

The UPS+PDU Ecosystem: A Systems Approach to AV Power

The Pro AV industry is the very essence of a business that is both an art and a science. AV professionals are creative, tech-driven specialists who personify the idea that the show must go on. Whether it's their own productions or those of clients, an installed or mobile system or a communications closet, these behind-the-curtain wizards take all precautions to assure that the system components work flawlessly and that there are no unplanned program interruptions. From concert halls and corporate events to the board room and the classroom, the pressure is the same, and if something ever goes south, the AV team suddenly finds itself in the spotlight — and not in a good way.

From the inconvenient to the catastrophic, nearly every AV professional has experienced a power issue. A power loss is not just a nuisance or embarrassment; it can cause a loss of equipment settings and data, damage sensitive equipment, or render a whole system inoperable. Even in applications where generators are in place, there is still a period of power loss as the generator works to meet the power load requirement — and every second of downtime during a production or presentation feels like an eternity.

Much like the IT equipment world, today's AV equipment has moved more toward digital and is being mounted in more locations outside of an enclosure, typically a rack. Many of the same principles and best practices from IT can be extended to AV, including a holistic approach to rack power management. For many years now, Uninterruptible Power Supplies (UPS) and Power Distribution Units (PDU) have formed a critical line of defense in IT against electrical issues. However, since audiovisual components are more sensitive than IT equipment, what works for IT doesn't suffice for AV. And with the goal of being as responsive and proactive as possible, AV professionals are realizing they need to take a more systems approach to AV power.

A Systems Approach to AV Power

In the AV industry, UPS and PDU systems have often been thought of — if they are thought of at all — as separate functions. They're usually installed to solve specific/known problems, not necessarily as a proactive approach to assuring overall rack system and component health. This is not a good strategy.

Today's UPS and PDU systems individually offer a range of features specifically designed for digital components. When used together, these systems provide comprehensive, end-to-end power protection, control and management. Benefiting from robust, integrated hardware and software, they create a platform that can include system performance data reporting and remote connectivity features.

A Power Distribution Unit (PDU) has multiple outputs designed to control and distribute electric power. Available as either non-intelligent or intelligent systems, rack-mounted PDUs become the central control hub for all the power outputs and help create a clean, clutter-free, cable-managed equipment rack.

The PDU's partner on the front line is the UPS, which allows equipment to keep running for a period of time when the primary power source is lost. In addition to bridging the gap during a power loss, a UPS also provides a defense from power surges and voltage protection by ensuring the connected devices are fed a consistent nominal voltage. When loss of power happens and a UPS is in use, it can be an *almost* instant switch (just a few milliseconds) or an instant switch (if the UPS is always on aka an Online UPS) to provide the rack power from the UPS battery. Both protect equipment and assure continuous operation.

There is a common misconception that UPS systems are installed in AV racks to provide enough backup power to finish a presentation if there is a drop in voltage or a power outage, but that's not the case. While a UPS and its batteries can buy some time, the primary function of a UPS is to protect the connected equipment from voltage drop, which can be very damaging to AV products. In a complete blackout, it provides enough power to safely shut down the equipment without physical damage or data loss. A UPS can also provide enough power and buy time until an available backup generator can come online.

It's also important to keep in mind that UPS systems not optimized for AV applications have a minimal ability to filter out fluctuations from an AC power source. Small fluctuations can be amplified within AV equipment and show up on-screen as video noise or produce humming/buzzing noises from speakers.

When a PDU and UPS are brought together in an intelligent, integrated and systemized way, they can be a powerful (pardon the pun) and valuable, pro-active solution within every AV integrator's tool kit.

Unique AV Power Needs

While many best practices may be borrowed from other industries, commercial AV equipment, applications and integrators have specialized needs. Each AV equipment rack is highly customized for each use or installation. There are no cookie-cutter AV installations, and each rack can contain a wide range of equipment types and brands, each with different power requirements and their unique range of power sensibilities.

From communications control systems, amplifiers and digital signal processing to projectors and displays, AV equipment is much more power and temperature sensitive than IT equipment. AV equipment overall is not very tolerant to power fluctuation, and even slight variations in power can affect performance. As a rule of thumb, AV equipment should be powered, monitored and controlled at the individual outlet level; there are simply too many variables for a one-size-fits-all approach to power.

Not only is AV equipment sensitive and specialized, there is almost no safety net for most AV installations. The AV experience is a live experience, and it can be difficult to provide redundancies in equipment and have "hot-swappable" solutions. Plus, AV equipment can be expensive. One of the best ways to ensure a long, reliable product life is to be proactive with power management. A systems approach to AV power provides that protection and more.

An Emerging Business Model

An intelligent, integrated, connected power system that includes PDUs and UPSs can monitor and log numerous vital environmental variables, including input voltage, load current, temperature and humidity conditions—performance data that can be valuable for forensic evaluation. These systems can also alert managers to any irregularities that need immediate attention. In emergencies, a smart system can even reboot or take another action to correct problems on its own.

For the AV integrator, a systems approach to power presents many advantages over plugging a rack into a wall and hoping for the best. A connected systems approach also opens the door to potential new business. Armed with collected data logs and the knowledge that systems have protections in place, integrators can recommend extended warranties and ongoing service contracts to their offerings.

By utilizing cloud access at a client's location, integrators can remotely troubleshoot and resolve issues without physically visiting the site, virtually eliminating commuting costs, travel time and client scheduling conflicts. From the client's perspective, they benefit from continuing their daily business, uninterrupted.

As an AV integrator in today's highly connected world, there are now opportunities for recurring revenue and multiple income streams. A business shouldn't just rely on one-off sales. Recurring revenue streams create a stable cash flow, contribute to client retention, increase the client base, and ultimately strengthen the bottom line. While strategies vary, the basics of a plan could include 24/7 remote system monitoring, troubleshooting and proactive preventative maintenance. By adding these line items to existing service contracts, integrators ensure peace of mind for the customer and their business.

Real-World Solutions

I recently heard of a situation where every morning, as the teaching staff at a university began teaching their classes, AV devices would drop offline and not be able to reconnect, prompting a call to the AV team for assistance. They couldn't figure out what was causing this!

Without other ideas, the staff decided to put in a UPS with monitoring to hopefully solve the problem. Once in place, they quickly saw that the voltage was dropping, which caused the equipment to drop offline. With the UPSs installed, this wasn't happening anymore, but what was causing the original problem? They discovered that when the HVAC system powered on, it caused a drop in voltage in the building. Not something you'd typically think about when designing an AV system, right?

The addition of the UPSs in the classrooms not only prevented future system outages and solved the mystery, but the units have also saved the staff a great deal of time and frustration each morning.

Understandably, power can be intimidating to some. Still, today's systemized UPS+PDU solutions deliver the ease of use and setup, along with web/app tools and actionable data to help make almost any AV rack power application a success. Today's power systems are more intelligent, more robust, and more attuned to the unique needs of AV equipment.

In today's digital and connected world, AV professionals can't afford to be simply reactive. Instead, their technology best practices and business models must be proactive. A systems approach to power helps assure end-to-end, long-term success, performance, and reliability for the equipment and the company.