

Microchip PoE Powers Outdoor IP Cameras

Power over Ethernet (PoE) has been powering IP cameras for over 20 years. Powering outdoor IP cameras using indoor PoE switches or midspans in outdoor enclosures usually fails. That is why it is important to understand what to look for in an outdoor PoE switch or midspan.



The Evolution of Outdoor IP Cameras

Security demands are driving growth in today's outdoor camera market. Originally CCTV cameras dominated the market, but today they are being replaced by IP cameras. Homes and businesses wanting to secure entrances and exits, perimeters, parking lots and even smart city security applications are driving the demand for these cameras.

The growth is due to their higher resolution, enhanced functionality that is enabled by connecting the camera to a network. In addition, because it requires only a single Ethernet cable to connect both power and data, IP cameras are much easier to install. For these reasons, IP cameras are the first choice for advanced applications such as facial recognition. An added benefit of IP cameras is the ability to provide data, image and power over a single ethernet cable simplifying the installation. IP cameras can be powered using PoE.

The PoE Legacy

PoE was first pioneered by PowerDsine, today a Microchip PoE Business Unit, in 1998 when they introduced the first Power Source Equipment (PSE) semiconductor which put power on the ethernet cable, and the first Powered Device (PD) semiconductor which is installed in a device such as an IP camera to take the power from the cable. At that time, there were no PSEs designed into ethernet switches, so in 1999 PowerDsine introduced the first midspan, also known as an injector. This device, which is connected to a switch port that does not have power via an ethernet cable, injects power onto an output cable which is connected to the device.

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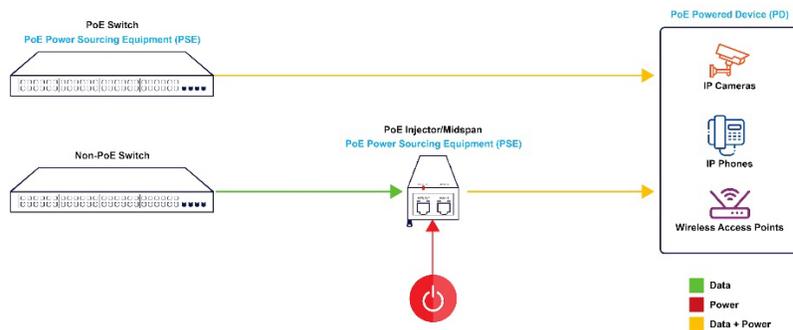


Figure 1: PoE switch and midspan powering devices

Even though there are PoE switches today, many IP camera manufacturers offer PoE Midspans as a powering option. This is because only 20% of installed switches can provide PoE. Additionally, due to the total power available, most PoE switches cannot provide full power on all ports. IP camera manufacturers offering a PoE midspan are assured their cameras have a power supply upon installation.

NEMA Enclosures Are Not Enough

There are different types of PoE midspans and switches designed to be deployed in different environments including indoor, industrial and outdoor. Since indoor units are less expensive, many try to place them in outdoor NEMA enclosures. The National Electrical Manufacturers Association (NEMA) has a rating system for enclosures of many different environments; however, placing a switch or midspan in an outdoor rated enclosure is not a viable solution.

In heat, the temperature inside a NEMA enclosure can get twice as hot as the ambient temperature. One solution is to install ventilation and a fan which will allow moisture and other elements to compromise the device. Cold can be another factor to impact functionality and the biggest challenge is protecting the unit against lightning strikes and other power surges. Most indoor and industrial units are not designed to withstand extreme heat or cold nor do they include surge protection. Those who have tried this solution eventually conclude the only solution is to use PoE midspans and switches that were designed to operate in an outdoor environment after experiencing high failure rates.

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Outdoor PoE Midspans and Switches Power IP Cameras

PoE outdoor midspans and switches are really the only solution for powering outdoor IP cameras. This is because they are designed and rated for the outdoor environment:

- **Temperature:** Temperature affects performance and outdoor cameras must continue to function in extended temperature ranges from -40° C to +50°C. It is very important that the design of the casing acts as a heat sink in order to be able to dissipate internal heat in extreme temperatures.
- **Ingress Protection (IP) rating:** The International Electrotechnical Commission (IEC) has developed the IP rating system for dust and water. An outdoor device should at least have an IP rating of 65 which is dustproof and resistant to low pressure water and volume. Many environments that have extreme storm conditions would require a minimum of an IP 66 rating which would be resistant to high pressure water and volume. An IP rating of 67 means the unit can even be submerged for up to 30 minutes. In addition, outdoor midspan and switch designs incorporate advanced level of surge protection up to 6kV.
- **Tamperproof:** Because these PoE midspans and especially switches are deployed outdoors, they should also be fully sealed and tamperproof. Some outdoor switches can only be configured by opening the unit. This subjects the unit to hacking. Any switch deployed outside must be able to be configured, managed and reset remotely. To ensure data integrity, look for switches that provide MAC based data authentication and network access control lists.
- **Security:** To prevent intrusion, outdoor PoE switches must also incorporate the very latest security measures. This must include user authentication where multiple levels of user privileges can be set up and managed locally or remotely. The switch must be capable of HTTPS and encryption. Certificate management provides network monitoring to prevent interruptions. Another important security feature to look for is Distributed Denial of Service (DDoS).
- **Beyond 100 meters:** PoE outdoor switches may be deployed a good distance from the source of the network which is usually housed indoors. Since an ethernet cable has a maximum length of 100 meters, to get the data to an outdoor switch may require several kilometers. For this, an added fiber port is the best solution. Some outdoor PoE switches do not offer a fiber SFP port while others offer a single port. The optimum solution is to have two fiber SFP ports that can be used to daisy chain and extend the reach of the network.

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Microchip Portfolio of Outdoor PoE Midspans and Switches

Microchip offers a complete line of outdoor **PoE midspans along with a 2nd generation PoE switch**. All are fully sealed with a temperature range to function in the coldest or hottest environments. They are IP 67 rated able to handle any rain, sleet or snow. And all come with industry leading 6kV surge protection.

Outdoor PoE midspans are available in IEEE 802.3 at (30W), bt Type 3 (60W) and bt Type 4 (90W) maximum power with a data rate of up to 1Gbps. Additionally, there are outdoor PoE midspans that have data rates of 2.5Gbp, 5Gbps and even 10Gbps.

The Microchip outdoor PoE switch is a 4 PoE Port IEEE 802.3bt Type 4 that can provide up to 90W on a single port. Along with all the features of our PoE midspans, this second-generation switch is remotely managed, contains all the necessary security functions and has two fiber SFP ports. The two fiber ports enable both daisy chaining to extend the network along with backup-failover should one of the fiber links be broken.

Active Solutions Addresses IP Video Deployment With PoE

Active Solutions LLC is a leading networking and communications systems integrator that is well known for designing security systems, deploying access control systems for buildings and developing products for street-level public video programs. A municipal client approached Active Solutions to design and install an outdoor IP video system featuring cameras in high-profile locations across multiple city sites including some in very hard-to-reach locations. It was a complex installation requiring significantly higher power consumption than traditional security cameras. Read the **case study** on Microchip's website to know why our PDS-104GO outdoor PoE switches were chosen to address the outdoor and power-related deployment challenges in the municipal video application.