

## Use case

### Eaton LAN transformer module LANxV family



# Eaton ensures optimal signal integrity in high-speed remote camera monitoring

Today's remote camera monitoring systems require stable, high-speed data transmission and continuous power supply to operate optimally. In a remote camera monitoring setup, multiple cameras are installed at various points and constantly stream video data to a central monitoring system using Ethernet cables. Power over Ethernet (PoE) technology serves a dual purpose — allowing for the simultaneous transmission of data and DC power via a single Ethernet cable. This simplifies the installation process, reduces cost, and enhances system reliability.

IEEE 802.3BT is a standard that provides 10 Gigabits per second data rates and up to 100 W of power, making it an excellent choice for the latest

IoT remote camera monitoring systems. With high-speed 10 Gbps data rates, ensuring optimal signal integrity is crucial. Signal noise results in data loss and power noise could potentially damage the device.

LAN transformers and common mode chokes (CMC) are critical in Ethernet connectivity. The LAN transformer is used for signal decoupling and isolation in Ethernet applications and plays a crucial role in maintaining signal integrity during high-speed data transmission. With its power isolation capabilities, the PoE supply can be optimally utilized as it isolates the power delivery from data signals, preventing potential interference and improving the system's overall power efficiency. On the other hand, the CMC minimizes common

mode noise present in power lines and data lines, protecting the device from potential damage.

A LAN transformer and common mode choke module combines these two critical components into one package, thus simplifying the design and implementation of the Ethernet interface and reducing the PCB footprint and the overall system cost. By integrating the LAN transformer and common mode choke into a single module, the overall size of the camera's circuitry can be significantly reduced. This not only enables a more compact design for the camera itself, but also offers more room for other components or potential hardware upgrades. Fewer connections also reduce the potential points of failure and the time required for troubleshooting.

The Eaton LANxV family is a comprehensive solution that combines a LAN transformer and a common mode choke into a single module. In remote camera monitoring systems, the LANxV series provides signal decoupling from the power line and common mode filtering for unshielded transmit (Tx) and receive (Rx) lines. Eaton offers a wide range of LAN transformers with IEEE 802.3 compliance across protocols from 100BASE-T to 10G for both non-PoE and PoE applications up to 100 W. Packaged in SMT sizes from 13 mm to 30 mm, LANxV complies with IEEE 802.3 (CSMA/CD bus), supporting 100/1000/2.5G/5G/10GBASE-T protocols. The LANxV family is rated for a wide operating temperature range up to -40 °C to +85 °C.

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