

# Minutes

## Control Protocols Working Group

Thursday, 27 October 2011  
Hilton Orlando

**Presiding chairman:** Michael Lay; Philips Color Kinetics (Royal Philips Electronics); P; MP

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

### Members attending:

Scott M. Blair; Full Throttle Films/ VER; P; DR  
Ron Bonner; PLASA EU; P; G  
Jean-Francois Canuel; Spectrum Manufacturing Inc. (A.C. Lighting Ltd.); P; CP  
Hamish Dumbreck; JESE Ltd. (James Embedded Systems Engineering); O; MP  
Larry Dunn; City Theatrical, Inc.; A; MP  
Bill Ellis; Candela Controls, Inc.; O; U  
Doug Fleenor; Doug Fleenor Design, Inc.; P; MP  
Howard Forryan; Harting Ltd. (Harting KGAA); A; G  
Ed Garstkiewicz; Harting Inc., North America (Harting KGAA); P; G  
Robert Goddard; Goddard Design Co.; P; MP  
Mitch Hefter; Philips Controls (Royal Philips Electronics), representing USITT; P; U  
Tyrone Mellon\_Jr.; Lex Products Corp.; P; CP  
Insu Kim; Electronics and Telecommunications Research Institute; O; MP  
Peter Kirkup; Zero 88 (Cooper Controls) Ltd.; P; MP  
Ulrich Kunkel; E3 Engineering & Education for Entertainment GmbH, representing the DIN, NVBF Committee;  
P; U  
Jason Kyle; JPK Systems Ltd.; O; MP  
Hans Lau; LumenRadio AB; A; MP  
Sang-Kyu Lim; Electronics and Telecommunications Research Institute; O; MP  
Kevin Loewen; Pathway Connectivity Inc. (Acuity Brands Inc.); P; MP  
Simon Newton; I; G  
Maya Nigrosh; Electronic Theatre Controls, Inc.; A; MP  
Philip Nye; Acuity Brands Lighting (Acuity Brands Inc.); A; MP  
Edward A. (Ted) Paget; Daktronics Inc. ; P; G  
Charles Reese; Production Resource Group; P; DR  
Larry Schoeneman; DesignLab Chicago, Inc.; O; DR  
Peter Willis; Howard Eaton Lighting Ltd.; P; CP

**Visitors:** Stephen Vanciel  
Jian Yu; CETA  
Dean Liu; Shanghai Theatre Academy

### 1 Opening remarks

Michael Lay called the meeting to order at 09:04. He asked those present to turn off cell phones.

### 2 Attendance

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

An attendance sign-in sheet packet, printed on hot orange and pink paper, was circulated. Those present introduced themselves to the assembly.

#### 2.2 Determination of a quorum

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

### 2.3 Recognition of alternate voting members

Alternate voting members were recognized.

## 3 Membership

### 3.1 Requirements for membership

The following statement was read aloud to the assembly by Michael Lay:

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:

Charles Reese; PRG; P; DR

Reese 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

The following applications had been submitted.

Oliver Waits; Avolites; observer; MP  
Kevin Lowen; Pathway Connectivity Inc. (Acuity Brands Inc.); principal ; MP  
Robert Bell; Acuity Brands Lighting (Acuity Brands Inc.); alternate; MP  
Gary Douglas; Acuity Brands Lighting (Acuity Brands Inc.); alternate; MP  
Alan Martello; Acuity Brands Lighting (Acuity Brands Inc.); alternate; MP  
Philip Nye; Acuity Brands Lighting (Acuity Brands Inc.); alternate; MP  
Scott Blair; Full Throttle Films/ VER; principal; DR  
Jason Kyle; JPK Systems Ltd.; observer; MP

Ted Paget moved that the applications be accepted. The motion was seconded. The motion was approved with a show of hands.

### 3.4 Consensus body

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

Name	Representing	Voting status	Int. cat.
Jean-Francois Canuel	A.C. Lighting Ltd.	P	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
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
Edward A. (Ted) Paget	Daktronics Inc.	P	G
Ulrich Kunkel	DIN, NVBF Committee	P	U

Name	Representing	Voting status	Int. cat.
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
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
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
Daniel Darrington	Wireless Solutions Sweden AB	P	MP
	<b>Total votes possible</b>	<b>25</b>	
	Subtotals by interest categories	11	MP
		3	CP
		2	DR
		4	U
		4	G
		1	DE

#### 4 Approval of the minutes from the July 2011 meeting

See *CPmin07-2011.pdf*.

Scott Blair moved that the draft minutes be approved as written. The motion was seconded and then approved with a show of hands.

## **5 Reading of the call for patents**

The following statement was read aloud to the assembly by Michael Lay:

"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."

Nothing was reported.

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

The following statement was read aloud to the assembly by Michael Lay:

"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."

Karl Ruling held up some of the easy-to-read pamphlets to show that they were available.

No restraint of trade issues were reported.

## **7 Approval of agenda**

Scott Blair asked for BSR E1.37-2 to be added as item 10.2

Peter Kirkup asked for an agenda item about an RDM protocol website.

Ted Paget moved that the amended agenda be accepted. The motion was seconded. The motion was 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 E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories. Revision, reaffirmation, or withdrawal in 2013. No action at this meeting.

ANSI E1.17 - 2010, Architecture for Control Networks. Revision, reaffirmation or withdrawal in 2016. No action at this meeting.

ANSI E1.20 - 2010, Remote Device Management over USITT DMX512. Revision, reaffirmation or withdrawal in 2016. No action at this meeting.

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. No action at this meeting.

ANSI E1.30-1 - 2010, EPI 23, Device Identification Subdevice. Revision, reaffirmation or withdrawal in 2016. No action at this meeting.

ANSI E1.30-3 – 2009, EPI 25, Time Reference in ACN Systems Using SNTP and NTP. Revision, reaffirmation, or withdrawal in 2014. No action at this meeting.

ANSI E1.30-4 – 2010, EPI 26, Device Description Language (DDL) Extensions for DMX512 and E1.31 Devices. Revision, reaffirmation, or withdrawal in 2015. No action at this meeting.

ANSI E1.30-7 – 2009, EPI 29, Allocation of Internet Protocol Version 4 Addresses to ACN Hosts. Revision, reaffirmation, or withdrawal in 2014. No action at this meeting.

ANSI E1.30-10 – 2009, EPI 32, Identification of Draft Device Description Language Modules. Revision, reaffirmation, or withdrawal in 2014. No action at this meeting.

ANSI E1.31 – 2009, Entertainment Technology – Lightweight streaming protocol for transport of DMX512 using ACN. Revision, reaffirmation or withdrawal in 2014. No action at this meeting.

### **8.2 BSR E1.37-1, Additional Message Sets for ANSI E1.20, Remote Device Management**

*Report from Karl Ruling on letter ballot that ended September 15, 2011 and further progress toward being an ANS.*

Karl Ruling reported that the working group, TSC, and PLASA NA Executive Committee had all approved the proposed standard. He needs to file the BSR9 form to have it approved by ANSI. He is not expecting any problems with that. Final approval should be gained this year.

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

*Progress report from the Task Group. At the Mar 2011 session, Ulrich Kunkel reported he had a draft with three possible ways to address universe synchronization. At the July 2011 meeting Ulrich Kunkel reported (via email) that he hoped to organize an LDI task group meeting to move this forward.*

Ulrich Kunkel reported that he had hoped to see Alan Martello here at LDI so they could work together, but that he plans to have something for the next meeting in any case.

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

*Report on public review that ended 17 October 2011.*

Scott Blair reported that 131 comments had been received, and that this was fewer than had been received during the first review of RDM.

Blair explained that from the comments it is clear that we need to take the SLP text out of the draft standard and reference the SLP standard itself. Some information will need to be added to the draft standard to explain how to use SLP, how it works in the context of the standard. The existing text in the draft standard simplifies SLP to make it understandable, but this is not the right way to do it.

Blair said that there was some debate about whether the standard should be port-centric or universe-centric.

## **8.5 ANSI E1.3 – 2001 (R2006), 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**

*Approved by ANSI for reaffirmation 29 June. Report from Karl Ruling on progress in getting this document published.*

Karl Ruling reported that it is published.

## **8.6 ANSI E1.27-1 – 2006 , Entertainment Technology - Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A) Products**

*Approved by ANSI for reaffirmation 29 June. Report from Karl Ruling on progress in getting this document published.*

Karl Ruling reported that it is published.

## **8.7 LED Illumination identification control protocol proposal**

*Report from Mitch Hefter & Eric Johnson on task group evaluation.*

Mitch Hefter, reported that there was a lot to be excited about with VLC, and that he would be chairing a task group meeting after the CPWG meeting to discuss possible applications/adoption within the entertainment industry

Sang-kyu Lim gave a presentation summarizing the modulation techniques used in VLC, IEEE 802.15.7. These include On-Off Keying, Variable Pulse Position Modulation, and Color Shift Keying. OOK is simple, but the data transmission affects dimming of the light. VPPM shifts the pulse position to convey the data and modulates the pulse width for dimming, so the two are independent, except when the LEDs are running at full light output or off. CSK is complex, and the data transmission changes the color of the light, but it is suitable for high rate data transmission.

In-su Kim gave a presentation suggesting three ways VLC data could be carried on an entertainment lighting control network. The first approach would be to increase the number of slots in a DMX512 data packet past the current 512 to allow VLC data to be transmitted in a packet after the regular lighting control data. The second would be to assign an Alternate START Code for VLC data in DMX512 and to develop additional message sets for RDM. The third approach would be to use a new protocol running on an IP network.

## **8.8 CPWG marketing efforts**

### **8.8.1 Protocol Articles**

Simon Newton suggested articles for PLASA's *Protocol* journal about a PID database and common discovery programming errors. He volunteered to write them in 2012.

### **8.8.2 July Plugfest**

Scott Blair reported that we would not organize a Summer 2012 Plugfest at the CPWG sessions in New York City because of the more complex logistical issues.

There was a discussion of holding a European Plugfest, this summer, but there was some concern about scheduling around the Summer Olympics. Ron Bonner will report back to the CPWG during the January session on the possibility of a PLASA sponsored European Plugfest next summer.

There will be a January 2012 Plugfest in Westlake, Texas.

### **8.8.3 PLASA Connectivity Pavilion**

Peter Willis reported on the booth at PLASA. He showed a video presentation that ran in the booth to show what RDM does and how it works.

#### **8.8.4 LDI Connectivity Pavilion**

Bill Ellis described the LDI booth, which now has video displays to attract the passersby. He read aloud a list of all the equipment and people/companies that have helped.

Controllers now outnumber the luminaires in the booth, noted Blair. The booth needs more RDM-enabled luminaires.

Ellis said that he has enough people to staff the booth during the trade show hours.

#### **8.8.5 PLASA/CPWG "Template" PowerPoint Project**

Michael Lay said he'd recently sent another draft template to task group. The project should be finished in time for the meeting in January.

#### **9 New business**

None.

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

##### **10.1 RDM website**

Peter Kirkup reported on the RDM website (unofficial, non-PLASA sanctioned) he had set up at <http://www.rdmprotocol.org/webtest>. The site was live, but did not have a link from the [rdmprotocol.org](http://www.rdmprotocol.org) home page yet. The response of the working group was quite positive. The group encouraged him to continue.

##### **10.2 E1.37-2 PID extensions**

Scott Blair explained that this next part would be for RDM messages geared toward LED wall and video monitoring and device control. His new employer has a material interest in this work.

Scott Blair explained that the task group members will have time to work on this after E1.33 is ready for a second review. He predicted that they will have something ready for discussion and a vote to move the project forward in January.

#### **11 Schedule for future meetings**

Michael Lay announced that the next meeting is scheduled for Monday, January 30, 2012, from 9:00 am to 1:00 p.m. at the Marriott Solana in Westlake, Texas.

#### **12 Adjournment**

Scott Blair moved that the meeting adjourn. The motion was seconded. The motion was approved with a show of hands. Michael Lay declared the meeting adjourned at 10:52.

**Working Group Members and Contact Information as of 17 November 2011**

<b>Name</b>	<b>Company</b>	<b>Representation</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
William Benner	Pangolin Laser Systems	Pangolin Laser Systems	O	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
Larry Busch	ADB Lighting Technologies	ADB Lighting Technologies	O	MP
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



Name	Company	Representation	Voting status	Int. cat.
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	P	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
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
Joost van Eenbergen	ELC Lighting	ELC Lighting	O	MP
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
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

Name	Company	Representation	Voting status	Int. cat.
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	Philips Controls (Royal Philips Electronics)	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
John Sondericker_III	Wybron, Inc.	Wybron, Inc.	O	MP
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	MP
Ujjal Kar	Standard Robotics & Lighting	Standard Robotics & Lighting	O	G
Michael Karlsson	LumenRadio AB	LumenRadio AB	P	MP
Kirk D. Keen	Hollywood Lighting Services, Inc.	Hollywood Lighting, Inc.	O	DR
Insu Kim	ETRI	Electronics and Telecommunications Research Institute	O	MP
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

Name	Company	Representation	Voting status	Int. cat.
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	O	MP
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 Martin	State Automation Pty. Ltd.	State Automation Pty. Ltd.	O	MP
Paul Kenneth McEwan	Zero 88	Cooper Controls Ltd.	O	MP
John Mehlretter	Lehigh Electric Products Co.	Lehigh Electric Products Co.	O	MP
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
Fabiano Pina	Clay Paky S.P.A.	Clay Paky S.P.A.	O	MP
Gary Pritchard	LSC Lighting Systems (Aust) PTY Ltd	LSC Lighting Systems PTY Ltd	O	MP
Eric Proce	Eric Proce	Eric Proce	O	U

<b>Name</b>	<b>Company</b>	<b>Representation</b>	<b>Voting status</b>	<b>Int. cat.</b>
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.	O	DR
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
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

Name	Company	Representation	Voting status	Int. cat.
Steve Unwin	Pulsar Ltd.	Pulsar Ltd.	O	MP
Ken Vannice	Leviton Manufacturing Co., Inc.	Leviton Manufacturing Co., Inc.	P	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
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

**Key to codes:**

P	principal voting member	MP	mass-market producer interest category
A	alternate voting member	CP	custom-market producer interest category
I	individual voting member	DR	dealer or rental company interest category
O	observer, non-voting	U	user interest category
		G	general-interest interest category
		DE	designer