



ZyPer PoE Devices

The Need for Shielded Ethernet Cables

Application Note (PoE Grounding Requirements)
Updated April 2024

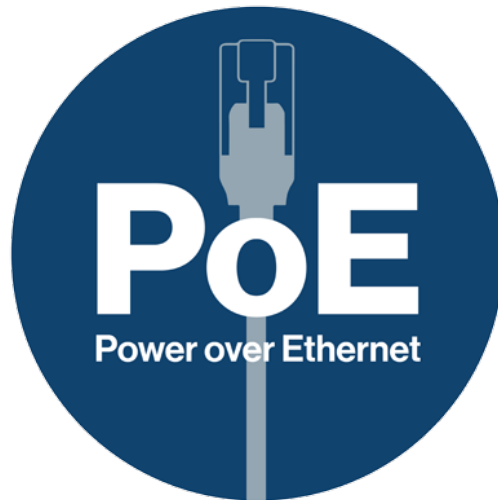


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Overview

Grounding is crucial for ensuring reliable operation in Power over Ethernet (PoE) systems. PoE technology enables both power and data transmission over Ethernet cables, which can lead to challenges related to electrical noise and voltage differentials. Proper grounding establishes a stable reference point for electrical signals, essential for device functionality and preventing disruptions.

In PoE systems, the convergence of power and data transmission increases the risk of interference. Without adequate grounding, electrical noise can compromise network performance. Furthermore, parasitic coupling phenomena can induce a 60V 60Hz signal onto the shielding of HDMI jackets, potentially leading to anomalous behaviors and PoE handshake failures. To combat these issues, proper grounding through shielded cable options such as F/UTP, S/UTP, F/FTP, S/FTP, SF/UTP, and SF/FTP is imperative.

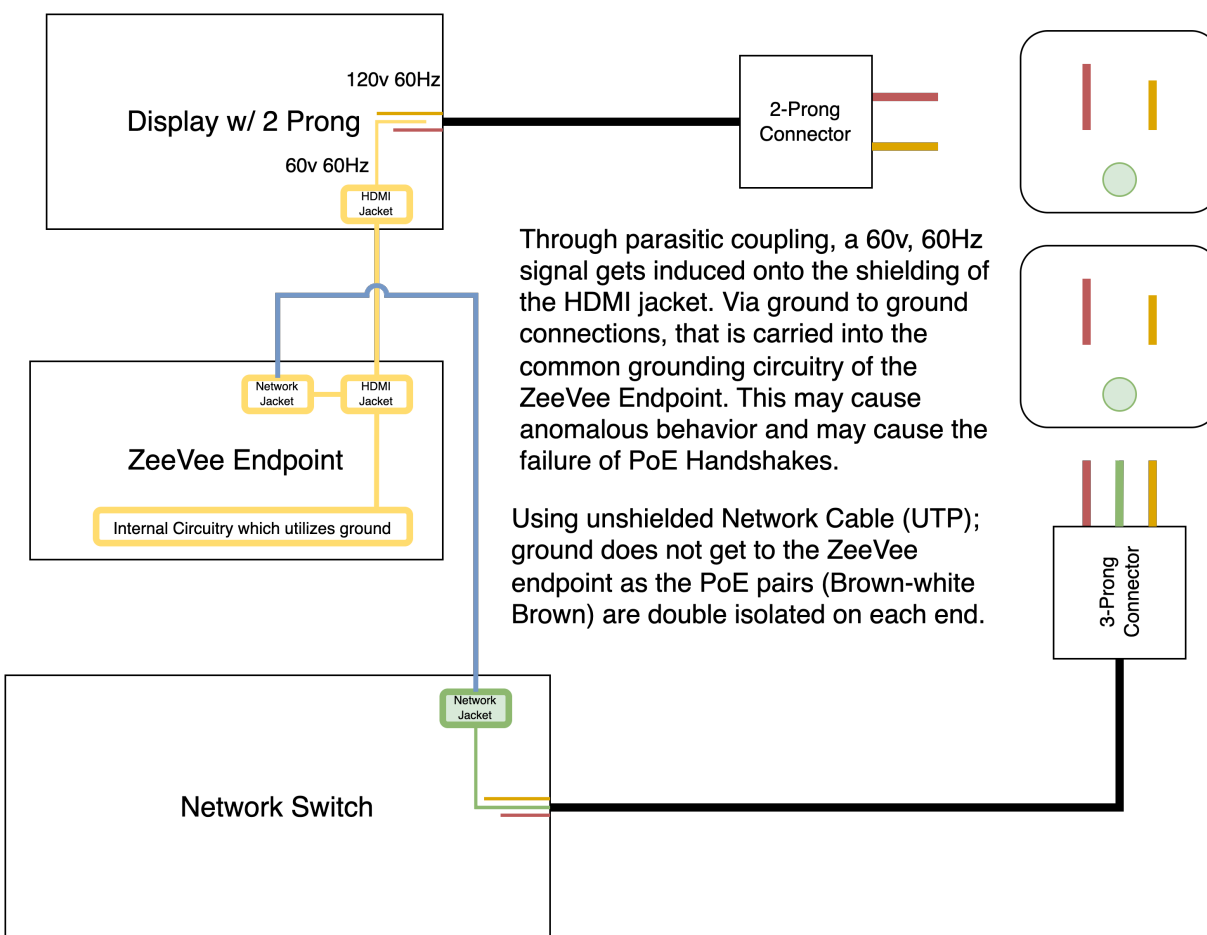
Inadequate grounding poses significant risks to the integrity of various signals in PoE systems. RS232 communication, for example, relies on a stable ground reference for accurate signal comparison. Without proper grounding, RS232 signals can become unreliable, leading to communication errors and system failures. Similarly, the operation of PoE relies on a solid ground connection to ensure efficient power delivery and data transmission. Any disruptions in grounding can result in PoE malfunctions or complete failure. Therefore, ensuring proper grounding is essential for maintaining the integrity and functionality of RS232, PoE, and internal components on a PoE powered AV over IP device.

In conclusion, proper grounding in PoE systems is paramount for maintaining reliability, performance, and signal integrity. By establishing a stable ground reference and mitigating electromagnetic interference, grounding ensures uninterrupted operation and safeguards against potential signal disruptions and equipment damage.

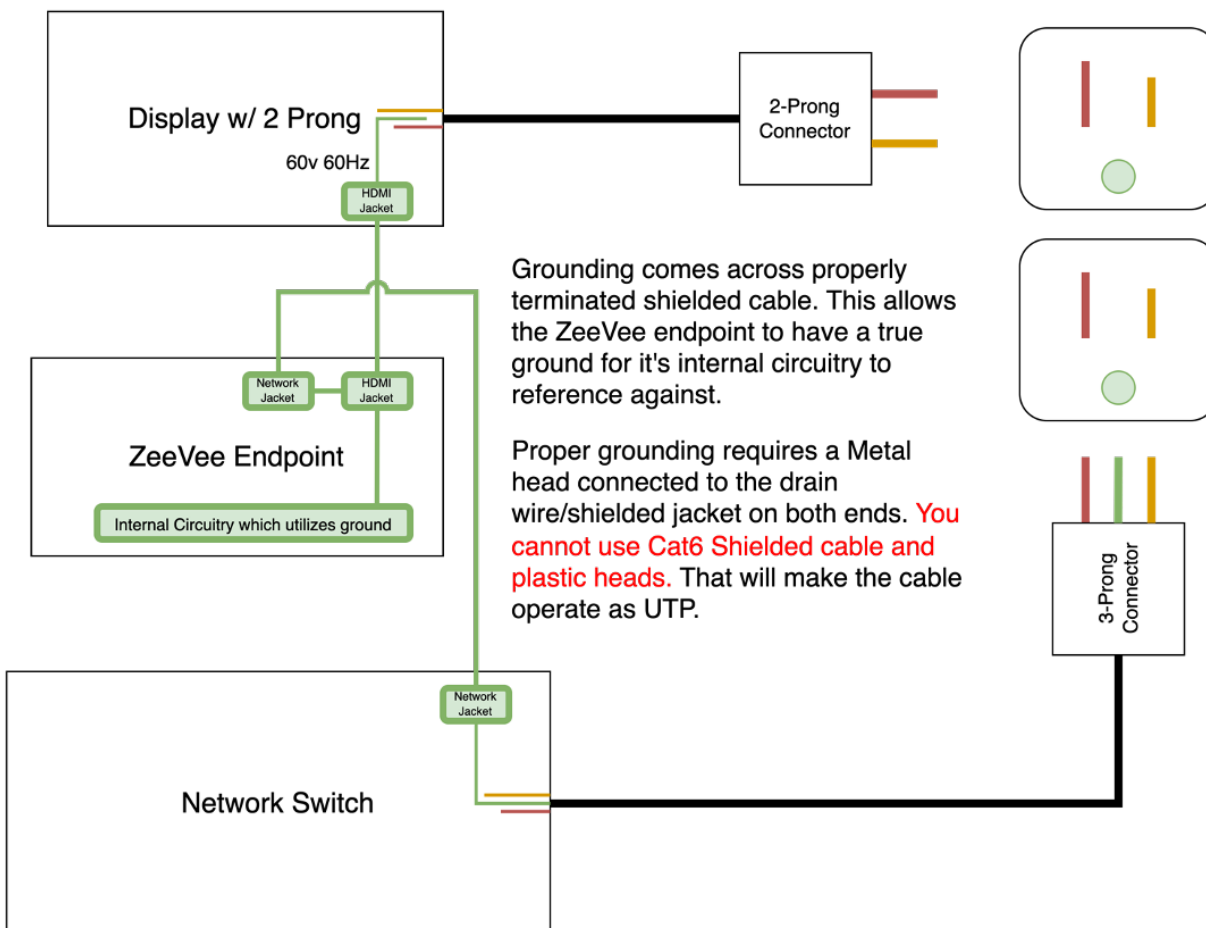
Examples

Shielded cable must be used with PoE systems to provide the ZyPer endpoint a path to ground when another path is not available. Shielded cable options include: F/UTP, S/UTP, F/FTP, S/FTP, SF/UTP and SF/FTP. (See Appendix)

Unshielded Example:



Shielded Example (F/UTP, S/UTP, F/FTP, S/FTP, SF/UTP or SF/FTP)



Recommended Cables:

ZeeVee has validated and can recommend Ethernet cables from Siemon Cable.

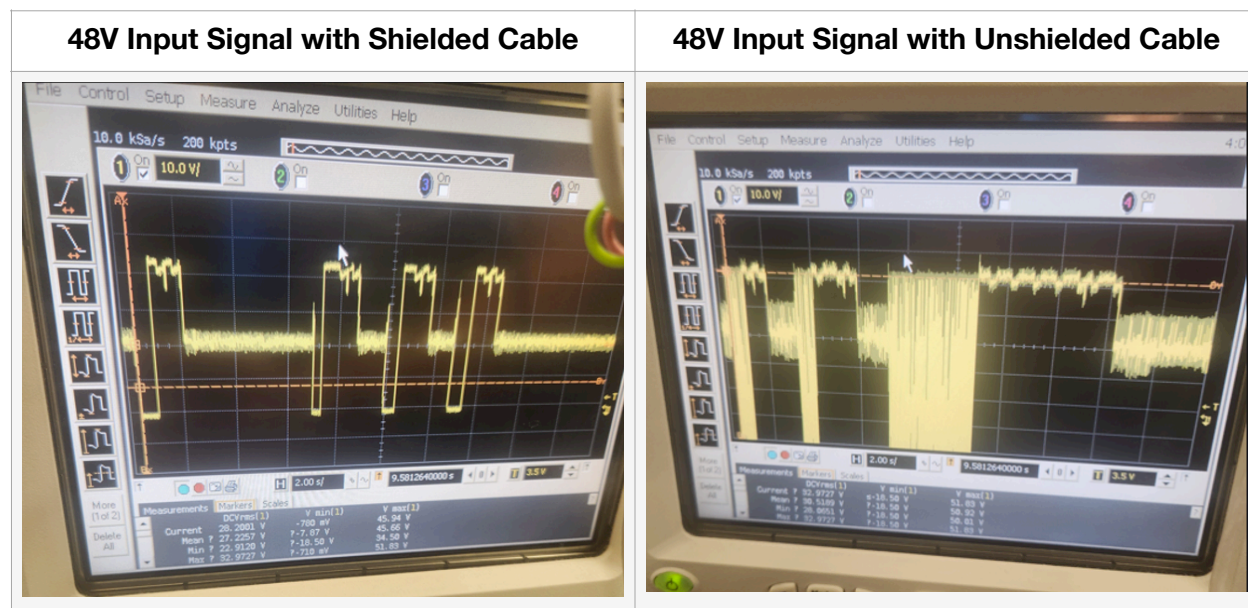
North America Link:

<https://ecatalog.siemon.com/en/Copper/Cable/Category-6A-Shielded-Cable-North-America>

International Link:









<https://ecatalog.siemon.com/en/Copper/Cable/Category-6A-Shielded-Cable-International>

Oscilloscope Traces



In the *Shielded* case, all the pulses are the same length because they are successful on the first try. The *Unshielded* case has variable length pulses because the network switch keeps polling.

Appendix - Cable Types

Cable Type	Cable Shielding Type	Twisted Pair Shielding Type	Example
U/UTP	None	None	
F/UTP	Foil	None	
S/UTP	Braiding	None	
SF/UTP	Braiding and Foil	None	
U/FTP	None	Foil	
F/FTP	Foil	Foil	
S/FTP	Braiding	Foil	
SF/FTP	Braiding and Foil	Foil	

Do not use U/UTP or U/FTP with PoE systems.

Disclaimers

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