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Ten Years of ACN

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In a few months, we'll mark the tenth anniversary of the lighting control protocol Architecture for Control Networks (ACN). In terms of technology, how long is ten years? When the protocol was ratified in October 2006, we didn't yet have iPhones, the current version of Windows was XP, and Facebook was barely a month old. So here we are, ten years down the road; ACN is almost as scarce today as it was in 2006, and it's not gaining any ground. Will it ever enjoy widespread adoption?

That was the question on the mind of a university student who asked if ACN would become the go-to protocol in the future. I used to think that the answer was a resounding yes. But today, finding ACN on a console is a bit like finding music videos on MTV. It's rare. And it doesn't look like that will ever change.

The idea behind ACN was to create an industry standard protocol that could take advantage of state-of-the-art computer hardware and software, including speed, bandwidth, and networking capabilities. The developers wanted it to be powerful enough to handle the most complex systems, yet simple and graceful enough to make it easy to use. They set out to achieve certain goals, including interoperability, meaning that any manufacturer's console could control any other manufacturer's devices; the ability to allow multiple sources to control multiple devices on the same network with data flowing both ways; and "one 'wire,' but multiple, independent uses" on the same network in order to "dynamically configure sub-venues as independent universes of control." They also wanted a mainstream protocol that didn't reinvent the networking wheel with "maximum opportunity to use off-the-shelf technology" like "routers, switches, protocol stacks, diagnostic tools, etc." They wanted "support for manufacturer-specific uses;" scalability, meaning it should work just as well with small systems as with the largest of systems; and extensibility, meaning that it should be able to adapt to new and unforeseen technologies; ease of configuration and management; efficient and predictable use of bandwidth; flexibility; and fault tolerance.

To get an idea of how complicated the protocol is, check out the pages and pages of documentation. The set of 16 documents and DDL files is available to download free of charge at www.tsp.esta.org. DMX, by contrast, is only 36 pages long and is relatively simple. If you know anything about lighting and electronics, you could probably read it in one afternoon and have a pretty good understanding of it. The ACN suite of documentation is far more complex and challenging to understand. The acronyms alone can take quite a while to become familiar.

Had they achieved all of these goals, this article might be celebrating its success. Instead, we're wondering what went awry. Why did ACN fail to achieve widespread industry support?

At least part of the answer may lie in its complexity. To get an idea of how complicated the protocol is, check out the pages and pages of documentation. The set of 16 documents and DDL files is available to download free of charge at www.tsp.esta.org. DMX, by contrast, is only 36 pages long and is relatively simple. If you know anything about lighting and electronics, you could probably read it in one afternoon and have a pretty good understanding of it. The ACN suite of documentation is far more complex and challenging to understand. The acronyms alone can take quite a while to become familiar.

A bigger factor is the issue of interoperability. In order for any protocol to be widely adopted, it has to provide an easy way for products from different manufacturers to work together seamlessly. Apparently, that's an issue with ACN. The protocol uses what is called Device Description Language, or DDL; it describes a device in plain English well enough that a controller is able to work with it and a programmer is able to program it. But the DDL for ACN was never completely finished, making it very difficult, if not impossible, for a controller to be able to control a device via ACN. As a result, an ACN controller could not automatically discover a device on the network and have the ability to control it. It would require the equivalent of an ACN fixture library that describes to the controller how the device works, and because the parameters are more completely described than they are in

DMX, it would be substantially more complex than the profile of a DMX device.

It's unfortunate that ACN has not been better implemented in the industry because it could have been a very powerful protocol with lots of potential to change the landscape of entertainment controls. It would have done away with many of the limitations of DMX, like the 512-slot limit, the eight-bit structure, the dependency on Remote Device Management (RDM) for bi-directional communication, and more. Ultimately, it was too big a leap from DMX and it provides no easy path for migration from DMX.

In contrast to ACN, DMX is very slow and primitive, but it works. In fact, it's practically bulletproof, and that's one of the most important criteria for our industry. The last thing we need is for a console or network to choke on data and stop working during a show. And, for the most part, the lighting industry has been able to get around some of the limitations of DMX512 by updating it to DMX512-A, adding RDM, and using some form of Ethernet-based protocol like Art-Net and Streaming ACN (sACN).

Although sACN shares three-quarters of its acronym with ACN, they have little in common. sACN is simply a protocol for streaming DMX across an Ethernet network. It does the same thing as Art-Net except it does it in a different way. ACN was designed to replace DMX while sACN needs DMX in order to work its magic. They are two completely separate, relatively unrelated ideas.

Today, sACN is enjoying much more success than has ACN. Most consoles now output sACN, and some devices, like the Robe BMFL series, accept sACN directly into the fixture. sACN offers an industry-standard alternative to Art-Net as a step forward for DMX.

DMX still is, and, for the forseeable future, probably will be the primary protocol to control lighting and

Robe's BMFL Spot accepts sACN directly into the fixture.

devices. RDM is gaining considerable traction and it will soon be an indispensable tool that techs will use to help configure and monitor lighting systems. That means that Art-Net or sACN will continue to be the primary way to transport multiple universes of DMX across an Ethernet network, which gets around the issue of how slow DMX is. Gateways (or protocol converters) will continue to be used to convert from Art-Net or sACN back to DMX because any Ethernet-based protocols, like Art-Net and sACN, have to be "star-connected," meaning you have to run a cable to each device, whereas DMX can be daisy-chained.

Who knows what the future holds for DMX512? It might turn out that the future needs of the industry are too demanding for it. What's going to happen when 3-D pixel-mapping drones require control of forward/backward, up/down, left/right, pitch, yaw, roll, and RGB to map out a 7680 x 4320 x 4320 video display? Until then, I think it's safe to say that we'll continue to use DMX512. And when that changes, we probably won't go to ACN.