DRAFT

Let's Be Careful
Thoughts From an ACN

By John Huntington

Caution, the author argues, is the key to a successful rollout of this new protocol

"Let's be careful out there;" so said the sergeant on *Hill Street Blues* at the end of roll call. As ESTA's E1.17 Multipurpose Control Network Protocol Suite, otherwise known as Advanced Control Network or ACN, nears completion, it's good advice for the lighting industry.

Don't get me wrong—I'm excited that ACN is moving forward after years of thankless work by ESTA's Control Protocols Working Group (CPWG); I think ACN will be the most important thing to happen to entertainment lighting control since the DMX standard. I've watched the progress towards an entertainment networking protocol for over ten years but, as a show-control guy, I take a broader perspective than my lighting colleagues—and I'm concerned that ACN's road to acceptance may be bumpy.

Can We Learn From The Past?
ESTA started working on ACN back in 1997; in 1998, I had a letter published in *Lighting Dimensions* asking the ACN task group to consider what was going on outside the lighting industry: "At the 1994 USITT conference in Nashville, some unfortunate (but not unusual) scheduling took place, with these two sessions running concurrently: 'New Technology in Computerized Control of Sound Systems' and 'Dimmer Protocol Standards.' I ran up and down the stairs, attending both meetings. At the Dimmer Protocol Standards meeting, where the possibility of a future standard was being discussed, I stood up and said, 'There's another meeting going on downstairs right now, describing a new sound-control protocol in development by the Audio Engineering Society (AES). You all should at least be aware of what's happening and, better yet, you should be active in the AES standards effort.' Silence greeted me; then, the chairman of the meeting basically said 'Next!'"

AES24, as it became known, was an effort by parts of the audio industry to develop an "object-oriented" control protocol that could allow a wide variety of equipment to inter-operate. This seemed similar to what lighting people wanted, so I kept pushing on this issue. Finally, at the ESTA meeting in Toronto in 1999, I got Jeff Berryman, the final chair of the AES24 effort, to speak to the ESTA CPWG. That year, the first part of AES24-1-1999 was published, but was essentially dead on arrival. After Berryman discussed why it had taken six to seven years for AES to get to that point, the ACN task group leadership thanked him, and then later basically said, "Well, it will never take us that long." That was five years ago.

Out There :

Observer

AES24 was killed by two market forces. First, as DSP got cheaper, centralized audio processing solutions got more cost-effective. Today, you can buy a single rackmount device that includes the digital equivalent of racks of analog audio gear, and a large mixer might just be a control surface connected to one of these DSP devices. In a typical system today, the number of audio devices that need external control is smaller, and those that do need control can be done in a "macro" way through existing approaches (MIDI Show Control, TCP/IP over Ethernet, etc). Also, control can be piggybacked onto digital audio distribution methods such as CobraNet.

The second factor was non-cooperation by key manufacturers, especially those who make amplifiers. This was, and is, unfortunate, because those companies' customers could have benefited the most from the open nature of the AES24 standard. It's my opinion that good standards cause markets to grow, but these manufacturers chose to not to support the effort as a way to snub their competition. If you already have amps and a proprietary control system from Manufacturer A, why would you buy amps from Manufacturer B when they won't work with your existing system?

OK, here's the good news: The market situation for ACN is much more favorable than it was for AES24. First, lighting systems have evolved from a few dimmer racks in a single location (as was the situation in 1986) to an increasing number of small, powerful devices distributed out over a relatively large area. Today, you might have intelligent moving lights, LEDs, and video

projectors all connected to the same lighting-control system. This has pushed DMX way beyond what it was designed to do, creating a situation on big shows where multiple consoles must be used to provide enough DMX universes to run all the fixtures. This creates a coordination/paperwork

nightmare for the production staff, but the technology and its limitations are well-known, and a lot of stunningly sophisticated work is done today. But this situation creates clear market pressure for the acceptance of ACN.

More good news: key manufacturers are involved in the ESTA task group. The companies and individuals who have been involved in this epic (seven years so far) development effort deserve tremendous credit for their foresight in supporting this process. The task group reached a tremendous milestone last year at LDI in Orlando: the long-awaited demonstration where actual devices from multiple manufacturers were shown to inter-operate. I have some concerns that this demo might have given the public the impression that it will be seeing ACN products in a couple of months. But after so many years and challenges, this event showed real progress and a light at the end of the tunnel. Now, we just have to be patient so we don't get run over by that train.

Avoiding a chaotic transition

OK, here's the let's-be-careful part. Watching that demo, and hearing about the architecture of the proposed standard (which I won't discuss here since it's not finalized), it occurred to me that the transition to ACN will not be smooth. In fact, there could be some

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significant train wrecks that, if not handled properly, could give ACN a bad name in the marketplace, which could slow its adoption.

In ACN (as proposed), it's possible to define communications for each target device in a different way. In the long run, this is the optimal way to design a modern control protocol, since it doesn't place a limit on how things can be controlled, now or in the future. However, this unstructured situation could create a chaotic transition period, since there will be a time where Lighting Console X can't control any or all the features of brand-new Moving Light Y because the control console is not up-to-date and the data available to be downloaded from the moving light itself can't be understood, due to the lack of a firmware upgrade, etc. Inevitably, this situation will be discovered on the load-in day of the huge event for your biggest client.

This situation will have to shake out, and, over time, some de facto and opti-

mal ways of doing things will develop. But if this period is too tumultuous, ACN could get a bad name right away; people will wait to use it, which will slow acceptance, which will constrain development. If that happens, short-sighted users and manufacturers could decide that the updated DMX [E1.11 DMX512-A] (due to be released soon), along with the upcoming E1.20 Remote

across the network?" For show control guys, who are increasingly working with software-based show-control systems that mostly speak Ethernet, we've seen the need for this network-wide sync. The panel's response, however, was it isn't currently necessary and, if it becomes so in the future, a method can be developed that will work in conjunction with ACN. This answer makes

and even fade it out whenever you pulled the master down on the lighting console.

This brings us back to the question of sync. Frame-accurate sync is a huge issue for video people, but isn't something lighting people have to deal with much. If Moving Light A fades in 10 seconds and Moving Light B takes 10.1, who cares? But if, instead we are talking about a dozen or 100 video projectors on the stage, that 10.1 seconds is about three frames, and that sync mismatch could be quite apparent. So sync is going to be important, even in the near future, and I hope the ESTA ACN task group will take this into consideration. It's not necessary to have network-wide sync implemented in ACN version 1.0, but by version 2 (or maybe even 1.1), it will be important. Perhaps another industry will develop it; but if not, ESTA will need to address the issue.

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Device Management (RDM), will provide all the functionality they would ever need; they will ignore ACN, further slowing its adoption.

I've seen similar situations in the marketplace many times, where innovative products get such a bad reputation ("That board always crashes!") that they are never accepted. ACN is not a single product, and it is the best solution for the market, so, in the long run, I'm confident it will prevail. But with so many manufacturers advertising ACN-ready products already (how can a product be ready when the standard isn't finished?), there could be a huge rush of ACN products to market at the first trade show after ACN is released, and those train wrecks mentioned above could take place.

Instead, I think it's critical that the rollout of ACN is handled slowly, carefully, and conservatively. No one should promise too much at first, and you should test, test, test in the shop before using this stuff on your first gig. Of course this can't be mandated, but I do hope ESTA will urge everyone-manufacturers, specifiers, and end-users alike-to be patient and to "be careful out there".

Lighting is video, video is lighting
At ESTA's demonstration and discussion at LDI, a number of my show-control colleagues asked the same basic question: "What about synchronization

perfect sense, since lighting people don't even have to think about sync today. But, looking at this situation from outside, I believe this sync feature will be needed inside the lighting market sooner than many people think.

Anyone who has watched the video world recently has seen an incredible series of developments. Ten years ago, the question about most video projection was how bad it was going to look. Then, even $500,000 projectors could look horrible, but today, you can go to your local CompUSA and buy a projector capable of surprisingly good images for about $1,000.

Sure, LSD's never-really released product, the Icon M, was ahead of its time, High End Systems' Catalyst is expensive today, and the contrast ratios of all projectors still need improvement for our market. But how much longer will it be until it's just not cost-effective to make moving lights, with all those hundreds of moving parts, when you could instead drop a video projector into a yoke, and have it create any color, any shape, and any image? These factors will accelerate the development of even more sophisticated lighting/video systems, which will further blur the lines between lighting and video presentation. This is evident today—at LDI last year, I saw quite a few lighting/video solutions, from moving-head video projectors to systems that would play back video

The Future is Bright
At the inter-operability demo, I realized that ACN could radically change lighting control, creating (to use the most overused word in technology) a paradigm shift. ACN won't just be an open way to send multiple universes of DMX over a single cable. Instead, with ACN, lighting control systems will finally be true networks, and this opens up a whole new world of possibilities.

For example, let's say I want to build a moving-head video projection fixture that is "aware" of its position in the room, and can aim itself at any spot on the stage at any elevation in XYZ coordinates (instead of pan and tilt angles). I could probably do this with today's technology, but if I wanted that fixture to work with any modern control console, I'd have to hamstring the functionality to cram the control protocol into a bunch of eight-bit DMX bytes, and then I'd have to really compress the control of a bunch of the features so that I could use more than a few fixtures on a single DMX universe. In the end, it would probably be easier to just build my own control console, talking Ethernet to these fixtures to, get the full functionality. Even then, my product

would not likely do very well in the marketplace.

Flash forward to a world where ACN is accepted. Now, I can take my fixture and design my own bi-directional control language, including everything I need in the most efficient way, and code it up in ACN. To establish basic and traditional "legacy" functionally, I might base some common features (like brightness) on established practices, and even have a "dumb" mode where my fixture responds to pan and tilt angles like a moving light of today. But I could also create a control mode where when my fixture works with any industry-standard console capable of supporting the new features.This product has a real chance in the market.

And that's just step one. What if I want a scenic automation controller to report a scenic unit's position and have my new fixture track it, projecting its image on a moving platform or screen as the scenic unit moves onstage? In the ACN future, I could plop a show controller into my system, have it interpret the information from the scenery controller, and output XYZ scenic position data in ACN (I'll need the show controller since I doubt ACN will be accepted much outside the lighting industry, but that's a subject for another article). My video fixture can now, using all open industry standard control methods, accept scenic position data from the show controller/scenic system and track that point in 3D space, while accepting image and intensity information from the "lighting" console (we may have to come up for a new name for consoles in the future). Think where all this can lead, and you can see why I think ACN will change everything. With it, the future is limited only by your imagination. Stick with DMX and we will certainly have innovative new products, but the introduction of something like I just described would probably be delayed by 10 years.

Get involved-now
As of this writing, a draft ACN standard has been issued once to the public for comment, responses have been received, and the ACN task group is hard at work resolving these comments. The documents are likely to go out for public comment at least once more, and I urge you to get involved. Read the standard even if you're not a networking expert. And if you don't know anything about networks, now's a good time to start learning. That knowledge, though far outside what we traditionally think of as being necessary for our industry, is soon going to be indispensable.

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