

Fully integrated Powered Device modules simplify implementation of Power over Ethernet

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Power over Ethernet (PoE) brings wide-ranging benefits to the design, implementation and long-term usability of wired Ethernet local area networks (LANs). Cost, flexibility and even safety are all enhanced. PoE overcomes the major limitation that system designers often encounter whereby they must locate powered network devices in close proximity to AC power outlets, or have the extensive cost and disturbance of having them installed.

With PoE, both data and power at a safe nominal 48VDC are carried over the same Ethernet cable. If network devices can be configured to run from powered Ethernet, the need for external or internal AC/DC power supplies is eliminated. The freedom this gives to position devices where they are needed rather than where power cords dictate, and the long-term flexibility to relocate devices around to suit the changing operational needs of the workspace and the business, are both highly desirable benefits for any organisation.

A further and key benefit of using PoE technology is single-point backup. PoE systems can use a single uninterruptible power supply (UPS) to provide power over the network. Consequently, if the power goes down, all PoE enabled products remain operational. A UPS also provides valuable protection against damage to equipment caused by mains spikes and surges. The guarantee of 100% up time is useful in any business scenario, but is especially beneficial in industries where telecom equipment is critical to operations, for example, the emergency services and brokerage houses.

Typical devices used on a powered Ethernet such as VoIP phones, cameras and Wi-Fi access points may need to be specially designed or adapted to run from Ethernet 48VDC. DC/DC converters in the network devices will normally be required to drop and isolate the 48V supply down to a lower voltage such as 5V, suitable for the device circuitry. To take full advantage of PoE, the network devices will also be required to handle the handshaking process that allows the network hub to recognise a device as being PoE enabled and understand and manage its specific power needs.

In response to this requirement, and recognising the huge potential and benefits to all types of business of implementing PoE, C&D Technologies has launched a family of fully integrated Powered Device (PD) modules that will significantly reduce component count, design time and installation cost of Power over Ethernet (PoE) applications. The NMPD series of compact power extraction modules are the industry's first PDs to feature on-board DC/DC conversion, and provide a full IEEE802.3af functionally compliant data and power interface to an Ethernet line including short-circuit protection.

The NMPD modules are ideal for PoE designs in applications ranging from security equipment and public address systems to remote environmental monitoring, telemetry and industrial control. Operating with a maximum power rating of 10W, the modules

extract power from a CAT5 twisted pair Ethernet cable when sourced by IEEE802.3af-compliant power sourcing equipment (PSE).

Each module integrates data isolation transformers, PSE handshaking and signature control functionality, and a UL-approved DC/DC converter delivering an isolated DC output voltage. As a result, the need for external power sources and isolation transformers is eliminated. Typical signature resistance and signature capacitance is 25k Ω and 100nF respectively, while classification current is 4mA.

The new modules work with a nominal 48V input voltage and are available with isolated output voltage options of 3.3V, 5V, 12V and 15V. Isolation is rated at 1200V (for one minute). In accordance with the IEEE802.3af standard, NMPD PDs allow for voltage input on the Ethernet data lines or spare pair wires.

All of the modules in the NMPD series incorporate an LED to indicate output voltage presence, while on-board thermal shutdown and overcurrent protection further reduces the need for external components. A module enters overcurrent mode when maximum output power is exceeded, and automatically recovers when the overload condition is removed.

In an ideal situation, PoE enabled versions of equipment should be housed in the same basic enclosure used by the externally powered versions on which they are based. This can help significantly reduce design time and avoid costs associated with tooling for new enclosures. Similarly, the minimum amount of impact on the circuitry and internal design of the unit will help simplify and speed the transformation of an externally powered product to a PoE enabled derivative. NMPD modules support this philosophy being supplied in a compact, vertically mounted SIP form factor with dimensions of just 91.8mm x 25.1mm. Suitability for use in a diverse range of applications is reinforced by the fact that the parts will operate at full load in ambient temperatures ranging from -40°C to 110°C.

PoE is undoubtedly going to change the way that many pieces of electrical equipment are powered. The benefits and flexibility that a powered Ethernet provides are huge and make it impossible to ignore for businesses of all types. For companies building new premises or those refitting their existing locations, it is well worth them considering becoming early adopters of PoE.