Video Power

By: Richard Cadena

There's an age-old debate about whether electronics should be kept on continuously or turned off each night. On the one hand, turning them off every night (or periodically) creates a cycle of heating and cooling that causes expansion and contraction of components and solder joints, which some people say can lead to premature failure. On the other hand, leaving electronics powered up costs money and leaves them exposed to the vagaries of the electrical power grid, including spikes, surges, swells, and lightning strikes, which could instantly destroy components.

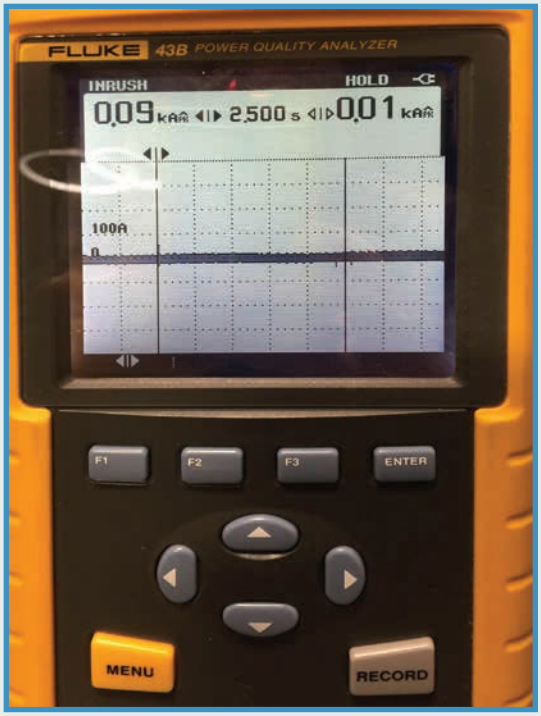
One side of this debate is losing its veracity as computer chips and power supplies get smaller and more efficient because they produce less heat; therefore, the cycle of expansion and contraction is less significant. The power grid hasn't gotten any more stable over the last several years, so I tend to lean towards the side of turning electronics off every night. If severe weather is expected, I'll also unplug all of my electronics to protect them from lightning. It's a chore and it takes more time than I would like, but when you have thousands of dollars worth of electronics, it's worth it.

But there has to be an easier way.

The easiest way is to use remote-controlled motorized circuit breakers or relays that can be programmed to turn on and off on a regular schedule. You may have seen such products at trade shows or, if you're like me, maybe you've seen them used with audio systems for sequencing power on and off. It's particularly important to sequence power on and off correctly in an audio system; you could literally blow up speakers if done incorrectly. But I never thought about using them for video walls and displays until I saw an ad in a trade magazine.

Something about this particular ad caught my eye. I'd like to say that it was the technology. The mere mention of the words "inrush," "automated," "server," "computer," "sensor," "IP," "DMX512," "sACN," or "RS-232" can easily capture my attention. And pictures of a neatly wired panel with integrated electronics and automation make my heart race ever so slightly. But if I'm honest, I'll have to admit that it was probably the colorful video backdrop with a silhouette of a female form that first drew my eye to the LynTec ad proclaiming, "Video walls needs power control, too."

LynTec's proposition is that, for something as costly and power-hungry as a large video wall, automated power control makes financial sense. The company's RCP Series motorized circuit breakers or relay panels can be programmed to sequence on and off in order to control inrush currents, thereby easing the stress on the electrical system. And, by virtue of a built-in astronomical time schedule, you can reduce energy costs while protecting sensitive electronics from voltage spikes, surges, and similar power issues, like lightning, when display panels are not in use. And then they tease you with features like a browser-based setup using a computer, tablet, or smart phone, and compatibility with DMX-512, sACN, RS-232, and more.



The inrush current for the video panel was about nine times the normal current.

The idea resonated with me because I've been interested in power quality issues with LEDs since they started to dominate the entertainment industry. And, judging by the number of consultants who have been asking me about LEDs and inrush current lately, I'm apparently not the only one.

Like LEDs, video display panels have a switch-mode power supply with lots of capacitors. When a video panel is first turned on, the power supply draws a large amount of current in order to charge the capacitors in the circuit. This inrush current is typically about 10 times the normal current.

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It subsides very quickly—typically dropping down to the normal current draw in about .33 to .5 seconds, but the effects of energizing a large number of devices all at once can be detrimental to the power distribution system.

Out of curiosity, I made a trip to a nearby video wall vendor and asked to measure the inrush current using my Fluke 43B power-quality meter. The day before, I requested that the video wall be powered down overnight, so I could start with no charge on the capacitors. What I found was almost exactly what I expected. The inrush current varied from seven to nine times the normal current, and it dropped to the normal level within about six cycles (about .10 seconds). A single video panel doesn't draw a lot of power, especially when it has no input signal, but if you power up many panels at once, it can put a huge amount of stress on the electrical system, making conduit jump and loosening wire nut connections and other joints over time. This situation may or may not cause any problems, depending on the situation, but it's definitely not good for the electrical system. By sequencing the panels on with just a few seconds between circuits, it spreads the inrush current over time and lessens the impact.

Programming the electrical system to power down when not in use also saves electricity. The quiescent power drawn by a modern switch-mode power supply is not large, but it adds up in a larger system. Over the span of a year, it could add up to hundreds of dollars. And if you live in a warm climate where you have to run the air conditioner to remove the heat generated by the power supplies, this could add 30% or more, depending on the efficiency of the HVAC system, to the cost of leaving the video system on all of the time.

But one of the best reasons to disconnect the power from an expensive video system is to protect it from the electrical power grid. We tend to think of the electrical supply as stable and unchanging when, in reality, there are many events that cause anomalies. Think about how the lights in your home or office blink when the air-conditioning compressor turns on, or how your radio crackles when there's a lightning stroke in the vicinity. These are small windows into the world of electrical power. If you have a meter designed to capture these events, you'll find sags, swells, and transients are a common feature of your electrical power, and even more so if you're in an industrial area with large machinery.

LynTec's RPC Series provides energy savings and protection against power surges and anomalies.

The LynTec solution is worth checking out for permanent installations. The price can vary from about $160 to $300 per circuit, depending on the circumstances. The system can be as simple as a four-relay cabinet or as extensive as 168-position motorized breaker panels.

"In many cases," says Alan Tschirner, VP/GM of LynTec, "adding remote power control is a single digit percentage increase in the project budget with tangible return on investment."

Technology that pays for itself is even sexier than a color backdrop and…well, than a colorful backdrop.