

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

Saturday, 21 July 2012  
Hilton New York  
1335 Avenida de las Américas  
New York, NY

**Chairpersons:** Kimberly Corbett; Schuler Shook; P; DE  
Michael Lay; Philips Color Kinetics (Royal Philips Electronics); P; MP

**Recording secretary:** Karl G. Ruling; PLASA

**Members attending:**

Reza Khanmalek; Spectrum Manufacturing Inc. (A.C. Lighting Ltd.); A; CP  
Kevin Loewen; Pathway Connectivity Inc. (Acuity Brands Inc.); P; MP  
Eric Johnson; High End Systems (Barco); P; MP  
Paul Kleissler; City Theatrical, Inc.; P; MP  
Larry Dunn; City Theatrical, Inc.; A; MP  
Edward A. (Ted) Paget; Daktronics Automated Rigging Solutions (Daktronics Inc.); P; G  
Larry Schoeneman; DesignLab Chicago, Inc.; P; DR  
Ulrich Kunkel; E3 Engineering & Education for Entertainment GmbH, representing the DIN, NVBF Committee;  
P; U  
Sean Sill; Doug Fleenor Design, Inc.; A; MP  
Maya Nigrosh; Electronic Theatre Controls, Inc.; A; MP  
Sang-Kyu Lim; Electronics and Telecommunications Research Institute; P; G  
Insu Kim; Electronics and Telecommunications Research Institute; A; G  
Scott M. Blair; Full Throttle Films/ VER; P; DR  
Robert Goddard; Goddard Design Co.; P; MP  
Ed Garstkiewicz; Harting Inc., North America (Harting KGAA); P; G  
Edwin S. Kramer; I.A.T.S.E. Local 1; P; U  
John Huntington; City Tech, Ent Tech Department, representing I.A.T.S.E. Local 1; A; U  
Roger Lattin; I.A.T.S.E. Local 728; P; U  
Ken Vannice; Leviton Manufacturing Co., Inc.; P; MP  
Tyrone Mellon Jr.; Lex Products Corp.; P; CP  
Michael Karlsson; LumenRadio AB; P; MP  
Simon Newton; I; G

**Visitor:** Gary Falls: City Theatrical

**1 Opening remarks**

Michael Lay called the meeting to order at 9:01.

**2 Attendance**

**2.1 Introductions of those present and circulation of attendance sheet**

A bright yellow sign-in sheet was circulated while those present introduced themselves.

**2.2 Determination of a quorum**

Michael Lay asked for a show of hands of voters. He counted them and announced that a quorum was present.

### 2.3 Recognition of alternate voting members

Alternate voting members were recognized and voters for companies that had two or more voters present were reminded that only one may vote at a time on a question.

## 3 Membership

### 3.1 Requirements for membership

Michael Lay read the following statement aloud to the assembly:

Membership is open to all who are affected by the work of the group. People and companies that would be in any interest category other than a manufacturer interest category are at this time particularly encouraged to apply for membership. Voting members are required to attend meetings and to vote on letter ballots. Voting members and their alternates may not miss three consecutive meetings without a loss of voting status.

### 3.2 Changes to observer status due to lack of attendance

Voting members who have missed the previous two meetings and will be moved to observer status if this meeting also is missed:

Ulrich Kunkel; DIN, NVBF Committee

Kunkel was present so there was no change to his voting status.

### 3.3 Processing of new membership requests and reaffirmation of members with new companies

As of Wednesday, July 11, the following applications had been received and logged:

John Musarra; Observer

Sang-Kyu Lim; ETRI; Principal; General interest (change of voting status from observer)

InSu Kim; ETRI; Alternate; General interest (change of voting status from observer)

Larry Schoeneman asked that his voting status be changed to principal from observer in the Dealer/Rental company category

Roger Lattin moved that the membership requests be accepted. The motion was seconded and then approved with a show of hands. There were now a possible 21 votes present out of a voting body of 27.

### 3.4 Consensus body

The full consensus body, including those not present, during the time of this meeting was:

Name	Representing	Voting status	Int. cat.
Jean-Francois Canuel	A.C. Lighting Ltd.	P	CP
Reza Khanmalek	A.C. Lighting Ltd.	A	CP
Kevin Loewen	Acuity Brands Inc.	P	MP
Robert Bell	Acuity Brands Inc.	A	MP
Gary Douglas	Acuity Brands Inc.	A	MP
Alan Martello	Acuity Brands Inc.	A	MP
Philip Nye	Acuity Brands Inc.	A	MP
Garrett Gallant	Acuity Brands Inc.	A	MP
Eric Johnson	Barco	P	MP
Paul Kleissler	City Theatrical, Inc.	P	MP
Larry Dunn	City Theatrical, Inc.	A	MP
Peter Kirkup	Cooper Controls Ltd.	P	MP

<b>Name</b>	<b>Representing</b>	<b>Voting status</b>	<b>Int. cat.</b>
Edward A. (Ted) Paget	Daktronics Inc.	P	G
Larry Schoeneman	DesignLab Chicago, Inc.	P	DR
Ulrich Kunkel	DIN, NVBF Committee	P	U
Doug Fleenor	Doug Fleenor Design, Inc.	P	MP
Milton Davis	Doug Fleenor Design, Inc.	A	MP
Sean Sill	Doug Fleenor Design, Inc.	A	MP
Daniel W. Antonuk	Electronic Theatre Controls, Inc.	P	MP
Steve Terry	Electronic Theatre Controls, Inc.	A	MP
Maya Nigrosh	Electronic Theatre Controls, Inc.	A	MP
Sang-Kyu Lim	Electronics and Telecommunications Research Institute	P	G
Insu Kim	Electronics and Telecommunications Research Institute	A	G
Scott M. Blair	Full Throttle Films/ VER	P	DR
Robert Goddard	Goddard Design Co.	P	MP
Ed Garstkiewicz	Harting KGAA	P	G
Howard Forryan	Harting KGAA	A	G
Peter Willis	Howard Eaton Lighting Ltd.	P	CP
Edwin S. Kramer	I.A.T.S.E. Local 1	P	U
John Huntington	I.A.T.S.E. Local 1	A	U
Roger Lattin	I.A.T.S.E. Local 728	P	U
Dennis Grow	I.A.T.S.E. Local 728	A	U
Alan M. Rowe	I.A.T.S.E. Local 728	A	U
Ken Vannice	Leviton Manufacturing Co., Inc.	P	MP
Tyrone Mellon_Jr.	Lex Products Corp.	P	CP
Joshua Liposky	Lex Products Corp.	A	CP
Michael Karlsson	LumenRadio AB	P	MP
Marcus Bengtsson	LumenRadio AB	A	MP
Hans Lau	LumenRadio AB	A	MP
Ron Bonner	PLASA EU	P	G
Charles Reese	Production Resource Group	P	DR
Michael Lay	Royal Philips Electronics	P	MP
Kimberly Corbett	Schuler Shook	P	DE
Simon Newton	Simon Newton	I	G
Mitch Hefter	USITT	P	U
Christopher Tilton	Westlake Reed Leskosky	P	DE
	<b>Total votes possible</b>	<b>27</b>	

Name	Representing	Voting status	Int. cat.
		3	CP
		10	MP
		3	DR
		4	U
		5	G
		2	DE

Votes by interest categories

#### 4 Approval of the minutes from the March meeting

See *CPmin03-2012.pdf*

An editorial change made in the body of the minutes to correct the reference to John Huntington's educational institution. This made an r1 version of the minutes.

Ted Paget moved that the amended minutes be accepted. The motion was seconded and then approved with a show of hands.

#### 5 Reading of the call for patents

Michael Lay read the following statement aloud to the assembly:

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

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

No protected property was reported.

#### 6 Reading of the anti-trust statement

Michael Lay read the following statement aloud to the assembly:

"The PLASA Board of Directors, the Technical Standards Council, and the leadership of this working group will reject or nullify any actions that unlawfully restrain trade. Anyone who feels that such an action is being or has been taken is requested to bring that matter to the attention of the chairs 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 PLASA chair immediately.

"PLASA legal counsel has informed us that violations of the anti-trust laws can have serious consequences. Individuals engaged in certain unlawful conduct can be found criminally liable. An individual convicted of a criminal violation of the Sherman Act may be fined as much as \$1,000,000 and imprisoned for up to ten years. An easy to read pamphlet describing restraint of trade issues is available from the Technical Standards Manager."

The Technical Standards Manager held up some of the easy-to-read pamphlets. No restraint of trade issues were reported.

#### 7 Approval of agenda

Simon Newton asked for an item 9.1 in which he would demonstrate the latest RDM responder test suite.

Scott Blair moved that the amended agenda be accepted. The motion was seconded and then approved with a show of hands.

## **8 Old business**

### **8.1 Standards Maintenance. Any news or action needed on any of these standards. This is a placeholder in the agenda, so we don't forget to maintain them.**

ANSI E1.3 – 2001 (R2011), Entertainment Technology - Lighting Control Systems - 0 to 10V Analog Control Specification & Application Guide For ANSI E1.3 – 2004 Lighting Control Systems 0 to 10V Analog Control Specifications. Revision, reaffirmation or withdrawal in 2016.

ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories. Revision, reaffirmation, or withdrawal in 2013.

ANSI E1.17 - 2010, Architecture for Control Networks. Revision, reaffirmation or withdrawal in 2016.

ANSI E1.20 - 2010, Remote Device Management over USITT DMX512. Revision, reaffirmation or withdrawal in 2016.

ANSI E1.27-1 – 2006 (R2011), Entertainment Technology - Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A) Products. Revision, reaffirmation or withdrawal in 2016.

ANSI E1.27-2 – 2009, Entertainment Technology - Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products. Revision, reaffirmation, or withdrawal in 2014.

ANSI E1.30-1 - 2010, EPI 23, Device Identification Subdevice. Revision, reaffirmation or withdrawal in 2016.

ANSI E1.30-3 – 2009, EPI 25, Time Reference in ACN Systems Using SNTP and NTP. Revision, reaffirmation, or withdrawal in 2014.

ANSI E1.30-4 – 2010, EPI 26, Device Description Language (DDL) Extensions for DMX512 and E1.31 Devices. Revision, reaffirmation, or withdrawal in 2015.

ANSI E1.30-7 – 2009, EPI 29, Allocation of Internet Protocol Version 4 Addresses to ACN Hosts. Revision, reaffirmation, or withdrawal in 2014.

ANSI E1.30-10 – 2009, EPI 32, Identification of Draft Device Description Language Modules. Revision, reaffirmation, or withdrawal in 2014.

ANSI E1.31 – 2009, Entertainment Technology – Lightweight streaming protocol for transport of DMX512 using ACN. Revision, reaffirmation or withdrawal in 2014.

ANSI E1.37-1 - 2012, Additional Message Sets for ANSI E1.20, Remote Device Management

No news or problems were reported with the above documents.

### **8.2 BSR E1.30-12, EPI 34, E1.31 Universe Synchronization**

Ulrich Kunkel offered a progress report on the EPI 34 project. The draft document sent to the working group was not for consideration for public review now, but for further discussion.

Kunkel said that the intention is to offer a simple method of universe synchronization. Scott Blair described the concept, which is that a bit flag would indicate if a universe is synchronized. Synchronized universes would be given a group ID. Then, each of these synchronized DMX512 universes would not be emitted until the last universe in the group is received over E1.31.

In response to questions, Kunkel explained that this is for the synchronous transmission of universes that were synchronized somehow in the creation of the DMX512 data. It is not for generating the initial data synchronously, which is a much more difficult problem.

Issues of latency and possible jitter were discussed. The consensus was that more task group work was needed.

### **8.3 BSR E1.33, Extensions to E1.31 for Transport of ANSI E1.20 (RDM)**

*Progress report on resolutions from the Task Group headed by Scott Blair. See E1-33\_Draft\_June2012d.pdf and E1-33FrstRevwDraftResols.pdf.*

Scott Blair announce that they have a document, thanks to the "heavy lifting" done by Simon Newton.

Blair moved that the draft resolutions be accepted. The motion was seconded and then approved with a show of hands. The vote was unanimous, with only the two working group leaders abstaining. There were no objections.

Blair moved that the revised draft standard be offered for another public review. The motion was seconded and then approved with a show of hands. The vote was unanimous, except for the two working group leaders abstaining. There were no objections.

### **8.4 BSR E1.37-2, Additional Message Sets for ANSI E1.20 (RDM) – Part 2, IPv4 & DNS Configuration Message.**

*Public review closed April 23. Resolution progress report from Simon Newton. See E1-37FrstPubRevwDRAFT\_Rsltns.pdf and E1 37-2\_2012-1001r1.pdf*

Simon Newton moved that the draft resolutions be accepted. The motion was seconded and then approved with a show of hands. There were no objections. Bob Goddard and the two working group leaders abstained.

Simon Newton moved that the draft revised standard be offered for a second public review. The motion was seconded and then approved with a show of hands. The vote was unanimous, except for the two working group leaders abstaining. There were no objections.

### **8.5 BSR E1.37-x, Additional Message Sets for ANSI E1.20, LED walls and video displays**

*From the March draft minutes:*

*"Scott Blair reported that no work had been done on this yet. He and his colleagues will work on this after the current work on the E1.33 project is done. He plans to talk to people at InfoComm about this at their June meeting. The project will focus on configuration methods for image displays."*

Scott Blair said he has started work making a list of the PIDs needed. He has about 50 so far. He said that when we get this done—or at least further along—we need to market this to InfoComm community. Mike Lay asked about doing a session at InfoComm. This lead to a discussion of marketing, during which Scott Blair and Bob Goddard agreed to write articles emphasizing the utility of our standards and our projects to the video display industry. Karl Ruling agreed to investigate the possibility of offering sessions at InfoComm and getting articles published. (The InfoComm trade show schedule is at <http://www.infocomm.org/cps/rde/xchg/infocomm/hs.xsl/meetingsandexhibitions.htm>. The one immediately following the CPWG meeting is in Mexico City.)

## **8.6 BSR E1.45, Visible Light Communication control protocol proposal**

Karl Ruling reported that the task group had a complete draft standard that can be considered for public review. See E1-45\_FrstDraft\_r5.pdf. E1-45ProcessSummaryAsOf6July2012.pdf describes how the document was developed.

Kevin Loewen moved that the draft E1.45 standard be offered for public review. The motion was seconded and then approved with a show of hands. There were no objections. Eric Johnson and the two working group leaders abstained.

## **8.7 CPWG marketing efforts**

### **8.7.1 USITT session**

Ed Garstkiewicz is doing a networking demonstration session at the 2013 USITT Conference and asked for assistance from the working group. John Huntington offered to help.

### **8.7.2 Protocol Articles**

*At a recent meeting an article on analog control wiring, perhaps written by Bob Goddard or Mitch Hefter, was suggested. Milton Davis recently came to the rescue of Protocol with an impassioned piece about sloppy E1.11 compliance. Are there other ideas?*

Possible topics were discussed. Bob Goddard agreed to write about the differences between current source and current sink 0-10V control and the difficulties and solutions when the two control methods must be used together.

Eric Johnson offered to write an article on corner cases in RDM timing.

### **8.7.3 European Plugfest**

Mike Lay forwarded the emailed report from Ron Bonner and Peter Willis to the CPWG email reflector so all can read it. The report read:

#### **PLASA RDM & sACN Developers Conference held in Europe**

The event, organised by Peter Wills (Howard Eaton Lighting), Hamish Dumbreck (JESE Ltd), Simon Hobday (Artistic Licence) and Peter Kirkup (Cooper Industries), in conjunction with Ron Bonner and the PLASA Technical Resources Office, is the first of these events to be held outside of North America, and has been hailed as a huge success.

Contributors attended from almost all major industry sectors, including moving light manufacturers, console developers and data distribution specialists, with over fifty participants. There were also attendees from outside the development community, with production electricians, venue technicians and rental companies represented.

The three day event was held from 26th-28th April in the Gatwick Manor, with attendees from across the globe travelling to London for the event. As well as the conventional plugfest format which has been tried and tested in the US, these sessions also featured seminars designed to both educate and promote discussion - subjects covered included Ethernet networking with RDM, performing firmware uploads over RDM and Product Marking for RDM compliance. Although focused towards the development community, sessions were offered to educate users on the benefits, potential pitfalls and future capabilities that these new protocols can offer to the industry.

Dates for the next European event have now been set, and the next European plugfest will be held on Thursday October 4th and Friday October 5th 2012, again at Gatwick Manor. If you wish to be added to

the distribution list regarding this event, please email Peter Willis (andera@compuserve.com) or Ron Bonner (ron.bonner@plasa.org)

A short video of the April event can be found at <http://www.youtube.com/watch?v=h2d3fvBVQnY&feature=youtu.be>

Peter Willis  
Ron Bonner  
July 20th 2012.

Simon Newton said that he'd seen gear that we don't see in the US at this plugfest. The event itself was a mix of sessions explaining the protocols for neophytes and the plugfest itself for technicians and engineers. Sean Sill said that there was enough separation between the presentation area and plugfest that people could work at the same time.

Ulrich Kunkel said that he liked the presentations. He noted that the products were 95% RDM and 5% E1.31. He thinks we need to promote E1.31. Scott Blair said that E1.31 is a better protocol than the dominant DMX512-data-over-Ethernet protocol in the market, but it delivers what the user wants, so there is no market drive to use E1.31 over it.

Bob Goddard said he is considering going again to the European Plugfest.

There was a discussion of the differences between the UK and US plugfests and the possibility of doing better end-user presentations in the US:

- Add a day on to our plugfests for presentations
- Work it into PLASA Focus events
- Offer sessions as part of ICAP
- Offer sessions at the New York City College of Technology

Simon Newton said that part of the success of this recent European Plugfest was that it was far enough away from places of note that people didn't disappear, they stayed there. The plugfest room was locked at 10:00 p.m. so people were forced out into the pub where they would talk, and then the pub would close, so people would leave and get some sleep. It was an enforced schedule that was effective. Goddard agreed that it was a good venue and noted that good food was available not too far away.

Eric Johnson moved that we thank the organizers of the European Plugfest for organizing it and carrying it through. The motion was seconded. The motion was approved with applause.

#### **8.7.4 Connectivity Pavilions**

*Planning for PLASA and LDI.*

##### **8.7.4.1 PLASA Connectivity Pavilion**

By email, Peter Willis offered the following report:

Space has once again been reserved at PLASA, in Earls Court<sup>2</sup>, and planning is underway. As the next European Plugfest is shortly after PLASA, this year the PLASA focus will be on presenting two fully functional hands-on displays. One will provide a typically Theatrical collection of equipment, whilst the other will feature product normally encountered in Architectural applications.

For further information, please contact Ron Bonner or Peter Willis.

##### **8.7.4.2 LDI Connectivity Pavilion**

Mike Lay read a summary of Bill Ellis's emailed plans for LDI:



Plan is to follow the same basic booth layout as of last year, due to the good success we had with it. I have not had a discussion with Frances yet in regards to exact layout of our booth with the rest of the PLASA display, but going to aim for the best traffic flow I can.

I am going to send out to the membership shortly the interest form so I can plan who and what gear will be available for this year's booth. I would also like Karl to cast it out wide in a press release to see if there is any new interest out there.

I am working on a source for donation of the truss for the display with one contact that I have in Las Vegas, but have not firmed that yet. If anyone has any other thoughts, please let me know.

I am in need of a source for donation of the display screens for running our message stream. I am looking for three screens, around 42" in size, with mounts to the truss, a distribution amp, and cables. If anyone has any information on who I may talk to, please email me.

My tentative schedule will be to arrive in Las Vegas on Tuesday, and get things corralled. Assemble the booth on Wednesday, and have it available for all the equipment on Thursday after our CPWG meeting. Anyone available on Wednesday to put up the truss would be appreciated, and the usual on Thursday.

I will make sure to have power distribution, DMX and NET cabling, and a couple of Ethernet switches. W. usually get a good response on controllers and distribution equipment, if members of the committee could push for fixtures and other receivers, that is usually our biggest lacking element for the booth.

If anyone has any other questions or thoughts, please either email me at [bellis@candelacontrols.com](mailto:bellis@candelacontrols.com), or call my office in Winter Garden, FL.

Michael Lay said that the only outstanding need is for video displays.

#### **8.7.5 LDI Sessions**

*Planning for LDI sessions.*

Simon Newton said one scheduled is for network debugging using Wireshark. Another one is on RDM et cetera. There was discussion, but no motions.

### **9 New business**

#### **9.1 Simon Newton presentation on RDM responder tests.**

Simon Newton demonstrated Automated RDM Responder Tests. While the tests themselves have been around since January 2011, it has been hard to setup a testing system since it requires knowledge of Unix command lines and access to a Linux or Mac machine. This sets up a barrier to testing, so only the most determined manufacturers are able to run the tests.

To alleviate this, a group Newton is working with has created a web interface to the tests and added support for running the tests on some very inexpensive embedded hardware called the Raspberry Pi (<http://www.raspberrypi.org/>). The result is that manufacturers can setup a test system with minimal investments of time and money. It's now as simple as downloading the image, copying it to an SD card and then plugging the device in.

#### **9.2 January Plugfest**

Scott Blair said that one is planned. It is likely to have some BSR E1.33 draft implementations to test.

### **10 Other business and announcements**

None.

**11 Upcoming Meetings**

Michael Lay announced that the LDI 2012 meeting would be on Thursday, October 18, from 9:00 a.m. to 12:00 p.m. at the Las Vegas Hotel & Casino 3000 Paradise Road Las Vegas, Nevada 89109 (formally the Las Vegas Hilton).

**12 Adjournment**

Ted Paget moved that the meeting adjourn. The motion was seconded and then approved with a unanimous show of hands. Michael Lay declared the meeting adjourned at 11:11.

**Working Group Members as of 25 July 2012**

<b>Name</b>	<b>Company</b>	<b>Representing</b>	<b>Voting status</b>	<b>Int. cat.</b>
Charles Alicea	Philips- Professional Luminaires	Royal Philips Electronics	O	MP
Simon Alpert	Lighttech Event Technologies	Lighttech Event Technologies	O	CP
Klaus Amling	Licht-Technik	Licht-Technik	O	MP
Daniel W. Antonuk	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	P	MP
Shahid Anwar	Avolites Ltd.	Avolites Ltd.	O	MP
Avraham Mendall Mor "Avi"	Lightswitch	Lightswitch	O	U
Daniel Ayers	Norcostco (Sales-Midwest)	Norcostco	O	DR
Timothy Baarsch	Artistic Licence Engineering Ltd.	Alderamin Group	O	DE
Tim Bachman	A.C.T Lighting, Inc.	A.C.T Lighting, Inc.	O	DR
Robert Barbagallo	Solotech Inc.	Solotech Inc.	O	U
Robert Bell	Acuity Brands Lighting	Acuity Brands Inc.	A	MP
Marcus Bengtsson	LumenRadio AB	LumenRadio AB	A	MP
Adam Bennette	Electronic Theatre Controls Ltd.	Electronic Theatre Controls, Inc.	O	MP
David Bertenshaw	David Bertenshaw	David Bertenshaw	O	G
Stephen Bickford	T. Kondos Associates	T. Kondos Associates	O	U
Torrey Bievenour	Vision Quest Lighting	Vision Quest Lighting	O	G
Scott M. Blair	Full Throttle Films/ VER	Full Throttle Films/ VER	P	DR
Lee J. Bloch	Bloch Design Group, Inc.	Bloch Design Group, Inc.	O	G
David A. Boller	Organic Machines LLC	Organic Machines LLC	O	CP
Ron Bonner	PLASA Technical Resources Office	PLASA EU	P	G
André Broucke	André Broucke	André Broucke	O	G
John (Javid) D. Butler	Integrated Theatre, Inc.	Integrated Theatre, Inc.	O	CP
Jean-Francois Canuel	Spectrum Manufacturing Inc.	A.C. Lighting Ltd.	P	CP
Steve Carlson	High Speed Design, Inc.	High Speed Design, Inc.	O	MP
Nyasha Chigwamba	Dept. of Computer Science	Rhodes University	O	U

Soo-Myong Chung	Bloch Design Group, Inc.	Bloch Design Group, Inc.	O	G
Paul J. Clark	HxDx	HxDx	O	CP
Edward R. Condit	Edward R. Condit	Edward R. Condit	O	G
Kimberly Corbett	Schuler Shook	Schuler Shook	P	DE
Eric Cornwell	West Side Systems	West Side Systems	O	U
Stuart Cotts	Oregon Shakespeare Festival	Oregon Shakespeare Festival	O	U
Klas Dalbjorn	Labgruppen AB	TC Group	O	MP
Daniel Darrington	Wireless Solutions Sweden AB	Wireless Solutions Sweden AB	O	MP
Milton Davis	Doug Fleenor Design, Inc.	Doug Fleenor Design, Inc.	A	MP
Gilray Densham	CAST Software	CAST Group Inc	O	MP
Gary Douglas	Acuity Brands Lighting	Acuity Brands Inc.	A	MP
Gary Dove	Dove Systems	Dove Systems	O	MP
Yongshun Duan	Macostar Physics Application Technology Development (Wuhan) Ltd.	Macostar International Ltd.	O	CP
Hamish Dumbreck	JESE Ltd.	James Embedded Systems Engineering	O	MP
Larry Dunn	City Theatrical, Inc.	City Theatrical, Inc.	A	MP
Jerry Durand	Durand Interstellar, Inc.	Durand Interstellar, Inc.	O	CP
James Eade	PLASA	PLASA	O	G
Andrew Eales	Wellington Institute of Technology	Rhodes University	O	U
Bill Ellis	Candela Controls, Inc.	Candela Controls, Inc.	O	U
Paul K. Ericson	Syska Hennessy Group Lighting Design	Syska Hennessy Group Lighting Design	O	U
Jon R. Farley	Sixteenth Avenue Systems	Sixteenth Avenue Systems	O	CP
Martin Farnik	Robe Show Lighting s.r.o.	Robe Show Lighting s.r.o.	O	MP
Doug Fleenor	Doug Fleenor Design, Inc.	Doug Fleenor Design, Inc.	P	MP
Trevor Forrest	Helvar Lighting Control	Helvar Lighting Control	O	MP
Howard Forryan	Harting Ltd.	Harting KGAA	A	G
Steve Friedlander	Auerbach Pollock Friedlander	Auerbach Pollock Friedlander	O	U
Garrett Gallant	Pathway Connectivity Inc.	Acuity Brands Inc.	A	MP

Phillip M. Gallo	TMB	TMB	O	DR
Ed Garstkiewicz	Harting Inc., North America	Harting KGAA	P	G
Robert Goddard	Goddard Design Co.	Goddard Design Co.	P	MP
Jerry Gorrell	Theatre Safety Programs	Theatre Safety Programs	O	G
Tom Grimes	High End Systems, Inc.	Barco	O	MP
Dennis Grow	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	A	U
Josh Gubler	Josh Gubler	Josh Gubler	O	CP
Rob Halliday	Rob Halliday	Rob Halliday	O	U
Sean Harding	High Output, Inc.	High Output, Inc.	O	G
Mitch Hefter	Mitch Hefter	USITT	P	U
Bill Hewlett	Hewlett Electronics	Hewlett Electronics	O	CP
Simon Hobday	Artistic Licence Engineering Ltd.	Alderamin Group	O	DE
Helge Hoffmann	JB Lighting	JB Lighting	O	MP
Jim Holladay	Luxence	Luxence	O	G
Wayne David Howell	Artistic Licence Engineering Ltd.	Alderamin Group	O	DE
John Huntington	City Tech, Ent Tech Department	I.A.T.S.E. Local 1	A	U
Osedum P. Igumbor	Dept. of Computer Science	Rhodes University	O	U
Sierk Janszen	Kiss Box	Ground Zero	O	U
Eric Johnson	High End Systems	Barco	P	MP
Rob Johnston	Interactive Technologies, Inc.	Interactive Technologies, Inc.	O	MP
Ed Jones	Edwin Jones Co., Inc.	Edwin Jones Co., Inc.	O	CP
Tyrone Mellon_Jr.	Lex Products Corp.	Lex Products Corp.	P	CP
Jussi Kallioinen	Eastway Sound & Lighting	Eastway Sound & Lighting	O	U
Tae Gyu Kang	ETRI	Electronics and Telecommunications Research Institute	O	G
Michael Karlsson	LumenRadio AB	LumenRadio AB	P	MP
Reza Khanmalek	Spectrum Manufacturing Inc.	A.C. Lighting Ltd.	A	CP

Insu Kim	ETRI	Electronics and Telecommunications Research Institute	A	G
Peter Kirkup	Zero 88	Cooper Controls Ltd.	P	MP
Hiroshi Kita	Marumo Electric Co., Ltd.	Marumo Electric Co., Ltd.	O	MP
Phil Klapwyk	IATSE Local 891	IATSE Local 891	O	U
Paul Kleissler	City Theatrical, Inc.	City Theatrical, Inc.	P	MP
Mark T. Kraft	Lehigh Electric Products Co.	Lehigh Electric Products Co.	O	MP
Edwin S. Kramer	I.A.T.S.E. Local 1	I.A.T.S.E. Local 1	P	U
Ulrich Kunkel	E3 Engineering & Education for Entertainment GmbH	DIN, NVBF Committee	P	U
Jason Kyle	JPK Systems Ltd.	JPK Systems Ltd.	O	MP
Roger Lattin	I.A.T.S.E. Local 728	I.A.T.S.E. Local 728	P	U
Hans Lau	LumenRadio AB	LumenRadio AB	A	MP
Michael Lay	Philips Color Kinetics	Royal Philips Electronics	P	MP
Rick Leinen	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	O	MP
Hans Leiter	ETC GmbH	Electronic Theatre Controls, Inc.	O	MP
Jon Lenard	Applied Electronics	Applied Electronics	O	MP
Maarten Lepelaars	eldoLED	eldoLED	O	MP
Sang-Kyu Lim	ETRI	Electronics and Telecommunications Research Institute	P	G
Joshua Liposky	Lex Products Corp.	Lex Products Corp.	A	CP
Kevin Loewen	Pathway Connectivity Inc.	Acuity Brands Inc.	P	MP
Mark Manthei	Shure Inc.	Shure Inc.	O	G
Paul F. Mardon	Pulsar Ltd.	Pulsar Ltd.	O	MP
Alan Martello	Acuity Brands Lighting	Acuity Brands Inc.	A	MP
Mick Martin	ShowCAD Control Systems	ShowCAD Control Systems	O	MP
Paul Kenneth McEwan	Zero 88	Cooper Controls Ltd.	O	MP
John Mehlretter	Lehigh Electric Products Co.	Lehigh Electric Products Co.	O	MP
John Musarra	John Musarra	John Musarra	O	U

Tobin Neis	Barbizon Companies	Barbizon Companies	O	DR
Simon Newton	Simon Newton	Simon Newton	I	G
Maya Nigrosh	Electronic Theatre Controls, Inc.	Electronic Theatre Controls, Inc.	A	MP
Philip Nye	Acuity Brands Lighting	Acuity Brands Inc.	A	MP
Lars F. Paape	Scientific Algorithms and Embedded Systems	Scientific Algorithms and Embedded Systems	O	U
Edward A. (Ted) Paget	Daktronics Automated Rigging Solutions	Daktronics Inc.	P	G
Gary Pritchard	LSC Lighting Systems (Aust) PTY Ltd	LSC Lighting Systems PTY Ltd	O	MP
Eric Proce	Eric Proce	Eric Proce	O	U
Torben Kaas Rasmussen	Martin Professional A/S	Martin Professional A/S	O	G
Charles Reese	Production Resource Group	Production Resource Group	P	DR
Charlie Richmond	Richmond Sound Design Ltd.	Richmond Sound Design Ltd.	O	CP
Bernardo Benito Rico	Ben-Ri Electronica S.A.	Ben-Ri Electronica S.A.	O	MP
Steve Roberts	Carr & Angier	Carr & Angier	O	G
Erwin Rol	Erwin Rol Software Engineering	Erwin Rol	O	G
Dietmar Rottinghaus	Connex GmbH	Connex GmbH	O	G
Alan M. Rowe	IATSE Local 728	I.A.T.S.E. Local 728	A	U
Richard Salzedo	Avolites Ltd.	Avolites Ltd.	O	MP
Yngve Sandboe	Sand Network Systems, Inc.	Sand Network Systems, Inc.	O	MP
Larry Schoeneman	DesignLab Chicago, Inc.	DesignLab Chicago, Inc.	P	DR
Martin Searancke	Dream Solutions Ltd.	Dream Solutions Ltd.	O	MP
Chuck Seifried	Phoenix Civic Plaza	City of Phoenix	O	U
John Sellers	AIM Northwest	AIM Northwest	O	G
Andrew Sherar	Lightmoves PLC	Lightmoves PLC	O	MP
Yehuda Shukram	Compulite Systems	Compulite Systems	O	MP
Sean Sill	Doug Fleenor Design, Inc.	Doug Fleenor Design, Inc.	A	MP
Storm K. Staley	Stormwerx	Stormwerx	O	U
Ralph Stillinger	Strand Lighting	Royal Philips Electronics	O	MP

Bart Swinnen	Luminex LCE	Luminex LCE	O	MP
Arnold Tang	Arnold Tang Productions	Arnold Tang Productions	O	U
Steve Terry	Electronic Theatre Controls	Electronic Theatre Controls, Inc.	A	MP
Geoffrey O. Thompson	Nortel Networks, Inc.	IEEE 802.3/Nortel Networks	O	G
Christopher Tilton	Westlake Reed Leskosky	Westlake Reed Leskosky	P	DE
David Timmins	Jands Electronics	Jands Electronics	O	MP
J. B. Toby	Avolites Ltd.	Avolites Ltd.	O	MP
Bob Toms	Catalyst Microsystems LLC	Catalyst Microsystems LLC	O	G
Robert Tooker	Robert Tooker	Robert Tooker	O	U
Tad Trylski	Tad Trylski	Tad Trylski	O	U
Stephen J. Tyrrell	Quantum Logic	Quantum Logic	O	MP
Tracy Underhill	4U Consulting	4U Consulting	O	G
Steve Unwin	Pulsar Ltd.	Pulsar Ltd.	O	MP
Samuli Valo	Picturall Ltd.	Picturall Ltd.	O	MP
Ken Vannice	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	P	MP
Carlo Venturati	Clay Paky S.P.A.	Clay Paky S.P.A.	O	MP
Will Wagner	Carallon Ltd.	Carallon Ltd.	O	MP
Oliver Waits	Avolites Ltd.	Avolites Ltd.	O	MP
John Warwick	Philips/Color Kinetics	Royal Philips Electronics	O	MP
Colin Waters	TMB	TMB	O	DR
Ralph Weber	ENDL Texas	ENDL Texas	O	G
Lars Wernlund	Lewlight	Lewlight	O	MP
Michael (Mike) Whetstone	Integrated Theatre, Inc.	Integrated Theatre, Inc.	O	CP
Peter Willis	Howard Eaton Lighting Ltd.	Howard Eaton Lighting Ltd.	P	CP
Loren Wilton	Showman Systems	Showman Systems	O	CP
Barbara Wohlsen	Barbara Wohlsen	Barbara Wohlsen	O	U
C. S. Wong	Macostar International Ltd.	Macostar International Ltd.	O	CP



Jiantong Wu	Beijing Special Engineering Design & Research Institute	Beijing Special Engineering Design & Research Institute	O	G
Kehang Wu	Shure Inc.	Shure Inc.	O	G
David Yellin	LightMinded Industries, Inc.	LightMinded Industries, Inc.	O	MP
Larry Zoll	Zoll Design & Consulting, LLC	Zoll Design & Consulting, LLC	O	U

P principal voting member  
A alternate voting member  
I individual voting member  
O observer, non-voting member

MP mass-market producer  
CP custom-market producer  
DR dealer or rental company  
U user  
G general interest  
DE designer (specifies the subject matter products in designs)