

**Minutes**  
**Control Protocols Working Group**  
Saturday, July 17, 1999  
Dallas/Ft. Worth Marriott  
Irving, Texas

Chairman: Steve Terry; PRG Lighting Division (PRG); Principal; User  
Recording secretary: Karl G. Ruling; ESTA

Members attending: John Sellers; AIM Northwest; Principal; General interest  
Peter Willis; Andera Ltd.; Principal; Producer  
Wayne David Howell; Artistic Licence (UK) Ltd.; Principal; Producer  
Tim Bachman; Barbizon Light (Barbizon Companies); Principal; User  
Lee J. Bloch; Bloch Design Group Inc.; Principal; General interest  
Doug Fleenor; Doug Fleenor Design, Inc.; Principal; Producer  
Ed Jones; Edwin Jones Co.; Principal; Producer  
Tracy Underhill; Electronics Diversified Inc. ; Principal; Producer  
Robert Goddard; Goddard Design Co.; Principal; Producer  
Dave Higgins; Gray Interfaces; Principal; Producer  
Trevor Forrest; Helvar Lighting Control ; Principal; 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  
George Kindler; Thoughtful Designs (PRG); Alternate; User  
Robert Barbagallo; Proximo Inc.; Principal; User  
Paul F. Mardon; Pulsar Ltd.; Principal; Producer  
Mitch Hefter; Rosco/Entertainment Technology (USITT); Principal; User  
Milton Davis; Strand Lighting; Alternate; Producer  
Jerry Gorrell; Theatre Safety Programs; Principal; General interest  
Brian Dowd; TMB Associates; Principal; User  
Eckart Steffens; SOUNDLIGHT (VPLT); Principal; General interest  
John Sondericker III; Wybron, Inc.; Principal; Producer

Note: The names in parenthesis indicate the organization represented, if different from the company affiliation.

Visitors: Louis Bradfield, Bally's Casino Resort Las Vegas

1 Opening Remarks

Steve Terry called to order at 9:03 a.m.

2 Attendance and membership

2.1 Introductions of those present

Those present introduced themselves, proceeding around the large table in a counterclockwise direction.

2.2 Determination of quorum (11 needed)

Terry asked the principal voting members, or the alternates if their principal was not present, to raise a hand. Terry announced that it was clear we had a quorum.

### 2.3 Recognition of alternate voting members

Terry reminded alternates that they may only vote if the principal is not present, or if the principal cedes his or her vote to the alternate.

### 2.4 Requirements for membership

Terry emphasized that the commitment for voting members must be for four meetings a year.

### 2.5 Processing of new membership requests

Membership applications had been received for:

Jussi Kallioinen; Eastway Sound & Lighting; Observer; User  
Jon Farley; Rosco/Entertainment Technology; Observer; Producer  
David Timmins; Jands Electronics; Observer; Producer  
Soo-Myong Chung; Bloch Design Group Inc.; Alternate; General interest

Terry asked all those in favor of granting working group membership to these people to raise a hand. All were in favor.

## 3 Approval of the minutes from the previous meeting

Ted Paget moved that the minutes be accepted. The motion was seconded. By show of hands, all were in favor. None opposed or abstaining.

## 4 Call for patents

Terry directed the group to read the call for patents printed in the agenda (see below), and then asked if there were any patents or other protected intellectual property that the group should know about. Mitch Hefter revealed that the talkback scheme written into the new DMX 512 standard is copyrighted by Rosco/Entertainment Technology. However, Hefter stated that the copyright will not be an obstacle to either the publication or the implementation of the standard.

### **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."

Terry directed the group to read the anti-trust statement printed in the agenda.

### **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

Ted Paget moved that we accept the draft agenda. It was seconded. Unanimous by show of hands.

## 6 Old Business

### 6.1 E1.3 status report

Ruling reported that it is still in public review. It has received some comments, but not a lot.

### 6.2 E1.11

#### 6.2.1 Task group update

Mitch Hefter reported that he had received 48 comments from the WG on the draft that was distributed. There were also a few missing items in the draft.

Ted Paget moved that the document be sent to public review as soon as the missing items are plugged in and the document is complete (Note: complete does not mean perfect) Wayne Howell second. Unanimous show of hands in support. When the task group says the document is complete, it will be sent to the working group with a letter ballot containing the motion to send the draft document to public review.

There was a discussion of allowing different connectors for power delivery at higher voltages or currents than now allowed on the five-pin connector in the draft document. A straw poll revealed that the WG did not feel that a specific connector needed to be specified for these unusual power applications. However, the standard will require that all five connections found on the standard 5-pin connector must appear on the alternate connector as part of the scheme.

There was a discussion of the IPS talkback scheme, whether this should be left in as a specific type, Type 3, or whether it should just be one of many possible variants of Type 4. The sense of the group was to leave it in as Type 3.

#### 6.2.2 IEC update

Mitch Hefter reported that an application was put in with IEC to take DMX as an IEC standard. This needs to be voted on by the IEC members. The voting closes Aug 2, and then two months are allowed to tally the votes. Hefter gave a general review of the IEC process. We are now at the Proposal stage.

There was a general discussion of how the IEC process might interface with our work via the P&P. The sense was to follow the two processes in parallel for now. It is not clear right now whether the IEC will take on the project, and that will not be clear until perhaps October. It does not make sense to wait for the IEC. In any case, we need an American National Standard and an international standard. We need to do our best to make sure these are the same or equivalent.

### 6.3 Report of ACN Task Group

Ruling pointed out that the written report from Steve Carlson had been distributed, and encouraged people to read it. (Report is appended to these minutes.) Steve Terry noted that the enthusiasm for JINI has gone away, but that the friction between manufacturers also has disappeared, and so the group is moving forward.

Howell stated that ACN group not meeting here in conjunction with the CPWG was very bad. Part of the justification for him coming here is to have contact with the ACN group, and he cannot attend the

ACN group and CPWG meeting when they are both happening at the same time but in different cities. Willis also objected to the lack of access to the members of the ACN group. The sense was that the ACN task group and the CPWG at large should at least meet several times a year together. Lee Bloch stated that as a member of that task group he understands that the ACN group's needs would not be met by meeting here in Irving.

## 7 New Business

### 7.1 Publishing DMX on Cat 5 report

Mitch Hefter moved that the CAT 5 task group develop an executive summary of their results stating that DMX on cat 5 is possible, and that the details of how to do this will be addressed in the new DMX standard. Lee Bloch seconded.

Ted Paget amended the motion stating it shall be published in Protocol. This was acceptable to Mitch Hefter, who said it could be put on the ESTA website.

By show of hands, one opposed, two abstentions, the rest (21) in favor. Motion carried.

### 7.2 DALI

Wayne Howell asked that we consider DALI, the Digital Addressable Lighting Interface. Peter Willis read a press release about it. Trevor Forrest, who's company is developing it, described it. It's a replacement for 0-10V ballast control, with a low baud rate (100 millisecond update), support for up to 64 nodes, two-way communication, and discovery of devices on the network. It is being written as an digital extension to the existing analog standard, IEC 929. ACN is a possible backbone.

### 7.3 Analog Application Guide

Karl Ruling asked for comments on the draft E1.3 application guide by October 1.

There was a generally positive response to the guide. The consensus was the guide could be published in several forms, but that it should not be issued as part of the E1.3 standard. Also, it should not be issued before E1.3 is published.

### 7.4 Standard for moving lamp personalities (Howell)

Wayne Howell spoke to the need for a standardized way of reporting and storing moving light personalities. An analogy would be a printer driver.

Tracy Underhill, Eckart Steffens, and John Sellers agreed to be on a task group with Wayne Howell to draft a standard for automated luminaire personalities data interchange. Ted Paget moved that such a task group be formed. The motion was seconded. Unanimous approval by show of hands, with no opposition and no abstentions. .

## 8 Other business

Ruling said that a secretary was needed for the CPWG meeting at LDI. The LDI Institute is having a fog demonstration at a time that conflicted with the working group meeting.

Ted Paget volunteered to be the recording secretary at the next meeting.

## 9 Schedule for future meetings

Steve Terry announced that the next meeting will be on the Thursday, November 18, from 9:00 to 18:00 at LDI.

There was a discussion of the meeting schedules at LDI, with some people expressing unhappiness with the way the meetings conflict with the trade show hours and setup time. Steve Terry asked Ruling to explore rescheduling meetings for other times that would conflict less with the trade show, both with the actual show itself and the build up to it.

10 Adjournment

Eddie Kramer moved the meeting adjourn. The motion was seconded. Unanimous. Terry declared the meeting adjourned at 11:05 a.m.

# ACN Task Group Report

July 1999

by  
Steve Carlson

The ACN Task Group decided at the January meeting to investigate Sun Microsystems "Jini" networking technology. Jini (pronounced "genie") is intended to create a world where any type of intelligent device can interact with any other device without any user intervention. Jini has received tremendous attention in the trade press, and has had a number of high-profile companies e.g. Sony, Fujitsu, Kodak, H-P, IBM, among others, announced support for Jini. Jini is the networking component of Sun's Java programming language.

The TG agreed to read the Jini specifications, which comprise twelve separate documents totaling some 500 pages, and be prepared to discuss them at the March USITT meeting in Toronto. During this meeting, the sense of the working group was that Jini might well offer everything we needed, but that the Jini documentation did not have the depth required for the TG to 1) really understand Jini and 2) decide whether it was useful. It was decided to continue investigating other technologies while asking Sun Microsystems to provide further information.

At the conclusion of the Toronto meetings the ACN "Retreat" meeting was planned. All of the TG members have been frustrated at the lack of "face-to-face" time, especially in the context of trade shows where people have many other responsibilities. An interim ACN meeting was planned for May in Madison, WI, to coincide with COMDEX in Chicago.

Sun Microsystems flew Dan Hushon, a "Practice Manager" from Sun's Java Center Enterprise Solutions Group in McLean, VA, to this meeting. Mr. Hushon is an engineer specializing in Java/Jini applications. The TG had prepared a series of questions for Mr. Hushon, which he answered at a very rapid pace.

It soon became clear that Jini at its present state of development is not ready for complex, real-time applications such as ACN. Jini really seems at this time to be more of a design philosophy than an actual product. This is probably fortunate, since while some parts of Jini are free, other parts are really expensive. Over the next few years Jini may solve all of these problems and may very well become what it set to be. In the meantime, other technologies will have to be used for ACN. The Home Plug and Play initiative promises to provide the same sort of functionality by using standard Internet protocols. The TG is watching this effort carefully.

ACN is intended to be built on top of industry-standard protocols with TCP/IP at the core. Unfortunately, TCP does not provide several key technologies. The largest hole is the lack of reliable multicasting. This is a key to the design of ACN. A number of reliable multicasting protocols have been put forth in the Internet Engineering Task Force. The major player is Reliable Multicast Protocol. This is a very complex and extensive protocol designed to give reliable multicasting in the context of the Internet. It is therefore a "heavy" protocol in the sense that it requires substantial computing resources to operate. This does not meet the ACN criteria of "lightweight" ACN devices which should be as simple and inexpensive as possible.

RMP has a junior partner called Lightweight Reliable Multicasting Protocol (LRMP) which is designed for smaller local networks. Unfortunately, LRMP is too lightweight and is missing some key constructs required by ACN. Adding these constructs to an existing protocol turns out not to be practical. It is somewhat like remodeling a house. By the time you fix everything that gets broken while you are fixing something else, you could have built a new house much faster and at less cost.

Greg Heinzle is researching some other reliable multicasting techniques and is creating a "litmus test" to match them against ACN's requirements.

Richard Lawrence presented his report on simplifying the Component Management Protocol (CMP). The concept of a fixed unique world-wide component ID (CID) was introduced. This CID is 64 bits long and has a 16-bit manufacturer ID and a 48-bit unique identifier. There was debate about extending this to a 128-bit CID. This allows the Device Management Protocol server code to simply be a list of CIDs making minimal DMP servers easy to implement in simple controllers.

Steve Carlson and Dexter McNeil presented a report on the use of DHCP to assign IP addresses. In systems without DHCP services a "random address" assignment based on the DHCP RFC 2462 will be used. A report on the state of network-ready embedded processors was given, with primary focus on the NET+ARM family from Netsilicon.

Jon Ide brought up the possible use of Extended Markup Language (XML) as a basis for the class description language. Jon had several books on XML and after some discussion and Web research the group was enthusiastic about this idea. XML will be the basis for the class description in the Home Plug and Play project, so this looks like the right direction. Philip Nye created some XML test cases and felt that the results were very promising. Jon agreed to write an XML parser for testing and has posted it to the ACN FTP site and write up the description of control authority in each device.

Rich Leinen is developing the ACN Applications Programming Interface (API), initially for the Win32 platform.

Assignments were made for the next meeting. The group felt that the retreat had been extremely productive. It was decided to repeat the format for the July meeting. The group decided to hold the meeting in Portland, much to the relief of the two Portland-based TG members.

Steve Carlson was asked by IEEE 802.3 to provide them with help in establishing a Study Group for power over Ethernet. This will allow many ACN devices to be built without an internal power supply. While at the 802.3 meeting, Steve Adams from the Intel Architecture Labs in Hillsboro, OR, expressed interest in the ACN project. He has been invited to attend the Friday sessions and will make a presentation on Intel's plans for embedded networking. Michael Karagosian of the AES24 (AES SC-10-01) may also attend one session as part of the ESTA/AES liaison.

Working group membership at the end of the meeting:

| Name                  | Company                        | Parent co./<br>org representd  | Voting<br>Status | Interest<br>cat. |
|-----------------------|--------------------------------|--------------------------------|------------------|------------------|
| John Sellers          | AIM Northwest                  | AIM Northwest                  | P                | G                |
| Tony de Rijk          | Amazing<br>Controls! Inc.      | Amazing<br>Controls! Inc.      | P                | P                |
| Peter Willis          | Andera Ltd.                    | Andera Ltd.                    | P                | P                |
| Wayne David<br>Howell | Artistic Licence<br>(UK) Ltd.  | Artistic Licence<br>(UK) Ltd.  | P                | P                |
| Steve<br>Friedlander  | Auerbach &<br>Associates, Inc. | Auerbach &<br>Associates, Inc. | O                | U                |
| Sierk<br>Janszen      | Avenger<br>Showcontrol         | Avenger<br>Showcontrol         | O                | P                |
| J. B. Toby            | Avolites Ltd.                  | Avolites Ltd.                  | O                | P                |
| Shahid<br>Anwar       | Avolites Ltd.                  | Avolites Ltd.                  | O                | P                |
| Richard<br>Salzedo    | Avolites Ltd.                  | Avolites Ltd.                  | O                | P                |
| Tim Bachman           | Barbizon Light                 | Barbizon<br>Companies          | P                | U                |
| Tobin Neis            | Barbizon<br>Companies          | Barbizon<br>Companies          | A                | U                |
| Lee J. Bloch          | Bloch Design<br>Group Inc.     | Bloch Design<br>Group Inc.     | P                | G                |
| Soo-Myong<br>Chung    | Bloch Design<br>Group Inc.     | Bloch Design<br>Group Inc.     | A                | G                |
| Ted Fregon            | Bytecraft Pty.<br>Ltd.         | Bytecraft Pty.<br>Ltd.         | O                | P                |
| Murray<br>Mason       | Bytecraft Pty.<br>Ltd.         | Bytecraft Pty.<br>Ltd.         | O                | P                |
| Marty<br>Lazarus      | Chicago<br>Spotlight, Inc.     | Chicago<br>Spotlight, Inc.     | O                | G                |
| Fred<br>Lindauer      | Compulite R&D                  | Compulite R &<br>D             | O                | P                |
| Tal Miron             | Compulite R &<br>D             | Compulite R &<br>D             | O                | P                |
| Jason<br>Friedman     | Creative<br>Realities, Inc.    | Creative<br>Realities, Inc.    | O                | G                |
| Mikael Fahl           | Dataton AB                     | Dataton AB                     | O                | P                |
| David<br>Bertenshaw   | David<br>Bertenshaw            | David<br>Bertenshaw            | O                | P                |

| Name                | Company                                       | Parent co./<br>org representd           | Voting<br>Status | Interest<br>cat. |
|---------------------|---|---|------------------|------------------|
| Doug<br>Fleenor     | Doug Fleenor<br>Design, Inc.                  | Doug Fleenor<br>Design, Inc.            | P                | P                |
| Gary Dove           | Dove Systems                                  | Dove Systems                            | O                | P                |
| Jussi<br>Kallioinen | Eastway Sound<br>& Lighting                   | Eastway Sound<br>& Lighting             | O                | U                |
| Ed Jones            | Edwin Jones<br>Co.                            | Edwin Jones<br>Co.                      | P                | P                |
| Bill Fehrmann       | Electrol<br>Engineering,<br>Inc.              | Electrol<br>Engineering,<br>Inc.        | O                | P                |
| Ed Prasser          | Electronic<br>Theatre<br>Controls, Inc.       | Electronic<br>Theatre<br>Controls, Inc. | P                | P                |
| Bruce<br>Lehnus     | Electronic<br>Theatre<br>Controls, Inc.       | Electronic<br>Theatre<br>Controls, Inc. | O                | P                |
| Adam<br>Bennette    | Electronic<br>Theatre<br>Controls Ltd.        | Electronic<br>Theatre<br>Controls, Inc. | O                | P                |
| Bill Florac         | Electronic<br>Theatre<br>Controls, Inc.       | Electronic<br>Theatre<br>Controls, Inc. | O                | P                |
| Dennis<br>Varian    | Electronic<br>Theatre<br>Controls, Inc.       | Electronic<br>Theatre<br>Controls, Inc. | A                | P                |
| Jon Ide             | Electronic<br>Theatre<br>Controls, Inc.       | Electronic<br>Theatre<br>Controls, Inc. | A                | P                |
| Greg Heinzle        | Electronic<br>Theatre<br>Controls, Inc.       | Electronic<br>Theatre<br>Controls, Inc. | A                | P                |
| Scott Rempel        | Electronics<br>Diversified Inc.               | Electronics<br>Diversified Inc.         | A                | P                |
| Tracy<br>Underhill  | Electronics<br>Diversified Inc.<br>(Colorado) | Electronics<br>Diversified Inc.         | P                | P                |
| Paul Bennett        | Electronics<br>Diversified Inc.               | Electronics<br>Diversified Inc.         | O                | P                |
| Philip Nye          | Engineering<br>Arts                           | Engineering<br>Arts                     | P                | G                |



| Name                  | Company                           | Parent co./<br>org representd     | Voting<br>Status | Interest<br>cat. |
|-----------------------|-----------------------------------|-----------------------------------|------------------|------------------|
| 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                |
| Edwin S. Kramer       | IATSE, Local 1                    | I.A.T.S.E. Local 1                | P                | U                |
| Larry Schoeneman      | Interesting Products, Inc.        | Interesting Products, Inc.        | O                | G                |
| David Timmins         | Jands Electronics                 | Jands Electronics                 | O                | P                |
| John Huntington       | John Huntington                   | John Huntington                   | O                | U                |
| 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                |

| Name                   | Company                         | Parent co./<br>org representd | Voting<br>Status | Interest<br>cat. |
|------------------------|---------------------------------|-------------------------------|------------------|------------------|
| Gerard Cohen           | Martin Professional Inc.        | Martin Professional A/S       | O                | P                |
| Tracy Schwenk          | Martin Professional Inc.        | Martin Professional A/S       | O                | P                |
| Geoffrey O. Thompson   | IEEE 802.3 / Nortel Networks    | Nortel Networks               | O                | G                |
| William Benner         | Pangolin Laser Systems          | Pangolin Laser Systems        | O                | P                |
| Tim Cox                | PLASA                           | PLASA                         | P                | G                |
| Tony Douglas-Beveridge | PLASA S                         | PLASA                         | A                | G                |
| 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                |
| Steve Carlson          | Rosco/ Entertainment Technology | Rosco Laboratories            | P                | P                |
| Jon Farley             | Rosco/Entertainment Technology  | Rosco Laboratories            | O                | P                |
| Mick Martin            | Showcad Control Systems         | Showcad Control Systems       | O                | P                |

| Name                   | Company                        | Parent co./<br>org representd | Voting<br>Status | Interest<br>cat. |
|------------------------|--------------------------------|-------------------------------|------------------|------------------|
| Andre Broucke          | ADB - TTV Technologies         | Siemens                       | O                | P                |
| Richard Lawrence       | Strand Lighting Ltd.           | Strand Lighting               | P                | P                |
| Milton Davis           | Strand Lighting                | Strand Lighting               | A                | P                |
| Jerry Gorrell          | Theatre Safety Programs        | Theatre Safety Programs       | P                | G                |
| Thom Weaver            | Thom Weaver                    | Thom Weaver                   | O                | G                |
| Brian Dowd             | TMB Associates (NJ)            | TMB Associates                | P                | U                |
| Colin Waters           | TMB Associates                 | TMB Associates                | O                | U                |
| 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                |
| Paul Vincent           | Vincent Lighting Systems       | Vincent Lighting Systems      | O                | G                |
| 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