

**Minutes
Control Protocols Working Group
Las Vegas, NV
Thursday, October 23, 1997**

Committee chairs: Steve Carlson, Rosco/Entertainment Technology
Steve Terry, Production Arts

Recording secretary: Karl G. Ruling

In attendance: Tim Bachman, Barbizon Light, Principal
George Sabbi, BASH Lighting Services (NJ), Principal
Mike Rothern, Celco, Principal
Trevor Forrest, Celco, Alternate
Amit Resh, Compulite R & D, Observer
Tal Miron, Compulite R & D, Observer
Philip Nye, DHA Lighting Ltd., Observer
Doug Fleenor, Doug Fleenor Design, Principal
Ed Jones, Edwin Jones Co., Principal
Ed Arend, Electronics Diversified Inc., Principal
Scott Rempel, Electronics Diversified Inc., Alternate
Paul K. Ericson, Ericson Lighting Design, Observer
Nick Archdale, Flying Pig Systems Ltd. (UK), Alternate
Robert Goddard, Goddard Design Co., Principal
Geoffrey O. Thompson, IEEE 802.3 / Bay Networks, Inc., Principal
Edward Paget, Jones & Phillips Associates, Inc., Principal
Philippe Jean, Kunst Macchina Production Company, Alternate
John Mehlretter, Lehigh Electric Products Co., Principal
Tony Douglas-Beveridge, PLASA, Principal
Steve Terry, Production Arts, Principal
Paul F. Mardon, Pulsar Ltd., Observer
Steve Carlson, Rosco/Entertainment Technology, Principal
Mitch Hefter, Rosco/Entertainment Technology, Alternate
Robert Barbagallo, Scéno Plus, Principal
Milton Davis, Strand Lighting, Alternate
Richard Lawrence, Strand Lighting Ltd., Principal
Jerry Gorrell, Theatre Safety Programs, Principal
John Sondericker III, Wybron, Inc., Principal
Peter Brooks, Zero 88 Ltd., Principal

1 Opening Remarks

Steve Carlson welcomed everyone to Las Vegas at 9:08 a.m. PDT

2 Attendance and membership

2.1 Introductions of those present

The attendees introduced themselves. Bob Goddard announced the birth of Grace McNeil, Dexter McNeil's daughter.

2.2 Determination of quorum (10 needed)

Carlson announced we had a quorum. We had 19 voting members, including the two chairs.

2.3 Recognition of alternate voting members

Carlson reminded the group that companies have one vote. If both a principal and an alternate are present, only one can vote on any question.

2.4 Requirements for membership

Steve Terry reminded the attendees that members have to be willing to do the work and to attend the four working group meetings held during the year.

2.5 Processing of new membership requests

The following membership applications were approved unanimously:

Peter Willis, Andera Ltd., Observer
Anders Ekvall, AVAB Transtechnik AB, Observer
J. B. Toby, Avolites Ltd., Observer
Shahid Anwar, Avolites Ltd., Observer
Richard Salzedo, Avolites Ltd., Observer
Ted Fregon, Bytecraft Pty. Ltd., Observer
Murray Mason, Bytecraft Pty. Ltd., Observer
Geoff Shiell, Bytecraft Pty. Ltd., Observer
Trevor Forrest, Celco, Alternate
Tal Miron, Compulite R & D, Observer
Paul K. Ericson, Ericson Lighting Design, Observer
Nick Archdale, Flying Pig Systems Ltd. (UK), Alternate
Andrew Sherar, Lightmoves PLC, Observer
Paul F. Mardon, Pulsar Ltd., Observer
Richard Thornton Brown, Zero 88 Ltd., Alternate

George Sabbi, BASH Lighting Services (a PRG company), was reconfirmed as the principal representing his company on this working group, after BASH's merger with PRG.

The contingent from Bytecraft had requested voting membership, with Fregon as the principal and Mason and Shiell as alternates. However, since no one from Bytecraft attended the meeting, and the company is located in Australia, the working group doubted that they would be able to fulfill the attendance requirement of voting members, and thus voted them in as observers. Fregon, Mason, and Shiell may become voting members by one of them attending a meeting and requesting a change of status.

After the membership applications were processed, there were 20 voting members attending the meeting

3 Approval of the minutes from the previous meeting

Ted Paget moved to accept the minutes as written, Tim Bachman seconded. Unanimous.

4 Call for patents

"ESTA intends to publish no standard that contains protected intellectual property, unless that property can be licensed by anyone for a reasonable fee. ESTA uses a process of open patent disclosure to implement this intent. ESTA does not conduct patent searches and does not warrant that its standards contain no protected intellectual property. "

"In keeping with the open disclosure policy, I ask if anyone present wishes to notify the working group of the existence of a patent or copyright that might protect material in a standard being developed by the working group. You need not be the holder of the patent or copyright in order to notify the working group of its existence."

and Anti-Trust Statement

"The ESTA Board of Directors, the Technical Standards Committee, and the leadership of this Working Group will reject or nullify any actions that restrain trade. Anyone who feels that an action restraining trade is being or has been taken is requested to bring the matter to the attention of the chair immediately. Anyone who feels that actions in restraint of trade have been taken and not properly annulled is requested to notify the TSC chair or ESTA president immediately."

"ESTA legal counsel has informed us that any member of this working group may be found individually liable for any action that restrains trade taken by this working group. An individual convicted of a violation of the Sherman Act may be fined as much as \$100,000 and be imprisoned for up to three years. An easy to read pamphlet describing restraint of trade is available from the Technical Standards Committee."

5 Approval of agenda

Amit Resh asked to be able to present an ACN relevant document. Carlson advised him that it would be appropriate to present it at the ACN task group meeting following the working group meeting. Resh agreed.

Paul Mardon asked to be able to make a presentation addressing the need to update the DMX standard and address the uses of pins 4 & 5. This was added to new business.

Ted Paget moved we accept the agenda with the addition of Paul Mardon's presentation. Dave Higgins seconded the motion. Unanimous.

6 Report of DMX start code project

Bob Goddard reported that a draft appendix of DMX512 exists. Its contents will have no affect on people using 00h start codes. It is a USITT document, and is being prepared for public review through USITT. It identifies a single registration authority, and will allow the 513-frame limit to be exceeded with packets using start codes other than 00h.

7 Report of Analog Task Group

Ruling announced that the draft document goes to public review on October 24. Carlson and Terry reminded the working group members of their responsibility to vet the document.

It was suggested that Ruling put the ESTA P&P on the ESTA website so people can read and understand our procedures.

8 Report of 100MBPS Task Group

Steve Carlson reported that little progress had been made because many of the people on the task group had gotten budened by company projects or made redundant by their employers. Tim Bachman and Milton Davis volunteered to help.

Carlson said the draft document is essentially a restatement of the EIA/TIA 568 generic cabling document. The goal is to get theatres out of specialty cabling and into the mass market of office products.

9 Report of ACN Task Group

Carlson reported that a document was presented to the task group, but not the working group, at the June meeting. The ACN task group will meet after this working group meeting.

10 Report on PLASA Controls Protocol meeting

Peter Brooks reported on the meeting at PLASA, which was largely a report to PLASA on this group's work and a discussion of Paul Mardon's proposal to allow 25V power to be carried on pin 5 of the DMX connectors. This report lead into a discussion that flowed into the next item on this agenda.

11 New Business — Proposal for joint USITT/PLASA/ESTA DMX survey project

Ruling and Douglas-Beveridge reported on Douglas-Beveridge's proposal for the trade associations to survey their members to get a sense of the level of compliance or non-compliance with all the requirements of the DMX512 standard. Douglas-Beveridge suggested that the information could be made available as a reference database.

Various people reported problems with supposedly conforming products not being compatible. Some people questioned if manufacturers would complete the survey in a manner that would yield useful information. The consensus was that if they did and the information was made publically available that it would encourage compliance. There was also a discussion of the difference between compliance and compatibility.

Geoff Thompson described a PICS form, which is used on government contracts and in other industries as a way for a manufacturer to declare conformity with a standard or the requirements of a specification. Essentially a PICS form is a listing of the shalls from a document with yes-no boxes next to each. (e. g. "The product shall be bigger than an American National Standard bread box," translates into "Is the product bigger than an American National Standard bread box? Yes or no?").

Terry suggested that the questionnaire should be a pics for the DMX512 standard.

Fleenor moved that we table this discussion until the questionnaire is devised. Archdale seconded. Thirteen for tabling, five against. Discussion tabled.

12 Other business

Paul Mardon read the following prepared statement:

Ladies and Gentlemen, I know you have a busy day ahead of you, your time is precious and you have new and exciting things to discuss so I will try to keep to the crux of the matter but if you then need background information or wish to raise and discuss other aspects of the subject please do so.

I'd like to talk to you about two problems and a then offer a solution.

Problem #1 is the protection of DMX inputs and outputs.

Problem #2 is the multiple use of pins 4&5 of the DMX connector.

Problem #1 - the protection of DMX inputs and outputs falls into 2 parts - protection to make a reliable product and protection to comply with the legal requirement to make products that

pass the Electro Magnetic Compatibility immunity requirements so that they can be CE marked.

The EIA-RS-485 standard, to which the DMX standard refers, was written in 1983 and obviously its writers didn't know that 12 years later we would have Electro Magnetic Compatibility regulations and CE marking. We HAVE to protect inputs and outputs by law to meet the EMC Emission and Immunity requirements. Your FCC requirements are similar, it is just that, as I understand it, they are not *yet* mandatory in the USA whilst ours in Europe are. But if you want to use or sell your equipment in Europe you need to comply.

The RS-485 standard specifies the signal levels but admits that protection for electrically noisy environments is outside its scope. A Rock and Roll tour is an example of a rough tough electrical environment. In the real world where much of our equipment operates, DMX runs encounter multiple earths causing induced currents and voltages, incorrectly wired plugs, damaged cables, 1000V spikes from motor contactors, dirty feeds from generators and all manner of transients and over-voltages. And what's more an insulation breakdown in any one fixture can put mains voltage on *all* the fixtures on its DMX line.

Equipment build to the RS-485 and DMX standards alone will not be as reliable as it could be and I in my experience it will not pass E.M.C. requirements.

Problem #2 - other uses of pins 4&5:

At PLASA this September, I was brave enough, or stupid enough, to stand up and explain that we are putting our low voltage current supply, which had always been available on our 0-10V analogue connectors, onto pin 5 of the XLR connectors.

We have over twenty 0-10V products which use this supply. This saves the inconvenience and cost of another mains connection and mains power supply unit with all its associated safety legislation. If these products are upgraded to provided a DMX output or new DMX products are introduced, we need this power to be available on the DMX lead. Many other companies power their controllers via the 0-10V analogue lead and have the same requirement as us.

We introduced our first controller which receives its low voltage power from pin 5 four years ago. At PLASA this year we launched a second unit which takes advantage of this power supply. (Show it.) This is an 18†Channel, 1 Preset, Analogue and DMX Desk/Tester/Multiplexer. This Desk is invaluable for testing and trouble shooting purposes. It is very convenient when you are up a rig to be able to plug such a unit directly into a Scan to check it without having to connect a mains supply too. We are currently upgrading more of our analogue desks to DMX and they will be capable of receiving their low voltage supply from pin†5.

However, watching the activity on the Internet news groups and talking to other manufactures reveals that we represent just the tip of the iceberg. Pins 4&5 are already being used for all manner of things besides DMX data. There are other companies besides us which already power their desks via these pins. There are companies who would like to and are watching the outcome of these discussions. There are MIDI signals on pins 4&5, RS232 signals, Contact closures, Dimmer connected pull down signals, Dimmer over-temperature control lines and of course one of the most numerous is 24V power for Colour Scrollers.

Last Friday our Project Support Manager, Andy Graves, went to the National Theatre in London to demonstrate a Clay Paky Stage Scan. The National Theatre is probably the largest and most prestigious theatre in Great Britain. They took the Stage Scan up in the lift to the

rig and while they were up there Andy enquired about all the gadgets and gismos he saw. They explained that they had put 24V onto virtually every DMX lead in the rig to power their DMX Relay boxes, DMX Buffers and DMX Splitters. Also, they have around 300 colour scrollers. These have fans. Three-hundred fans can make a lot of noise so they have made light sensitive fan controllers which only power up the fans when the light is on. All these items use the 24V supply that the National Theatre has put on their DMX cables for the purpose.

And now I would like to propose a solution.

Who can put their hands on their heart and say that damaged DMX transmitter or receiver chips are unheard of in their products? And I'm talking about the chips on the conventional pins 1, 2 and 3? Well, we can. And this is because we have protected all Pulsar and Clay Paky inputs and outputs to 240V mains capability from the very beginning. And all it takes to do this is one 30 cent P.T.C. thermistor and one 20 cent zener diode or TransZorb per pin.

Here are the components - normally they would be mounted on a circuit board but I wanted to show you what they look like and that they can be retro-fitted on the socket if necessary. I believe these 2 components can solve all the problems I have mentioned.

It costs 50 cents per pin to make blown DMX transmitter and receiver chips a thing of the past. Just 50 cents per pin to know that you will meet the EMC immunity legal requirements. And that same 50 cents per pin ensures that anybody can use pins 4&5 for data or whatever use they chose without fear of damage.

In conclusion:

I started by saying that you have other new and exciting things to discuss today.

Well I believe this is one of them!

Here we have the opportunity to make our equipment more reliable, the opportunity to help manufacturers of DMX equipment everywhere to meet their legal obligations with regard to EMC immunity and CE marking, we have the opportunity to allow manufacturers to use pins 4&5 for whatever they wish without damaging each other's equipment.

And while we're at it, we could even take the opportunity to specify the alternative use of a 3 pin XLR connector and its pin configuration to bring the 90% of the products on the market that use it back into full DMX standard compliance.

Now what happens if we don't take this opportunity?

If we don't take this opportunity, it won't be the USITT DMX standard that is looked up around the world, it will be the new German DMX standard that is perceived to be the best because it already addresses the requirement to protect the pins. The proposed DIN DMX Standard shows sufficient protection to meet EMC immunity requirements and it has all the protection we need to ensure that transmitters and receivers will not be harmed by our low voltage supply on pin 5. It is however not sufficient to make a product completely reliable in the electrically noisy real world and it won't cope with colour scroller power, for example, being inadvertently connected to data lines. This is better than the USITT standard but I think we can do better still and completely solve the problem.

I say we because I am happy to offer my time and energy to help with this project and I'm prepared to offer our proven "trade secrets" - our protection circuits, to the industry.

Ladies and Gentlemen please don't pass up this opportunity.

If these proposals meet with your approval, we could perhaps set up a sub-committee and maybe even produce a draft today.

Mardon provided some sample circuit diagrams, which are appended to the end of these minutes.

There was an open discussion of the proposal, the following comments being some of the highlights:

Carlson pointed out that even with Mardon's proposal, the talk back feature of those products using the ET talkback scheme will be lost.

Thompson said that the proposal is a request for the standard to allow non-compliant equipment to be plugged in. Thompson pointed out that the standard has encouraged people to provide for 485 signals on pins 4 & 5. Putting large DC power on these pins is contrary to that.

Rothon pointed out that if we have different talk-back protocols we already have the same interoperability incompatibility.

Terry agreed that there could be a new, better DMX standard, but said that there is 11 years of installed base that must be considered. We cannot make a new version of DMX512 that will not work with older equipment.

Gorrell said that the National Theatre's actions are those of an end-user, and are not relevant to the standard.

Terry summarized the discussion by saying that there are two issues in Mardon's proposal:

- 1) here's a way of protecting the pins
- 2) changing the standard to allow power on the pins

The consensus of the working group was that there is a commercial need in some parts of the lighting market to carry both digital data and power on the same cable. A quick poll of the membership yielded ten in favor of examining the issue of carrying data and power on the same cable, and none against such an investigation.

Paget moved we form a task group to examine the issue of simultaneous transmission of data and power on a single cable, including the possibility of using alternate connectors. Gorrell seconded. Twelve in favor, six abstained, none against. Motion carried.

The working group chairs appointed Paul Mardon as the chair of the task group, to be assisted by Peter Brooks, Mike Rothon, Nick Archdale, and John Sondericker. The group's mandate is to report to the working group on possible solutions at the January 1998 meeting.

13 Schedule for future meetings

January 24, 1998 from 9:00 a.m. to 6:00 p.m. at the Dallas/Ft. Worth Marriott in Irving, Texas.

The USITT Conference meeting will be held Thursday, March 19, 1998 from 9:00 a.m. to 6:00 p.m. in Long Beach, California.

Ruling was requested to provide place cards at future meetings. Thompson recommended felt-tip pens for labelling the cards.

14 Adjournment

Richard Lawrence moved and Bob Goddard seconded. Adjourned at 12:44 p.m. PDT.