)

LMP-0501 Series (SC/ST Connector)
6-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port

LMP-0600 Series
6-Port Industrial PoE+ 10/100TX Switches

LMP-0601G-SFP Series
6-Port Industrial PoE+ Gigabit Switches w/ 1 SFP Port

LMP-0602 Series (SC/ST Connector)
6-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports

LMP-0702G-SFP Series
7-Port Industrial Gigabit PoE+ Managed Ethernet Switches

LMP-0800G Series
8-Port Industrial PoE+ Gigabit Switches

LMP-0804G-SFP Series
8-Port Industrial PoE+ Gigabit Switches w/ 4 SFP Ports

LMP-10002G-SFP Series
10-Port Industrial PoE+ Gigabit Switches w/ 2 Fiber Ports

LMP-1202M-SFP-T Series
12-Port Industrial PoE+ Light Layer 3 Managed Ethernet Switches

LMP-1202G-SFP Series
12-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports

LMP-1204G-SFP Series
8-Port Industrial PoE+ Gigabit Managed Ethernet Switches

LMP-2602G-SFP Series
26-Port Industrial PoE+ Gigabit Switches w/ 4 SFP Ports

LMP-2804GN-SFP-T Series
28-Port Industrial PoE+ Gigabit Switch w/ 4 RJ45/SFP Ports

Managed Switch Features & Highlights
- Network Redundancy: RSTP/MSTP, G.8032
- IGMP
- Quality of Service
- IEEE 802.1Q VLAN
- SNMP
- PoE Ping Alive
- Event Scheduling
- System Warning
- USB Data Load & Backup
- Port Mirroring
- Port Statistics & Control

About Antaira
Antaira Technologies is a leading developer and manufacturer of high-quality industrial networking and communication product solutions. Since 2005, Antaira has offered a full spectrum of product lines that feature reliable Ethernet infrastructures, extended temperature tolerance, and rugged enclosure designs. Our product lines range from industrial Ethernet switches, to industrial wireless devices, Ethernet media converters, industrial serial communications. Our vast professional experience has allowed us to deploy a wide array of products worldwide in mission-critical applications across various markets, such as, automation, transportation, security, oil and gas, power/utility and medical.

 Managed PoE Switches
Low Voltage (12-55VDC)

LMP-0501-M-24 Series
5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port; Multi-Mode

LMP-0501-24 Series
5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port; ST Connector

LMP-0501-S3-24 Series
5-Port Industrial PoE+ 10/100TX Switches w/ 1 Fiber Port; Single-Mode

LMP-0600-24 Series
6-Port Industrial PoE+ 10/100TX Switches

LMP-0601G-SFP-24 Series
6-Port Industrial PoE+ Gigabit Switches w/ 1 SFP Port

LMP-0602-M-24 Series
6-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports; Multi-Mode

LMP-0602-ST-M-24 Series
6-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports; ST Connector

LMP-0602-S3-24 Series
6-Port Industrial PoE+ 10/100TX Switches w/ 2 Fiber Ports; Single-Mode

LMP-0702G-SFP-24 Series
7-Port Industrial Gigabit PoE+ Light Layer 3 Managed Ethernet Switches

LMP-0800G-24 Series
8-Port Industrial PoE+ Gigabit Switches w/ 2 SFP Ports

LMP-0800G-SFP-24 Series
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