



By Tim Kridel

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Pro AV is increasingly about IP networking, with everything from audio to video surveillance traversing Ethernet. If you're not running power over that cable, too, you're missing an opportunity to reduce the cost and complexity of your installations.

From Wikipedia:

"Power over Ethernet, or PoE technology, describes a system to pass electrical power safely, along with data, on Ethernet cabling. The IEEE standard for PoE requires category 5 cable or higher for high power levels, but can operate with category 3 cable if less power is required. Power is supplied in common mode over two or more of the differential pairs of wires found in the Ethernet cables and comes from a power supply within a PoE-enabled networking device, such as an Ethernet switch, or can be injected into a cable run with a midspan power supply."

In practical terms, AV integrators can use Power over Ethernet (PoE) products to eliminate the need for running a separate electrical line to each camera, touch panel or other AV device. And depending on local building codes, PoE can reduce or eliminate the need to hire an electrician. (Caveat: Some states, such as Connecticut, require a license to do low-voltage installations, including those involving PoE.)

“We use it quite a bit, more recently with some of the smaller in-wall Crestron touchpanels,” says Blaine Brown, director of technology for AV integration firm Sensory Technologies. “It’s very convenient: a single Cat5 to each panel. We’ve had great experiences using PoE.”

Some cost savings are less obvious. For example, if the installation is in a retail store or airport, the client might require that the work be done after hours to avoid disrupting patrons. Eliminating the need to pull separate power lines can reduce the cost of paying employees overtime to work nights or early mornings.

Because it’s low voltage, PoE also can be a way to address safety issues and costs. For example, PoE could be less expensive if its cable can be run through damp areas and other locations where a regular power line would require the additional expense of a conduit.

Of course, like all things technology, you can’t just grab devices that call themselves PoE-enabled and expect them to work together. Though there’s an IEEE standard for PoE, it isn’t the only option for providing remote power to AV devices over twisted pair infrastructure (technically speaking, providing “power” over “Ethernet cabling”). The plethora of options sometimes creates confusion.

“Although the terms ‘remote power,’ ‘power insertion’ or ‘injection’ and ‘PoE’ may be used interchangeably, it’s important to understand they may not be standards-based or cross-platform compatible,” says Joe da Silva, Extron Electronics director of product marketing.

Regarding compatibility, even when AV vendors adopt IEEE-standard PoE, they may also layer additional (non-standard) functionality on top of the PoE standard in order to give their products market-differentiating features. One example is when a vendor says its product employs PoE

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17. 12. 2012

but delivers more wattage than the standards allow. In this respect, PoE can be like Wi-Fi, where one vendor's 802.11 products will work with other vendors' 802.11 gear, but to get additional features or performance, all of the equipment has to come from the same manufacturer.

"They're referencing a standard, but they're stating that they're doing something differently," one vendor says privately. "So compatibility is off the table, and confusion trickles in."

Know the Specs

A successful PoE installation starts with selecting the right gear. One important consideration is whether the equipment supports the original PoE standard (IEEE 802.3af), the newer PoE+ (802.3at) or both. Each standard has different cable requirements: PoE works with Cat3 or higher, while PoE+ requires at least Cat5.

PoE provides up to 15.4 watts of DC power to each device, while PoE+ provides 25.5 watts. So a 16-port PoE switch, for example, would have a total available power budget of 250 watts.

But sometimes, the math isn't so clear-cut. That's why it's important to dig into a product's specs to see if it has enough juice to support your client's system.

"Some switches will have support for both PoE and PoE+," says Toine C. Leerentveld, Crestron product line manager for control systems. "They often have a power budget enough to cover full PoE on all ports, but not PoE+. For these switches, the calculation is a bit more complicated. Every port with a PoE+ device attached will take away 25.5 watts from the total budget."

Higher end switches will have power on every port, while less expensive models will power only some of their ports. If the client already has PoE switches, such as for its VoIP phone system, power issues can occur if AV gear is plugged into them. For example, a PoE switch might work fine powering a bunch of 8-watt phones, but when it has to support several PTZ cameras, the switch might struggle. This can result in perplexing problems, such as some devices powering up just fine one moment and not working the next. In those kinds of situations, make sure that

the switch can deliver the maximum 15.4 watts or 25.5 watts to each port

Pay attention to the specs on other devices, too, especially power-hungry ones such as PTZ cameras and large, touchscreen displays. “They should clearly indicate whether they’re PoE or PoE+,” Leerentveld says.

Another spec to look for is Link Layer Discovery Protocol (LLDP). “This will help with exact identification of the class of device and other important information,” Leerentveld says. “Using LLDP, a switch can make sure that it won’t power up a device if not enough power is available.”

PoE+ increased the amount of power available, so running out of juice might become less of an issue over time. That increase also dovetails with decreasing power requirements on the device side, making PoE in general a viable option for a wider range of products.

“As devices become more power efficient, even more devices will be able to be powered by PoE,” Leerentveld says. “The future for PoE is very bright.”

Inject or Switch?

Some PoE-based AV systems use power injectors to “inject” power into a data line. This may come in handy when you want juice devices that are connected to a non-PoE/PoE+ switch. Also known as midspans, power injectors make sense if only one device needs power. Conversely, power injectors also are used when there are more devices than a single switch can comfortably support.

“Power injectors may be required if you don’t have a PoE/PoE+ switch, but they greatly diminish some of the benefits, as using them adds wiring complexity and additional power supplies,” Leerentveld says.

When multiple devices require power, a PoE/PoE+ switch can be a better choice. Just make

sure you sit down with the IT department first.

“Typically that would be an unmanaged switch, and some IT facilities don’t want you putting an unmanaged switch on their network,” says Sensory’s Brown. “If that’s the case, and all the devices need to be on their network, we’ll use a multiport PoE injector. Those are pretty handy. They’ll pass a Gigabit signal and inject the line with power.”

Clearly, using PoE for AV projects offers up yet another example of why AV pros need to understand networking basics so they can work effectively with a client’s IT staff. In case you didn’t know already, an unmanaged switch can’t be configured – it’s low cost and plug and play. A managed switch can be modified.

“If they’re a small company, they’re going to be fine with us putting an unmanaged device on their network,” Brown says. “In other instances, they’re going to want – and we actually prefer – managed equipment, so it’s end-to-end managed switches. A lot of times, [the IT staff] will provide a managed PoE switch for the application, if we’ve had those talks early enough on in the project. If they can’t provide that, then we’ll provide the injectors by themselves, and that way, we’re not interfering with their network.”

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