Lighting Standards Are Meaningless without Interoperability

Solid-state lighting (SSL) is driving innovation in the lighting industry and LEDs are making their way into all facets of lighting for home, business, outdoor applications, or anywhere dependable, long-lasting lighting is required. And with the expanding adoption of SSL comes new possibilities for intelligent lighting. LEDs can be programmed to perform in myriad ways, however, integrating lighting controls for maximum user benefit with other systems requires a standardized means of communications that promotes compatibility between various vendors. For lighting intelligence to be shared, integrated systems have to speak the same language.

First let's consider some of the new applications for intelligent lighting, including integrated control systems:

- "Smart lighting" connects SSL with automated control systems to adjust light levels based on conditions such as the amount of sunlight present or room occupancy, resulting in substantial energy savings.

- Office building managers want to control LED color temperature to provide full-spectrum illumination and support functions such as color tuning to promote health and productivity.

- In situations where older LED lights and new LED fixtures coexist, the newer fixtures tend to outshine the older units. Individual unit light intensity can be programmed to provide consistent illumination.

- Specialized applications, such as tunable outdoor lighting, are being considered by city managers of for law enforcement, such as the ability to control streetlights to aid with crowd control.

There are new applications for smart lighting emerging daily, all driven by networked systems capable of supporting dimming, color tuning, remote monitoring, task tuning, remote and wireless controls, system alerts, and energy usage reporting. These smart lighting applications rely on centralized or distributed control systems, and they need integrated communications. That's where the lighting industry lags far behind other industries.

Standards at Work

Consider the impact that standardization has had in other industries. Technologies such as Bluetooth and Wi-Fi have become widely adopted because the standards are well-documented and well-understood; vendors can create products guaranteed to interoperate with other products designed using the same standards. This kind of open standards approach to manufacturing promotes intersystem compatibility and system extensibility. Could you imagine checking into a hotel and being told that the Wi-Fi only works with Samsung mobile phones or Lenovo PCs?

As with any emerging technology, such as programmable or "smart" lighting, it becomes a footrace to see whose technology will be adopted first. The more widespread the adoption of one vendor's platform, the more likely that platform will be adopted as a de facto standard. However, it seldom pays to bet on a vendor selling a closed system. If you think back to the era of videotape, VHS dominated because Philips made the standard broadly available for license while Sony kept Betamax as a proprietary platform. You also may remember Novell NetWare? Novell had a virtual monopoly in the network operating system business in 1990 and NetWare was everywhere. Today NetWare is non-existent and the open, Internet standards are driving network interoperability.

No one vendor's proprietary technology will be able to deliver universal interoperability. Even Apple has been forced to offer open source code for its iOS platform to promote third-party development. Betting on one vendor to deliver all the functions you need today and in the betting on one horse that may not be able to go the distance.

Agreeing on Emerging Standards

Of course, choosing the right lighting system interoperability standards can be challenging as well. There already are a number of emerging standards that are gaining momentum in the lighting industry:

- ZigBee – ZigBee is being promoted as a wireless standard that provides control over various types of devices, including lighting. ZigBee is being touted as the ideal standard to manage the Internet of Things (IoT). It's already been endorsed by the Connected Lighting Alliance.
- TALQ – The TALQ Consortium is working to create a management software standard with interfaces to control and monitor outdoor lighting systems.
- DALI – The Digital Addressable Lighting Interface (DALI) is growing in popularity as the wired standard for digital lighting controls including LEDs.

Still, compliance and interoperability are not assured for these emerging standards. For example, while DALI standard has approved compliance testing, some vendors claim DALI "super set" functionality, creating derivative DALI implementations. This dynamic is even worse with ZigBee. Similarly, the 0-10V dimming standard for LEDs does not specify when a luminaire actually turns off, so two luminaires can receive the same control signal and one may turn off while the other only dims to a low lighting level.

There also are a number of emerging applications and standards that are shaping next-generation lighting systems and are going to be important for lighting interoperability:

- Internet of Things (IoT) – Internet addresses are being embedded in all devices, not just lighting, and there will be increased demand for centralized control of these things for applications such as automated buildings, all using IoT standards.

- Wireless standards – The IEEE 802.11ac wireless networking standard is becoming popular for applications such as in-home systems management. For example, homeowners are now using Wi-Fi technology for remote home management, including setting alarms, adjusting the thermostat, and activating and adjusting lights.

- Power of Ethernet (PoE) – PoE is becoming more prevalent in new construction and areas where electrical access is limited. Being able to power lighting systems using Ethernet is ideal for some lighting applications, such as retail lighting which must be frequently moved, and Ethernet provides network access for lighting management at the same time.

As the lighting controls market continues to accelerate, interoperability is going to become increasingly important. Vendors and customers should demand compatibility with recognized industry standards. There will be more demand interoperability testing to ensure that systems are truly standards-compliant and will interoperate. Standards bodies and testing facilities are going to step forward with certification procedures and seals of approval to prove interoperability.

Recognized lighting control interoperable standards are not going to appear overnight, but they will evolve with time, and with the cooperation of the industry at large and the standards bodies in particular. As new standards emerge, vendors are going to have to ensure that those standards support legacy units as well as next-generation lighting systems. And if any single vendor steps forward with a new solution that promises to revolutionize lighting control, be sure to look carefully under the hood to see that it complies with the right standards and offers proven interoperability.