

PROTOCOL

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sACN: How I made my life easier!

BY SAM BOWDEN

WITH ALL THE RECENT DEVELOPMENTS in networking and control protocols, figuring out what the new technology is all about can be a bit daunting. You may even wonder if climbing this learning curve is worth the effort or if it's even relevant to your current new projects. After all, DMX512 as a protocol and a standard has been with us for so long now, so you may ask, "If it ain't broke, is it worth the effort to fix it?"

I believe it is, and here's why. When it comes to networking and data, it isn't really about not moving from DMX512 because it works just fine; it's more about accessing new features more easily so I can do more creative things, if I change up and do something different.

People often scoff at the number of channels that modern moving lights use, and moving wash lights are always a great example. The purists among us may only take their moving light, focus it, make it red or green, or mix its colours together and then zoom it in and out. This works just fine for those jobs where all you need is a simple wash to light specific parts of a set or people on stage.

However, what if you want to do more? Suppose, for example, you want to create a more energetic look for rock and roll or you are in the theatre and want some



PHOTO COURTESY HELEN MAYBANKS AND THE NATIONAL THEATRE

James McArdle (Louis) and Nathan Stewart-Jarrett (Belize) in the National Theatre's *Angels in America* – Perestroika. sACN helped make the production's extensive use of technology possible.

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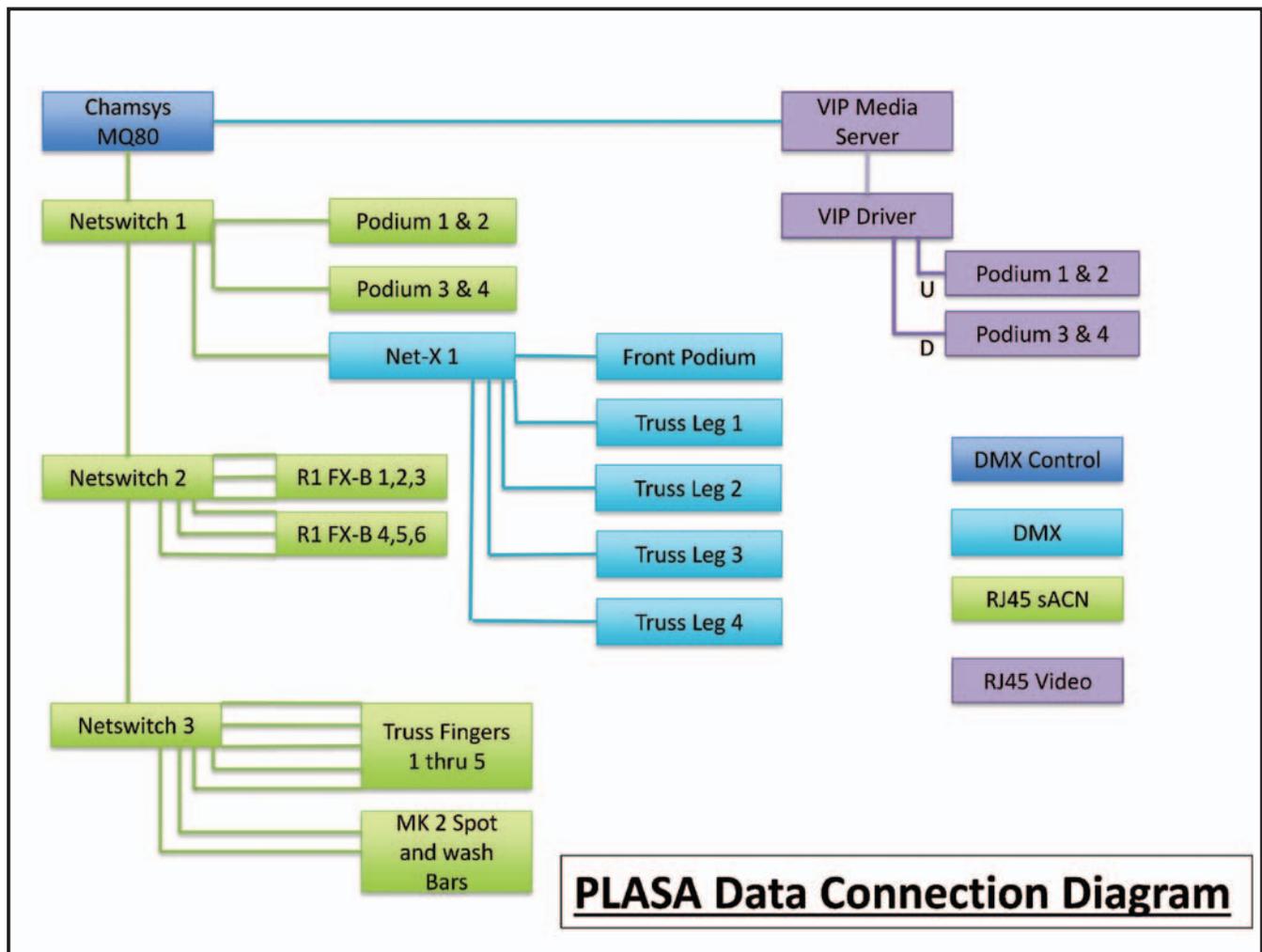
atmospheric looks like lightning strikes. In these cases, why not use pixel mapping and really start pushing your units to do everything they can do? Well, one possible reason is perhaps that in order to do this, your unit will end up using over 100 channels and take up nearly quarter of a DMX universe by itself.

When I add new units onto a rig I want to make sure I have access to every new feature that made me want to choose this unit to begin with. This way I can maximise on the potential within that fixture to create dynamic looks. That sounds all well and good, but it means that even my simple rig may end up swallowing 12 universes of DMX in no time!

In the past, when I ran this number of universes I would use a desk which



The spectacular lighting in the Chauvet Professional stand at the 2016 PLASA Show was controlled using sACN. The "PLASA Network Connection Diagram" below maps how the controller and controlled devices were interconnected.





The massive rig for the iHeart Summer '17 Weekend at Fontainebleau, Miami Beach, culminated in a TV special and live, two-day national broadcast across 130+ iHeartRadio stations, websites, and apps.



The iHeart Summer '17 Weekend used sACN over the lighting system's data distribution network to maximize the potential of the full lighting rig, which included multiple luminous frames around the stage.

would send four lines of DMX512 out the back with the option to plug in an Art-Net node via the network port. From the node, I would then send out the next eight universes of DMX, and these would tail off to wherever they needed to go, breaking out on DMX splitters. As you can imagine, I was running cable everywhere!

So, when we first started adding networking into our CHAUVET Professional Maverick range with the ability to use sACN (ANSI E1.31) I immediately started reading up on the protocol to see what it is all about.

... sACN can operate on any network address. You can even mix and match in the same network ...

Now, I'm no electrical genius, nor am I a software wiz kid, but I can use a computer well enough, and I know my way round the basics of networking (in that we've had products with Kling-Net for a few years now.) When I come to use something new like this I start out at zero in the same way anyone else would. I look at it and ask

myself, "Is this going to make my life easier?" What it boils down to in a production environment is that we don't really have time for messing around just for the sake of it. If I am going to change my ways and take the time to learn how to do something differently, it has to be for a good reason.

So, upon reading up on sACN and talking with colleagues I quickly started to see that this is the protocol for me. I've built data networks in the past with Art-Net, but I always found they didn't really save me time and actually they opened up the potential for more issues.

I have never been a fan of the limitations of IP addressing that you find with Art-Net, although Art-Net 4, released in early 2017, offers more freedom. I found I could only use address codes that start with 2 or 10, and I had to go around and make sure all the units in the network have got onto the right IP address range otherwise they

wouldn't work.

As a result, the setup can become a lot more intricate; I must set the DMX address, the Universe, the sub net, and the IP address. Even then, I have to plug this info into the controller and hope it all works. Because of limitations like this, Art-Net just wasn't really saving me enough time and effort to justify me changing from straight DMX512.

Another thing that griped me is the unicast/broadcast dilemma. Broadcast is where all data is sent over the network to every fixture. This means there are huge masses of data flying around, colliding, and when they do finally arrive at your unit, the processor inside has to break the packet down and pull the relevant data from it—more often than not it is having to do this 42 times a second (the standard DMX512 refresh rate from desks such as Avolites, ChamSys, and Hog). When you're running two or three universes, this isn't such a huge issue, but when you get over 15 universes it starts to become a real problem and latency becomes a big issue.

Then there is unicast. This breaks down the data at the point of control and sends the relevant IP information to the relevant IP address. It's a much better way of doing

it, but it still puts strain on the front-end processing and there is still a lot of time involved with the network setup on the unit.

What makes sACN any better? It's the simple things really. For instance, sACN can operate on any network address. You can even mix and match in the same network; one unit might be address 10.5.234.12 and the next might be 50.4.21.124, but it won't matter, it still works. When you come to set your fixtures up, it is simple: just address the fixture and stick in the universe number. It's pretty much as easy as setting up a unit on DMX512.

Then there is the cabling advantage. For example, you might have five units next to each other and they might all be on different universes, but that would still be fine, since one cable carries all the universes on it anyway, so you can just link through. Suddenly my cable diagram has gone from having five cables coming up to the bar to having one, which means my time on site has been reduced greatly, because I'm dealing with a single line.

Most important of all, this is now a standard so all units that adopt it will be adopting the same thing.

My prep time has been reduced too, because now it really doesn't matter what universe that fixture is on or how many universes I'm using. I don't have to sit there trying to squeeze in that last unit with six channels on the end of a universe; nor do I have to pair those two units that no one will notice (I hope) on to the same address because I've run out of channels. With sACN I could run every unit on a different universe if I wanted to—and it wouldn't make much difference in my time on setup.

Also, it is how sACN sends the information: using multicast. The great difference with multicast is that it shares the load. So it doesn't send all information to every fixture to let them sort through it nor does it make the console sort through all the info at the front end and send messages

out to each fixture individually. After determining where the fixtures and nodes are on the network, multicast streamlines the process by breaking the data into groups which are sent to specific areas of the network, so that there are fewer individual messages, a lightened load on the fixtures and nodes, and fewer packet collisions, so less lag. The beauty of this system is that it's easily expandable, regardless of how many units run, or whether you have two or 200 universes!

From a design perspective, the protocol has been developed by ESTA's Technical Standards Program, which has been responsible for many of the latest developments in protocol as well as safety standards in the US. It's an open protocol, which anyone can adopt and use in their units, and there is one version out there, meaning everything on sACN is talking the same language. Most important of all, this is now a standard so all units that adopt it will be adopting the same thing. Just as we did

with DMX512, people can't go in and tweak it to suit their units, thus making it so they have their own special sACN.

Another attribute, which I am keen to try but have not personally used yet, is the ability to assign priority onto multiple controllers. This means you can put two control desks onto the same line and one will override the other so that the master desk always has control but in a situation where that desk should fail you can jump straight onto the second desk and pick up the gig from there with no down time on the control side. No more need to have that laptop hovering around ominously next to the desk ready so that you can quickly grapple around with cables and change them over if the main desk fails!

This can also be a huge benefit when

you have multiple technicians working on several different parts of the same large rig. They are each able to use controllers to check their individual portion of the rig simultaneously, without impacting your ability to control the entire rig from the main console.

Also, when I have a big pixel mapped rig, I can easily split control between the media server, and the lighting console. If I set the console to a lower priority, and the media server to a higher priority, the lights will follow the pixel information from the lighting desk until they see information from the media server, at which point they'll listen to it, instead. This allows me to leave a backup look in the console; so when the amazing content that I'm sending out of my server stops, there is still a look on-stage.

I can't talk highly enough of this protocol because for me when it comes to a production and the kit I am using, I ask myself three questions:

1. Does it work?
2. How easy is it?
3. If it goes wrong, can I sort it?

For me, sACN is able to answer all these questions better than either DMX512 or Art-Net. Therefore, it is my choice of protocol. Put simply, the reason I use sACN is because it's easier to implement than Art-Net, it's easier to cable than DMX, if it fails (which it hasn't for me so far!) then it's easier to resolve, and—most importantly of all—it just works! ■



Born in Somerset, England, CHAUVET Professional European Product Manager **Sam Bowden** has been involved in the lighting industry since the age of 18 when he began studying for a BSc Hons in Sound, Light and Live Event Technology at the

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