

**Minutes**  
**Control Protocols Working Group**

Thursday, 23 March 2000

Adam's Mark Hotel

Denver, CO

Chairs: Steve Terry; PRG Lighting Division (PRG); Principal; User  
Steve Carlson; High Speed Design, Inc.; Principal; Producer [change of company at this meeting]

Recording secretary: Karl G. Ruling, ESTA

Members in attendance: Tony de Rijk; Amazing Controls! Inc.; Principal; Producer  
Tim Bachman; Barbizon Light (Barbizon Companies); Principal; User  
David George; Christie Lites Manufacturing Ltd; Principal; Producer  
Doug Fleenor; Doug Fleenor Design, Inc.; Principal; Producer  
Ed Jones; Edwin Jones Co.; Principal; Producer  
Greg Heinzle; Electronic Theatre Controls, Inc.; Alternate; Producer  
Tracy Underhill, Electronics Diversified Inc. Principal, Producer  
Philip Nye; Engineering Arts; Principal; General Interest  
Robert Goddard; Goddard Design Co.; Principal; Producer  
Dave Higgins; Gray Interfaces; Principal; Producer  
Michael (Sandy) Twose; Gray Interfaces; Alternate; Producer  
Trevor Forrest; Helvar Lighting Control; Principal; Producer  
Lary Cotten; High End Systems; Principal; Producer  
Scott Blair; High End Systems; Alternate; Producer  
Edwin S. Kramer; IATSE, Local 1; Principal; User  
Edward Paget; Jones & Phillips Associates, Inc.; Principal; General Interest  
Ken Vannice; NSI Corporation (Leviton Manufacturing Co., Inc.); Alternate;  
Producer  
Tim Cox; PLASA; Principal; General Interest  
Steve Unwin; Pulsar Ltd.; Alternate; Producer  
Jon R. Farley; Rosco/Entertainment Technology (Rosco Laboratories); Principal;  
Producer [joined as principal from observer at this meeting]  
Milton Davis; Strand Lighting; Alternate; Producer  
Richard Lawrence; Strand Lighting Ltd.; Principal; Producer  
Jerry Gorrell; Theatre Safety Programs; Principal; General Interest  
George Kindler; Thoughtful Designs (PRG); Alternate; User  
Brian Dowd; TMB Associates; Principal; User  
Eckart Steffens; SOUNDLIGHT (VPLT); Principal; General Interest  
Mitch Hefter, Rosco/Entertainment Technology (USITT), Principal, USITT  
Richard Thornton Brown; Zero 88 Ltd.; Alternate; Producer

Visitor: Robert Harris, Electronics Diversified Inc.

**1 Opening Remarks**

The meeting was called to order by Steve Terry at 09:04

**2 Attendance and membership**

**2.1 Introductions of those present**

Terry asked those assembled to introduce themselves, which they did, proceeding around the table in a clockwise direction from Steve Carlson.

**2.2 Determination of quorum (11 needed)**

Carlson and Terry noted that it was obvious we have quorum.

**2.3 Recognition of alternate voting members**

Pulsar and Zero 88 had their alternates rather than principals present. Terry reminded the group that there is only one vote allowed per company.

## 2.4 Requirements for membership

Terry reviewed the requirements, emphasizing the attendance requirements. Membership in the working group is open to all who are affected by the work of the group. Voting members need to attend meetings.

## 2.5 Processing of new membership requests

Terry read the applications that had been received since the last meeting. The people who had applied were:

Bradley Klinkradt; Bradley Klinkradt; Observer; General interest  
 Steven B. Carlson (Steve Carlson); High Speed Design, Inc.; Principal; Producer (change of employer from Rosco/ET)  
 Jon R. Farley, Rosco/Entertainment Technology (Rosco Laboratories), Principal, Producer

Terry asked for a show of approval of support in accepting these applications. Unanimous approval was demonstrated by a show of hands.

The voting body for this meeting was thus:

Name	Company	Parent company or organization represented	Voting status	Int. cat.
John Sellers	AIM Northwest	AIM Northwest	P	G
Tony de Rijk	Amazing Controls! Inc.	Amazing Controls! Inc.	P	P
Peter Willis	Andera Ltd.	Andera Ltd.	P	P
Wayne David Howell	Artistic Licence (UK) Ltd.	Artistic Licence (UK) Ltd.	P	P
Tobin Neis	Barbizon Companies	Barbizon Companies	A	U
Tim Bachman	Barbizon Light	Barbizon Companies	P	U
Soo-Myong Chung	Bloch Design Group Inc.	Bloch Design Group Inc.	A	G
Lee J. Bloch	Bloch Design Group Inc.	Bloch Design Group Inc.	P	G
David George	Christie Lites Manufacturing Ltd	Christie Lites Manufacturing Ltd	P	P
Doug Fleenor	Doug Fleenor Design, Inc.	Doug Fleenor Design, Inc.	P	P
Ed Jones	Edwin Jones Co.	Edwin Jones Co.	P	P
Dennis Varian	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P
Jon Ide	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P
Greg Heinzle	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P
Ed Prasser	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	P	P
Scott Rempel	Electronics Diversified Inc.	Electronics Diversified Inc.	A	P
Tracy Underhill	Electronics Diversified Inc.	Electronics Diversified Inc.	P	P
Phillip Nye	Engineering Arts	Engineering Arts	P	G
Dexter McNeil	Goddard Design Co.	Goddard Design Co.	A	P
Robert Goddard	Goddard Design Co.	Goddard Design Co.	P	P
Michael (Sandy) Twose	Gray Interfaces	Gray Interfaces	A	P
Dave Higgins	Gray Interfaces	Gray Interfaces	P	P
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P
Scott Blair	High End Systems	High End Systems	A	P
Lary Cotton	High End Systems	High End Systems	P	P
Steve Carlson	High Speed Design, Inc.	High Speed Design, Inc.	P	P
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U
John Huntington	IATSE Local 1	IATSE Local 1	A	U
Edward Paget	Jones & Phillips Associates, Inc.	Jones & Phillips Associates, Inc.	P	G
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	A	P
Rick Leinen	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P
Tony Douglas-Beveridge	PLASA Standards Office	PLASA	A	G
Tim Cox	PLASA	PLASA	P	G
George Sabbi	PRG Lighting Group	PRG	A	U
George Kindler	Thoughtful Designs	PRG	A	U
Steve Terry	PRG Lighting Division	PRG	P	U
Robert Barbagallo	Proximo Inc.	Proximo Inc.	P	U
Steve Unwin	Pulsar Ltd.	Pulsar Ltd.	A	P
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	P	P
John Farley	Rosco/Entertainment Technology	Rosco Laboratories	P	P

Name	Company	Parent company or organization represented	Voting status	Int. cat.
Milton Davis	Strand Lighting	Strand Lighting Ltd.	A	P
Richard Lawrence	Strand Lighting Ltd.	Strand Lighting Ltd.	P	P
Jerry Gorrell	Theatre Safety Programs	Theatre Safety Programs	P	G
Brian Dowd	TMB Associates (NJ)	TMB Associates	P	U
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	U
Eckart Steffens	SOUNDLIGHT	VPLT	P	G
Keny Whitright	Wybron, Inc.	Wybron, Inc.	A	P
John Sondericker III	Wybron, Inc.	Wybron, Inc.	P	P
Richard Thornton Brown	Zero 88 Ltd.	Zero 88 Ltd.	A	P
Peter Brooks	Zero 88 Ltd.	Zero 88 Ltd.	P	P
			32 voting members	

### 3 Approval of the minutes from the previous meeting (CP/2000-1003r1)

Ted Paget moved to approve as amended in version r1. Seconded. Unanimous by show of hands.

### 4 Call for patents

Carlson read the following:

"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."

Carlson also read the 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."

No intellectual property or restraint of trade issues were identified.

At this point in the meeting Carlson allowed Ted Paget to model ESTA's new clothing accessories. The group was encouraged to buy them at the USITT Boutique to help support the Technical Standards Program.

### 5 Approval of agenda

Carlson suggested that DMX be moved to end of the agenda.

Paget moved that the agenda be approved with this change. The motion was seconded. The motion was accepted unanimously by a voice vote.

### 6 Old Business

#### 6.1 E1.3

### **6.1.1 Consideration of the revised document, CP/1997-1003r9**

Steve Unwin moved that the draft standard (CP/1997-1003r9) go to public review. The motion was seconded. A roll call ballot was conducted [which is attached]. The vote was 26 accept, with none opposed and no abstentions. The motion passed with a supermajority.

### **6.1.2 Analog Application Guide, new version CP/1999-1008r1**

Ruling asked for some guidance on how much advice to give equipment designers in the guide. This was prompted by a note from Steve Unwin stating that a small capacitor bypassing the resistor in the negative feedback loop was necessary to ensure stable opamp operation. Ruling stated that this is true, but wondered how far the Guide should go in offering general analog design advice.

A discussion ensued in which the consensus was that the guide should point out some of the easily overlooked quirks of 0-10V transmitters and receivers as applied to lighting control, but should not offer general analog circuit design advice.

Steve Terry offered the following sentence to address the issue of bypassing as it applies to 0-10V transmitters: "Designers are urged to pay particular attention to proper bypassing of op amps that have long wires attached to them." Ruling will insert it where appropriate.

### **6.2 Report of ACN Task Group**

Carlson reported that at the last meeting the task group went through session data transport and device management protocol documents. They are 85% to 90% done. The ACN overall document is the next thing to work on. In July the task group will do a tutorial on how it all works conceptually. They will send the protocol to some networking experts for comment. Version 1.0 by fall of this year.

### **6.3 Report on IEEE 802.3 DTE Power via MDI project & other IEEE matters**

Carlson reported that the group now is a task force rather than a study group. The group has almost gotten past "the CISCO problem." This is that company's desire to have phantom power using the center taps on the input/output transformers. This will work on 10M/s and 1000M/s, but not for 100M/s. The task force will probably use some kind of scheme were devices can be identified for their powering needs.

Carlson predicted that there will be products on the market by the end of the year – even before the standard is formally finished. We'll see powered hubs by this fall.

### **6.4 AES Liaison report, CP/2000-1004**

Nye referred the group to his written report. [Appended.] There were no questions from the working group.

### **6.5 E1.11**

#### **6.5.1 Public comment report summary**

The 165-page CP/2000-1005 had been circulated before the meeting. Mitch Hefter summarized the main issues in his report in 6.2.2 [which is appended to these minutes].

#### **6.5.2 Task Group progress report**

Mitch Hefter summarized the issues the task group has been addressing. [Appended]

In a search for guidance for the task group, Hefter posed a series of questions to the working group:

1. Should both cable schemes, C1 single-pair and C2 dual-pair, be permitted in permanent installations? Or should only one type, the C2 dual-pair scheme, be allowed?

The unanimous consensus was that only C2 (dual-pair) should be allowed.

2. Should the mandated protection be for sustained voltage levels outside EIA485 ranges or should devices be required to be protected only for transients that can be reasonably expected and that are outside EIA 485 voltage ranges?

The consensus was that protection against steady state voltages is desirable, but the majority did not feel that it should be mandated. By show of hands, six voted for steady state protection being required in the standard. Fourteen voted for protection against steady state voltage being a recommendation in a recommended practice only.

3. Shall the standard provide for power on pins 4&5?

There was extensive discussion on this issue, and it was decided that this should be dealt with by a formal motion.

Ted Paget moved that power not be permitted to be provided on pins 4 & 5 of the 5-pin XLR connector in E1.11. The motion was seconded by Jon Farley.

The discussion centered around issues of backward compatibility and anti-trust, and the manageability of a networked power system. The original DMX standard of 1986 and the 1990 revision are clear on the use of pins 4 & 5 for data. A number of companies have produce product which uses pins 4 & 5 in a manner compliant with the specification. It was argued that these manufacturers would have reason to make an anti-trust complaint if the standard were changed to support the use of pins 4 & 5 for supplying power. This would be a legal problem. However, there is a technical problem in supplying the limited power we have been entertaining in a daisy-chainable system. There is no way to control the length of cable in the chain, or how many power-consuming or power producing devices might be on the line, so it is impossible to limit the power available or control the power requirements to fit any possible limits. Passing power through a splitter box is a further complication.

By show of hands, 22 voted "accept," two voted "reject," and two abstained. The motion to prohibit allowing power on pins 4&5 of the 5-pin XLR connector in E1.11 carried.

### **6.5.3 IEC update**

Hefter reported that the technical committee's secretary has been promoted, so we have a new contact.

### **6.6 Publishing DMX on Cat 5 report**

Higgins said it is unclear if we will elect to do this. It needs to be discussed at the task group meeting. Some significant negatives have been raised, and there are additional findings to consider. However, in general the task group found Cat 5 cable is better than any of the conventional DMX cables for differential signals such as DMX512.

The Chairs urged Higgins and the Cat 5 task group to publish a report stating the performance of Cat 5 versus the requirements for DMX512. This would be enough. There is no need to reconcile the factual findings with the public comments on BSR E1.11 regarding Cat 5. The task group was directed to be ready to present recommendations to the CPWG at 16:00.

### **7 New Business**

None.

### **8 Other business**

None.

### **9 Schedule for future meetings**

Carlson reported that the next meeting is scheduled for 9:00 Saturday morning, July 15, 2000 at the Dallas/Ft. Worth Airport Marriott on Freeport Parkway.

Tim Bachman moved that we recess for lunch and task group meetings and reconvene at 16:00. The motion was seconded. Unanimous by show of hands. The meeting recessed at 11:39.

### **10 Reconvene**

Carlson and Terry reconvened the meeting at 16:05.

Hefter reported that the DMX task group made some changes to the Executive Summary of the ROP. He intends to send it to the working group for a vote by letter ballot for publication.

On Cat 5 cable they resolved all the concerns, says Hefter, except one. Color Kinetics had suggested a different pin-out on RJ45 connectors at patch bays than had been proposed in the draft document. Color Kinetics argued that it would be better to not use pins 4 & 5 with DMX because these could be used by telephone equipment and would have ring voltage on them. Thus, their suggested pin-out would be:

RJ-45	DMX
1	2
2	3
3	1
4	NC (telephone pin 1)
5	NC (telephone pin 2)
6	1
7	4
8	5
Shield	

Terry asked for a straw vote for those in favor of the above pin-out. There was no support for it.

Richard Lawrence proposed adapting the C5.2 cabling scheme that was in the draft standard that went to public comment. The adapted version would be as follows:

RJ-45	DMX
1	3
2	2
3	5
4	NC (telephone pin 1)
5	NC (telephone pin 2)
6	4
7	1 signal common
8	
Shield	

Ted Paget moved that Richard Lawrence's proposal (as shown above) be accepted. The motion was seconded. By show of hands, the motion was unanimously accepted, except for three abstentions. There were no negative votes.

## 11 Adjournment

Ken Vannice move the meeting adjourn. The motion was seconded. The motion was accepted unanimously with a show of hands. Carlson and Terry declared the meeting adjourned at 17:25.

## Control Protocols Working Group Roll Call Ballot re BSR E1.3 23 March 2000

**Motion:** Steve Unwin moved that the draft E1.3 standard (CP/1997-1003r9) go to public review. The motion was seconded.

**Question:** Do you accept the motion to send the draft E1.3 to public review?

Name	Company	Parent company or organization represented	Voting status	Int. cat.	Accept	Accept in principle	Accept in part	Reject	Abstain
John Sellers	AIM Northwest	AIM Northwest	P	G					
Tony de Rijk	Amazing Controls! Inc.	Amazing Controls! Inc.	P	P	X				
Peter Willis	Andera Ltd.	Andera Ltd.	P	P					
Wayne David Howell	Artistic Licence (UK) Ltd.	Artistic Licence (UK) Ltd.	P	P					
Tobin Neis	Barbizon Companies	Barbizon Companies	A	U					
Tim Bachman	Barbizon Light	Barbizon Companies	P	U	X				
Soo-Myong Chung	Bloch Design Group Inc.	Bloch Design Group Inc.	A	G					
Lee J. Bloch	Bloch Design Group Inc.	Bloch Design Group Inc.	P	G					
David George	Christie Lites Manufacturing Ltd	Christie Lites Manufacturing Ltd	P	P	X				
Doug Fleenor	Doug Fleenor Design, Inc.	Doug Fleenor Design, Inc.	P	P	X				
Ed Jones	Edwin Jones Co.	Edwin Jones Co.	P	P	X				
Dennis Varian	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P					
Jon Ide	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P					
Greg Heinzle	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P	X				
Ed Prasser	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	P	P					
Scott Rempel	Electronics Diversified Inc.	Electronics Diversified Inc.	A	P					
Tracy Underhill	Electronics Diversified Inc.	Electronics Diversified Inc.	P	P	X				
Philip Nye	Engineering Arts	Engineering Arts	P	G	X				
Dexter McNeil	Goddard Design Co.	Goddard Design Co.	A	P					
Robert Goddard	Goddard Design Co.	Goddard Design Co.	P	P	X				
Michael (Sandy) Twose	Gray Interfaces	Gray Interfaces	A	P					
Dave Higgins	Gray Interfaces	Gray Interfaces	P	P	X				
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P	X				
Scott Blair	High End Systems	High End Systems	A	P					
Lary Cotten	High End Systems	High End Systems	P	P	X				
Steve Carlson	High Speed Design, Inc.	High Speed Design, Inc.	P	P	X				
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U	X				
John Huntington	IATSE Local 1	IATSE Local 1	A	U					
Edward Paget	Jones & Phillips Associates, Inc.	Jones & Phillips Associates, Inc.	P	G	X				
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	A	P	X				
Rick Leinen	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P					
Tony Douglas-Beveridge	PLASA Standards Office	PLASA	A	G					
Tim Cox	PLASA	PLASA	P	G	X				

Name	Company	Parent company or organization represented	Voting status	Int. cat.	Accept	Accept in principle	Accept in part	Reject	Abstain
George Sabbi	PRG Lighting Group	PRG	A	U					
George Kindler	Thoughtful Designs	PRG	A	U					
Steve Terry	PRG Lighting Division	PRG	P	U	X				
Robert Barbagallo	Proximo Inc.	Proximo Inc.	P	U					
Steve Unwin	Pulsar Ltd.	Pulsar Ltd.	A	P	X				
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	P	P					
Jon R. Farley	Rosco/Entertainment Technology	Rosco Laboratories	P	P	X				
Milton Davis	Strand Lighting	Strand Lighting Ltd.	A	P					
Richard Lawrence	Strand Lighting Ltd.	Strand Lighting Ltd.	P	P	X				
Jerry Gorrell	Theatre Safety Programs	Theatre Safety Programs	P	G	X				
Brian Dowd	TMB Associates (NJ)	TMB Associates	P	U	X				
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	U	X				
Eckart Steffens	SOUNDLIGHT	VPLT	P	G	X				
Keny Whitright	Wybron, Inc.	Wybron, Inc.	A	P					
John Sondericker III	Wybron, Inc.	Wybron, Inc.	P	P					
Richard Thornton Brown	Zero 88 Ltd.	Zero 88 Ltd.	A	P	X				
Peter Brooks	Zero 88 Ltd.	Zero 88 Ltd.	P	P					
					26				

Motion carried with a supermajority of 26 in a voting body of 32.

CP/2000-1010



**Audio Engineering Society  
108th Convention  
Palais de Congres, Paris 20th - 23rd Feb 2000**

The AES convention lasted 4 days. It included a trade exhibition with over 300 exhibitors, two papers sessions and one workshop session running in parallel through the four days and a number of other events. On top of these were the standards committee meetings.

The AES Standards committee is structurally fairly similar to ESTA and is ANSI accredited. However they have an extra level of committees. The main committee of relevance to CPWG is AES SC-10 the sub-committee on control which is divided into two subcommittees - SC-10-02 on control protocols and SC-10-05 on software component technologies. There is also some activity on control in SC-06-02 the working group on IEEE 1394 (Firewire).

The current level of interest in SC-10 is very low. This is attributed largely to the failure of the AES24 protocol which was for a long time virtually the only activity of SC-10. However, attempts are being made to revive the committee with a much broader scope. At present though, the work of SC-10 attracts little attention from the majority of the industry where, proprietary solutions dominate.

SC-10-02 has several project underway at present. However, other than maintenance of previous work the principle active project is liaison with ESTA over ACN. At the committee meeting, I went over the outline of ACN as it has been presented at LDI and elsewhere. There is great interest in the committee in ACN and there was some discussion of ways in which they could help with the ACN effort to ensure its relevance to Audio. I have come away with a number of specific technical concerns and a suggestion for a liaison meeting once details of the ACN technology can be made available.

Other SC-10-02 projects were suggested for liaison with other protocol bodies e.g. MIDI, IEEE1394, etc. but none were started.

SC-10-05 is a new working group concerned with applications of mainstream component technologies such as COM, CORBA, JINI, ActiveX etc. to audio control. The plan is currently to define a set of data types for common audio control objects, then work towards standardizing an API at an abstract level which will then be applied to specific component technologies. This has the potential to provide a good level of interoperability without standardization of hardware interfaces and protocols. It also applies mainstream technology in a much more pragmatic way than AES24 ever did.

Outside of the standards committees, there were a couple of papers of interest.

Jason Flaks of Gibson Guitar Corp presented an introduction to GMICS (pronounced "Gimmicks"! ) which is a proposed standard for digital transmission right from the source (mic, guitar or whatever) in a performance environment where latency is very critical. They claim that none of the existing standards address this environment adequately - mostly on grounds of latency or limited range. GMICS is yet another CAT5/RJ45 interconnect and transmits power on two pairs!!  
More details from [www.gmics.org](http://www.gmics.org)

Richard Foss of Rhodes University, South Africa presented a paper comparing implementations they have done there of MIDI over IP (yes that's MIDI over Ethernet in 1994) and AES24 (the only implementation ever).

Philip Nye  
1 March 2000

**DMX512 Task Group Report**  
**November 1999 Request for Comments on BSR E1.11**

**Report: Summary of Key Issues**  
**March 18, 2000**  
**Author: Mitch Hefter**

---

In November of 1999, a request for comments on a draft of revised and updated DMX512 standard was issued. Three-hundred twenty-nine comments were received in response.

Below is a summary of some of the key issues along with the direction the DMX512 Task Group is taking towards resolution and preparation of a new draft.

Several topics emerged as key issues. These are:

- Alternate START Codes
- AC Termination
- Unit Loads
- Connectors & Cable
- Topologies & Earth Grounding
- Protection
- TYPEs
- Auxiliary (Device) Power (TYPE 5)
- Accessory Power (e.g., Scroller Power)

**Alternate START Codes**

The issue of altered timings for ASC packets was raised several times. This will get further examination.

**AC Termination**

A number of objections to requiring only AC termination were made. This requirement will be changed.

**Unit Loads**

The requirement of a maximum of 32 DMX512 devices/data link and not 32 unit loads was rejected in the comments received. No comments in favor of this restriction were presented. This text will be changed.

**Connectors & Cable**

Comments in favor of 2-pair only permanent cabling as well as maintaining the current draft language allowing for either 1- or 2-pair were received. Several comments for the use of Category 5 cable were received, as were several stating only 120 ohm EIA-485 compliant cable should be used. Further study will be required.

The language addressing NCC DMX512 needs refining.

**Topologies and Earth Grounding**

The issue of preferred and / or required grounding topologies will be further defined. It is expected that the preferred topology will be detailed in the body of the standard, while other topologies will appear in normative annexes. Many of the notes to figures will be incorporated into text, and language will be refined.

Drawings will be refined to indicate they are symbolic, not schematic.

## Protection

Comments received stated that higher protection levels than EIA-485 shouldn't be mandated, while other comments supported higher levels due to DMX512's use in mixed environments. At least one comment stated higher levels should be part of a Recommended Practice. The Task Group feels higher levels should be part of the standard, since DMX512 can be subjected to higher than EIA-485 levels; therefore higher protection is prudent. EIA-485 does state "Any devices complying with this Standard shall do so within the ranges of those factors appropriate for the device operation, such as . . . . It is intended that this Standard be referenced by other standards and specifications that specify the additional characteristics necessary to assure satisfactory operation of equipment." In addition to the timing and protocol issues DMX512 defines, the Task Group also believes the higher protection levels are necessary in our environment to assure satisfactory operation.

## TYPEs

There were a very large quantity of comments on TYPEs. These ranged from having no TYPEs to reducing the number of TYPEs to adding TYPEs. There seemed to be a misconception among many of the no-TYPE and fewer-TYPE proponents that we were inventing something new and adding complexity to the Standard.

What we doing was simply, but apparently not clearly enough, documenting the existing valid implementations of the second pair (yes, we added TYPE 5 – see that discussion below). We see this as a way to actually aid the user when mixing products from different manufacturers in the same system. Mixing different TYPEs in many cases would have no impact on the system functionality. However, when different implementations of the second pair do conflict, TYPEs would provide the user a simple way of identifying this incompatibility. Once equipment is up in a rig, it would understandably be difficult to troubleshoot, but using the information provided by TYPEs at the system design stage is where this kind of problem would normally be addressed. If not, the user is no worse off than today.

The TASK group firmly believes that, since the current standard allows for various uses of the second pair, some method of identifying those uses is required if we're going to improve the standard. We are examining ways of simplifying the presentation without compromising the information and benefits. One possibility involves merging of several TYPEs into one TYPE that corresponds to an electrical topology with sub-TYPEs providing further distinction (e.g., Rosco/ET and ADB apparently both use the same electrical scheme, and their distribution amplifiers would be compatible with each other, but the data would not; booth could be TYPE 3, with Rosco/ET being 3.1 and ADB being 3.2).

## Auxiliary (Device) Power (TYPE 5)

There were a large amount of comments on this subject, ranging from deleting this option to 5 volt power is OK to full support. Considerable debate is still ongoing, in part because not all are convinced that this scheme meets the "do no harm to legacy equipment" directive from the CPWG one year ago.

## Accessory Power (e.g., Scroller Power)

The comments in this area also ranged from not being appropriate to the Standard to being needed, but more defined to full support of the draft. The sense of the Task Group is there probably would be a benefit with this, but more definition is needed. It would be part of an annex or even a separate part of the standard.

## Other topics:

Scope / Overview - A revision to clause 1 is being reviewed by the Task Group. This revised material attempts to resolve the various comments on this subject

Definitions - While many comments said these should be part of an annex, IEC style dictates they be part of the standard, typically in clause 3. We've also been told that definitions already found in IEC 50 should not be part of the standard. However, since there are almost 200 different documents as part of IEC 50, we'll probably not address that issue at this time.

Structure - We will be doing some rearrangement to group data/protocol type material in one area and physical layer material in another. This even could conceivably be broken into two separate parts. Regardless, our sense is to move more items to Annexes, leaving a core standard (not reliant on annexes) that the most basic products would have to meet. Any thing beyond that, e.g., Alternate START Codes or other topologies, would be referenced to a Normative Annex.

Miscellaneous - A number of comments pointed out formatting and spelling problems, as well as some non-controversial issues, which will be addressed.

Our goal is to develop a revised draft for consideration for issuing to public review by the entire CPWG in July. This will be difficult, but not impossible.

### Control Protocol Working Group Membership after Changes of the 23 March 2000 Meeting

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
John Sellers	AIM Northwest	AIM Northwest	P	G
Tony de Rijk	Amazing Controls! Inc.	Amazing Controls! Inc.	P	P
Peter Willis	Andera Ltd.	Andera Ltd.	P	P
Wayne David Howell	Artistic Licence (UK) Ltd.	Artistic Licence (UK) Ltd.	P	P
Steve Friedlander	Auerbach & Associates, Inc.	Auerbach & Associates, Inc.	O	U
Sierk Janszen	Avenger Showcontrol	Avenger Showcontrol	O	P
J. B. Toby	Avolites Ltd.	Avolites Ltd.	O	P
Shahid Anwar	Avolites Ltd.	Avolites Ltd.	O	P
Richard Salzedo	Avolites Ltd.	Avolites Ltd.	O	P
Tobin Neis	Barbizon Companies	Barbizon Companies	A	U
Tim Bachman	Barbizon Light	Barbizon Companies	P	U
Bernardo Benito Rico	Ben-Ri Electronica S.A.	Ben-Ri Electronica S.A.	O	P
Lee J. Bloch	Bloch Design Group Inc.	Bloch Design Group Inc.	P	G
Soo-Myong Chung	Bloch Design Group Inc.	Bloch Design Group Inc.	A	G
Bradley Klinkradt	Bradley Klinkradt	Bradley Klinkradt	O	G
Ted Fregon	Bytecraft Pty. Ltd.	Bytecraft Pty. Ltd.	O	P
Murray Mason	Bytecraft Pty. Ltd.	Bytecraft Pty. Ltd.	O	P
Bill Ellis	Candela Controls, Inc.	Candela Controls, Inc.	O	U

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Marty Lazarus	Chicago Spotlight, Inc.	Chicago Spotlight, Inc.	O	G
David George	Christie Lites Manufacturing Ltd	Christie Lites Manufacturing Ltd	P	P
Tal Miron	Compulite R & D	Compulite R & D	O	P
Fred Lindauer	Compulite R&D	Compulite R & D	O	P
Jason Friedman	Creative Realities, Inc.	Creative Realities, Inc.	O	G
Mikael Fahl	Dataton AB	Dataton AB	O	P
David Bertenshaw	David Bertenshaw	David Bertenshaw	O	P
Doug Fleenor	Doug Fleenor Design, Inc.	Doug Fleenor Design, Inc.	P	P
Gary Dove	Dove Systems	Dove Systems	O	P
Jussi Kallioinen	Eastway Sound & Lighting	Eastway Sound & Lighting	O	U
Ed Jones	Edwin Jones Co.	Edwin Jones Co.	P	P
Bill Fehrmann	Electrol Engineering, Inc.	Electrol Engineering, Inc.	O	P
Bruce Lehnus	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	O	P
Ed Prasser	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	P	P
Bill Florac	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	O	P
Dennis Varian	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P
Jon Ide	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P
Greg Heinze	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	P

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Adam Bennette	Electronic Theatre Controls Ltd.	Electronic Theatre Controls, Inc.	O	P
Paul Bennett	Electronics Diversified Inc.	Electronics Diversified Inc.	O	P
Scott Rempel	Electronics Diversified Inc.	Electronics Diversified Inc.	A	P
Tracy Underhill	Electronics Diversified Inc. (Colorado)	Electronics Diversified Inc.	P	P
Philip Nye	Engineering Arts	Engineering Arts	P	G
Paul K. Ericson	Ericson Lighting Design	Ericson Lighting Design	O	U
Robert Goddard	Goddard Design Co.	Goddard Design Co.	P	P
Dexter McNeil	Goddard Design Co.	Goddard Design Co.	A	P
Dave Higgins	Gray Interfaces	Gray Interfaces	P	P
Michael (Sandy) Twose	Gray Interfaces	Gray Interfaces	A	P
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	P	P
Lary Cotten	High End Systems	High End Systems	P	P
Scott Blair	High End Systems	High End Systems	A	P
Steve Carlson	High Speed Design, Inc.	High Speed Design, Inc.	P	P
Edwin S. Kramer	IATSE, Local 1	I.A.T.S.E. Local 1	P	U
John Huntington	IATSE Local 1	IATSE Local 1	A	U
Rob Johnston	Interactive Technologies, Inc.	Interactive Technologies, Inc.	O	P
Larry Schoeneman	Interesting Products, Inc.	Interesting Products, Inc.	O	G

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
David Timmins	Jands Electronics	Jands Electronics	O	P
Edward Paget	Jones & Phillips Associates, Inc.	Jones & Phillips Associates, Inc.	P	G
John Mehlretter	Lehigh Electric Products Co.	Lehigh Electric Products Co.	O	P
Mark T. Kraft	Lehigh Electric Products Co.	Lehigh Electric Products Co.	O	P
Rick Leinen	NSI Corporation	Leviton Manufacturing Co., Inc.	P	P
Ken Vannice	NSI Corporation	Leviton Manufacturing Co., Inc.	A	P
Andrew Sherar	Lightmoves PLC	Lightmoves PLC	O	P
Gary Pritchard	LSC Lighting Systems PTY Ltd	LSC Lighting Systems PTY Ltd	O	P
Tracy Schwenk	Martin Professional Inc.	Martin Professional A/S	O	P
Gerard Cohen	Martin Professional Inc.	Martin Professional A/S	O	P
Hiroshi Kita	Marumo Electric Co., Ltd.	Marumo Electric Co., Ltd.	O	P
Geoffrey O. Thompson	IEEE 802.3 / Nortel Networks	Nortel Networks	O	G
David A. Boller	Organic Machines LLC	Organic Machines LLC	O	P
William Benner	Pangolin Laser Systems	Pangolin Laser Systems	O	P
Tim Cox	PLASA	PLASA	P	G
Tony Douglas-Beveridge	PLASA Standards Office	PLASA	A	G

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Steve Terry	PRG Lighting Division	PRG	P	U
George Sabbi	PRG Lighting Group	PRG	A	U
George Kindler	Thoughtful Designs	PRG	A	U
Robert Barbagallo	Proximo Inc.	Proximo Inc.	P	U
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	P	P
Steve Unwin	Pulsar Ltd.	Pulsar Ltd.	A	P
Stephen J. Tyrrell	Quantum Logic	Quantum Logic	O	P
Charlie Richmond	Richmond Sound Design Ltd.	Richmond Sound Design Ltd.	O	P
Jon R. Farley	Rosco/Entertainment Technology	Rosco Laboratories	P	P
Mick Martin	Showcad Control Systems	Showcad Control Systems	O	P
Andre Broucke	ADB - TTV Technologies	Siemens	O	P
Milton Davis	Strand Lighting	Strand Lighting Ltd.	A	P
Richard Lawrence	Strand Lighting Ltd.	Strand Lighting Ltd.	P	P
Tad Trylski	Tad Trylski	Tad Trylski	O	U
Jerry Gorrell	Theatre Safety Programs	Theatre Safety Programs	P	G
Thom Weaver	Thom Weaver	Thom Weaver	O	G
Colin Waters	TMB Associates	TMB Associates	O	U
Brian Dowd	TMB Associates (NJ)	TMB Associates	P	U

Name	Company	Parent Co./Org Represented	Vot. Stat.	Int. Cat.
Achim Russ	Transtechnik GmbH	Transtechnik GmbH	O	P
Hans Leiter	Transtechnik GmbH	Transtechnik GmbH	O	P
Anders Ekvall	Transtechnik GmbH	Transtechnik GmbH	O	P
Mitch Hefter	Rosco/Entertainment Technology	USITT	P	U
Eckart Steffens	SOUNDLIGHT	VPLT	P	G
Ken Wagner	Walt Disney Imagineering	Walt Disney	O	U
Keny Whitright	Wybron, Inc.	Wybron, Inc.	A	P
John Sondericker III	Wybron, Inc.	Wybron, Inc.	P	P
Peter Brooks	Zero 88 Ltd.	Zero 88 Ltd.	P	P
Richard Thornton Brown	Zero 88 Ltd.	Zero 88 Ltd.	A	P

#### Voting Status

- P Principal voting representative for a company or organization
- A Alternate voting representative for a company or organization
- I Individual representing no organization other than himself or herself
- O Observer, non-voting

#### Interest Categories

- P Producer (manufacturer) of control devices or products
- U User of control devices or products
- G General interest in control devices or products