

# Standards Watch

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## **Again, More Tests for UL 1573, Stage and Studio Luminaires and Connector Strips**

UL has revised the changes proposed for UL 1573 in the March 29 Bulletin [reported in the Volume 8, Number 8 issue of *Standards Watch*] and has sent a new Bulletin, dated October 1, 2004, to members of the Standards Technical Panel, to subscribers to UL's Standards Service for this standard, and to the previous public review commenters. Comments on the new Bulletin are requested by 3 December 2004 to Michael Hieb, STP 1573 Project Manager, [michael.j.hieb@us.ul.com](mailto:michael.j.hieb@us.ul.com).

In response to comments on the previous Bulletin, UL has changed and clarified a number of the requirements, but not backed away from the general requirement for leakage current tests for power supply cord-connected products covered by UL 1573. The current limits have also been revised and appear to be raised, allowing leakage to ground as high as 4.0 MIU (about 4 mA at 60 Hz). This higher level is still far below current levels that have been shown to be electrically hazardous. The argument for limiting leakage currents remains that someone might touch a luminaire or connector strip with a slight amount of leakage current and be startled and fall. Labeling is proposed to warn users against startle reactions with any product having leakage currents above 0.5 MIU. The labels would be required every four feet along a connector strip and would tell users to unplug the strip before touching it.

Several manufacturers are not satisfied with this new Bulletin because for some products it will require either additional testing for leakage currents and possible redesign to meet the requirements or the redesign of products so that they meet the criteria for exemption from the current leakage testing. Of course, if the products are redesigned for the exemption they still will need to be tested all over again because of the redesign. UL admits that there is no record of injuries from startle reactions with stage and studio luminaires and connector strips, but theoretically there could be startle reactions and therefore the additional requirements are prudent.

The October 1 Bulletin contains the comments on the March 29 Bulletin—68 pages of them—and all commenters were critical of the proposals in the bulletin, but UL's procedures for this standard do not require that UL satisfy the commenters. As UL points out in its explanation of the role of STPs posted at <http://ulstandardsinonet.ul.com/stp/index.html>, STPs are the consensus bodies for American National Standards and vote on the proposals. However, for non-ANSI standards, such as UL 1573, their function is only advisory. Several responses from UL to the received comments make this explicit, stating:

"Because UL 1573 is not being balloted for American National Standards Institute (ANSI) approval at this time, comments received in response to a Subject 1573 proposal bulletin serve UL in an advisory nature and are not required to be recirculated or subject to public review. Consensus from panel members is not required for approval and publication of new/revised requirements and UL is under no obligation to recirculate comments."

At this time there is no American National Standard for stage and studio luminaires and connector strips. Some testing labs will state that they test to ANSI/UL 1573, but no such standard exists.

## Three Draft ESTA Standards in Public Review

Three draft standards are available for public review through 7 December 2004:

- **BSR E1.20, Entertainment Technology — Remote Device Management over USITT DMX512**
- **BSR E1.23, Entertainment Technology — Design and Execution of Theatrical Fog Effects**
- **BSR E1.27-1, Entertainment Technology — Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A) Products**

The draft standards can be accessed by visiting <http://www.esta.org/tsp/>.

BSR E1.20, commonly known as RDM, has been significantly restructured as a result of the votes and comments from the last public review. The changes to BSR E1.23 and BSR E1.27-1 from their last public reviews are less sweeping but are substantive, so these additional public reviews are necessary.

Please observe the 7 December deadline and submit your comments earlier if possible. Late comments cannot be processed as part of this public review cycle.

## IEEE Report: Advice on Ethernet Cabling

by Steven B. Carlson, Chair, IEEE 802.3 Residential Ethernet Study Group

IEEE 802.3 has a Task Force, P802.3an, that is developing a standard for 10Gbps over twisted-pair copper wire, 10GBASE-T. When the Call for Interest was held in November of 2002, two companies, Solarflare and Plato Labs, claimed to have technology that would operate at 10Gbps over the existing Cat5 infrastructure. There was considerable skepticism from many quarters: cabling experts, PHY experts, EMC experts, information theorists, and many others all weighed in with their opinions. The resulting Study Group operated for 18 months, three times longer than normal, and became the "Battle of the PhDs" as different experts slugged it out.

All of this work put the spotlight on the cable plant. The TIA and ISO/IEC, as well as cabling vendors, all went back to the lab to look at what the cable plant could really do. The result has been a flood of misinformation, confusion, FUD (fear, uncertainty, and doubt), and good old-fashioned hype in the marketplace. Suddenly, terms like "augmented Cat6," "Class D," "Class E," "Cat7," "shielded Cat6e," "alien NEXT" were flying around.

Cabling is classed by performance, and there are two relevant categories that are currently manufactured, Cat5e and Cat6. The corresponding ISO designations are Class D and Class E. Category 5 cabling probably still dominates the installed base, but it is no longer manufactured for all intents and purposes. There is a third classification, ISO Class F, which uses Cat7 components, but it is not standardized in North America, and has virtually no market share here and little abroad.

Most cabling infrastructure is either Cat5 or, if installed in the last three years, Cat5e. The main difference between Cat5 and Cat5e is improved specification (both cables are specified to 100MHz) of the performance parameters, and improved return loss of the connectors. The overall performance of Cat5e cabling is better than Cat5, because the technology evolved and the specs give greater assurance of meeting the performance parameters. For example, Cat5 never had field measurement instruments and procedures when it was created. Cat5e did. Cat5 never had performance requirements for patch cords. Cat5e does, but it has taken a long time for the marketplace to catch up. Much of the Cat5e cable that is manufactured today meets Cat6 performance requirements. That is not true for connectors, however.

Cat6 is a further refinement of Cat5e. It is specified to 250 MHz rather than 100 MHz. Patch cord requirements are now an integral part of the standard. Cat6 connector near end crosstalk (NEXT) is very tightly specified, to the point where the connectors are truly difficult to manufacture and meet the spec. On the other hand, Cat6 cable often has considerable margin to near-end crosstalk requirements. Many cabling vendors stress the NEXT performance of their system, since it's really the only thing they have to sell. More on this later.

But what parameters are really important? Return loss is important, especially at higher frequencies. The connector return loss requirement was 14 dB for Cat5, 20 dB for Cat5e, 24 dB for Cat6, and will be 28 dB for the augmented Cat6. (All values taken at 100 MHz, but enforced to the maximum frequency of each standard).

Cat5e and Cat6 patch cords have return loss and NEXT requirements. If the user ensures that these requirements are met, it will improve the performance of the whole system.

Insertion loss (attenuation) is important, but it is primarily a function of the cable conductor diameter, and is only incrementally improved with each classification. The other important thing to consider is that insertion loss is at a maximum for the longest length specified by the standard. If the cables are shorter, insertion loss is better. There are other performance parameters also directly related to length, such as equal level far end crosstalk (ELFEXT), delay, and delay skew. Near end crosstalk and return loss are relatively unaffected by length and can actually be at their worst at the shortest lengths.

As far as application performance is concerned, 10BASE-T should run on Cat3 cabling, 100BASE-TX should run on Cat5, and 1000BASE-T should run on Cat5 with return loss specified. Generally we say that 1000BASE-T runs on Cat5e. Category 6 cabling is not really necessary for any existing PHY, but probably gives some added insurance that things will run smoothly if you worry about such things. That is how Cat6 is sold now to those that are too cheap to just put it in anyway.

Here's where the FUD factor comes in: An important thing to understand about the manufacturing and marketing of cabling is that NEXT (near-end crosstalk) performance is the primary attribute being sold. Since the advent of Cat4 and Cat5 cabling components and standards (remember Cat4?), the primary focus has been on improvement of NEXT. The other parameters have only been along for the ride. When a manufacturer touts his improved headroom, he is talking about NEXT. Don't ask him about his return loss headroom, or his insertion loss headroom. Those numbers will be much lower. Don't ask him about ELFEXT (equal level far end crosstalk). He probably doesn't even know what it is.

With the invention of 1000BASE-T, the PHY has NEXT cancellation built in. This means that the application's sensitivity to NEXT performance is very low. If you change the NEXT of the cable, the PHY adapts. The cabling vendors do not want to hear this, because it is orthogonal to their marketing plan. If you tell the salesman that you do not care about NEXT, he will not know what to do. Even today, in the cabling standards committees, the manufacturers and their engineers are scheming about how to improve the NEXT performance requirements of Cat6 connectors while the ANEXT (alien NEXT) performance is still unknown. It is just too seductive, because it is the way to get ahead of your competitor. If one looks at patents published related to connectors in the past 5 years, the overwhelming majority have to do with NEXT improvements.

For 10GBASE-T, there is no doubt that the ANEXT performance of cabling will be the primary factor. Why are the cabling companies still selling Cat6 NEXT headroom for this application when it will be of little practical benefit? The 10GBASE-T PHY will certainly have NEXT cancellers, so NEXT is a non-issue.

If you are running 10BASE-T, 100BASE-T, or 1000BASE-T, it will do just fine on Cat5, and will do even better on Cat5e. If you want even more margin, especially from alien NEXT, go with Cat6. At present there is no such thing as "Cat6e," "augmented Cat6," or "enhanced Cat6." Now that 10GBASE-T has chosen PAM-12 as its line code, it is possible that some sort of improved Cat6 will be standardized if it can deliver at 400Mhz.

When looking for cable and components, look for product that has solid performance data backing it up. Third party data is good, especially for Cat6 products. Many vendors self certify their Cat5e products to save on costs, but there should be some evidence from actual testing. If you are going to run 1000BASE-T, look carefully at return loss performance and then ANEXT data if you can get it. If you are planning to run 10GBASE-T at some time in the future, look at shielded Cat6, or just wait until the smoke clears, probably sometime next year.

Thanks to Sterling Vaden, VP of Research and Engineering, at Superior Modular Products for a candid discussion of this subject.

## **New Book on Patent Reform from Lerner and Jaffe**

*Standards Watch* readers interested in the U.S. patent system and how it got to be the way it is might be interested in a new book announced by Princeton University Press. Written by Harvard investment banking professor Josh Lerner and Brandeis economics professor Adam Jaffe, *Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to Do About It* is scheduled to be released in November. The authors argue that changes enacted by Congress in the 1980s have made it easier to get a patent, easier to enforce a patent against others, easier to get a large financial award from such enforcement, and harder for those accused of infringing to challenge a patent's validity. An excerpt from the book and more information is available at <http://pup.princeton.edu/chapters/i7810.html>.

## **Making Disasters Less Disastrous**

On September 23 the Department of Homeland Security, in partnership with the Advertising Council and a variety of business organizations, announced the launch of Ready Business, a campaign to help owners and managers of small to medium-sized businesses prepare their employees, operations, and assets for emergencies. The Ready Business website offers advice on what to do with the controversial plastic sheeting and duct tape Homeland Security Secretary Tom Ridge said would be useful in a terrorist attack, but it also has some obviously sensible advice for preparing for more common business-disrupting emergencies such as hurricane, flood, and fire. Information and planning templates can be downloaded from <http://www.ready.gov/business>.

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## **ANSI Public Review Announcements**

The following draft standards have been announced by ANSI as being available for public review. Please send your comments before the relevant deadlines to the person indicated and to the Board of Standards Review at the American National Standards Institute, <mailto:psa@ansi.org>. Reaffirmations and withdrawals available electronically may be accessed at: <http://webstore.ansi.org>.

### **Due by 15 November 2004**

#### **BSR/NCSL Z540.x-200x, Requirements for the Calibration of Measuring and Test Equipment (new standard)**

Establishes the technical requirements for the calibration of measuring and test equipment through the use of a system of functional components. Collectively, these components are used to manage and assure that the accuracy and reliability of the measuring and test equipment are in accordance with identified performance requirements. In addition, this standard includes and updates the relevant calibration system requirements for measuring and test equipment described by the previous standards such as Part II of ANSI/NCSL Z540.1 (R2002) and Military Standard 45662A. Single-copy price: \$20.00. Order from and send comments to: Craig Gulka, <mailto:cgulka@ncsli.org>

### **Due by 22 November 2004**

#### **Draft INCITS 401-200x, Information Technology - Multimedia Commands - 4 (MMC-4) (new standard)**

This standard defines a set of SCSI command descriptor blocks that are useful in accessing and controlling devices with a peripheral device type set to 5. This command set is transport independent and may be implemented across a wide variety of environments for which a SCSI transport protocol has been defined. To date, these include Parallel SCSI, ATA/ATAPI, Serial ATA, Universal Serial Bus (USB versions 1.1 and 2.0), and High Performance Serial Bus (IEEE 1394, 1394A, and 1394B). Single-copy price: \$18.00.

Order from: INCITS, <http://www.incits.org>; or ANSI, <http://www.ansi.org>  
Send comments to: Deborah Spittle, <mailto:dspittle@itic.org>

**Draft INCITS 402-200x, Information Technology - SCSI Architecture Model - 3 (SAM-3)** (new standard)

This standard defines a reference model that specifies common behaviors for SCSI devices, and an abstract structure that is generic to all SCSI I/O system implementations. Single-copy price: \$18.00.

Order from: INCITS, <http://www.incits.org>; or ANSI, <http://www.ansi.org>

Send comments to: Deborah Spittle, <mailto:dspittle@itic.org>

**Draft INCITS 403-200x, Information Technology - Automation/Drive Interface - Commands (ADC)** (new standard)

This standard defines the model and command set extensions to facilitate operation of automation drive interface devices. The clauses of this standard, implemented in conjunction with the applicable clauses of SPC-2 and SPC-3, fully specify the standard command set for automation drive interface devices. Single-copy price: \$18.00.

Order from: INCITS, <http://www.incits.org>; or ANSI, <http://www.ansi.org>

Send comments to: Deborah Spittle, <mailto:dspittle@itic.org>

**BSR/TIA 568-B.1-7-200x, Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements - Addendum 7: Guidelines for Maintaining Optical Fiber Polarity with Systems Using Array Connectors** (supplement to ANSI/TIA 568-B.1-2001)

This standard specifies the reliability specification requirements for balanced twisted-pair connecting 5 hardware used within a commercial building telecommunications cabling system. Single-copy price: \$74.00.

Order from: Global Engineering Documents; <http://www.global.ihs.com>

Send comments to: Susanne White, <mailto:swhite@tiaonline.org>

**Due by 7 December 2004**

**BSR/ASME B107.14-200x, Hand Torque Instruments (Mechanical)** (new standard)

This standard provides performance and safety requirements for manually operated torque instruments, commonly used for mechanical measurement of torque for control of the tightness of threaded fasteners. It is not intended to describe products infrequently utilized or those designed for special purposes. How can you reliably torque a cable clip if there are no reliable torque wrenches? Single-copy price: \$10.00.

Order from: Silvana Rodriguez, <mailto:rodriguez@asme.org>

Send comments to: Jack Karian, <mailto:karianj@asme.org>

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## New Projects

ANSI has announced the starts of the following projects. Please contact the person listed if you are interested in more information or in becoming involved in the project.

**BSR/ASME Y14.44-200x, Reference Designations for Electrical and Electronics Parts and Equipments** (new standard)

This standard covers the formation and application of reference designations for electrical and electronics parts and equipment. Project Need: A number of Y14 standards reference an outdated IEEE standard for reference designations. This standard was withdrawn as an American National Standard some years ago by IEEE. ASME has purchased the rights to this standard and this project represents the reestablishment of the standard as an American National Standard.

Contact: Silvana Rodriguez, <mailto:rodriguez@asme.org>

**BSR/AWS C4.2-200x, Recommended Practices for Safe Oxyfuel Gas Cutting Torch Operation** (revision of ANSI/AWS C4.2-2002)

The new revised manual for oxyfuel gas cutting includes the latest procedures to be used in conjunction with oxyfuel gas cutting equipment. The manual also includes the latest safety requirements.

Contact: Andrew Davis, <mailto:adavis@aws.org>

**BSR/AWS A5.8/A5.8M-200x, Specification for Filler Metals for Brazing and Braze Welding** (revision of ANSI/AWS A5.8/A5.8M-2004)

This specification prescribes the requirements for the classification of filler metals for brazing and braze welding. The chemical composition, physical form, and packaging of more than 75 brazing filler metals are specified. The filler metal groups described include aluminum, cobalt, copper, gold, magnesium, nickel, silver, and brazing filler metals for vacuum service.

Contact: Andrew Davis, <mailto:adavis@aws.org>

**BSR/CEA-852-B-200x, Tunneling Device Area Network Protocols Over Internet Protocol Channels** (revision and redesignation of BSR/CEA 852-A-200x)

This standard specifies the method to use for IP tunneling with ANSI/CEA 709.1-B-2002 and ANSI/CEA 600.81-1997 (R2004).

Contact: Leslie King, <mailto:rjustus@ce.org> (It's hard to believe that Leslie King has the email address rjustus@ce.org, but that's what ANSI's *Standards Action* says.)

**BSR/CEA 709.4-2000 (R200x), Fiber-Optic Channel Specification** (reaffirmation of ANSI/CEA 709.4-2000)

In conjunction with ANSI/CEA 709.1-A Control Network Protocol Specification, BSR/CEA 709.4 defines a complete 7-layer protocol stack for communications on an CEA 709.4 single-fiber (half-duplex) fiber-optic channel. CEA 709.4 specifies the physical layer (OSI Layer 1) requirements for the CEA 709.4 fiber-optic channel which encompasses the interface to the Media Access Control (MAC) layer and the interface to the medium. The single-fiber channel implemented as specified in CEA 709.4 allows two nodes to communicate bi-directionally across a single piece of fiber cable.

Contact: Leslie King, <mailto:rjustus@ce.org>

**BSR/CEA 2027 ERRATA-200x, A User Interface for Home Networks Using Web-Based Protocols**

This CEA standard defines a user-to-machine interface method allowing a source of home-network services, such as a cable or terrestrial set-top box, digital VCR, or DTV, to utilize the presentation capabilities in a network-attached renderer such as a DTV display or PC. The method defined here enables user control of networked devices (either local to the user or remote) via another device's (e.g., DTV or PC) web browser graphical user interface (GUI).

Contact: Leslie King, <mailto:rjustus@ce.org>

**BSR/ISA 95.00.05-200x, Enterprise-Control System Integration - Part 5: Business-to-Manufacturing Transactions** (new standard)

This standard will define business-to-manufacturing transactions that may be used on the objects defined in the object models of ANSI/ISA 95.00.01-2000 and ANSI/ISA 95.00.02-2001. The transactions of required and actual manufacturing activities bind and organize the manufacturing objects and activities defined in those earlier standards.

Contact: Charles Robinson, <mailto:crobison@isa.org>

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## TSP Meeting Schedule

The following TSP meetings will be held Harrah's Las Vegas Casino & Hotel in Las Vegas, Nevada.

**Control Protocols Working Group** Thursday, 21 October 2004, 09:00 - 13:00

**Electrical Power Working Group** Friday, 22 October 2004, 19:00 - 23:00

**Floors Working Group** Wednesday, 20 October 2004, 08:00 - 12:00

**Fog and Smoke Working Group** Saturday, 23 October 2004, 08:00 - 11:00

**Followspot Position Working Group** Friday, 22 October 2004, 18:00 - 21:00

**Photometrics Working Group** Friday, 22 October 2004, 08:00 - 10:00

**Rigging Working Group** Wednesday, 20 October 2004, 19:00 - 23:00

**Technical Standards Committee** Wednesday, 20 October 2004, 13:00 - 17:00

**ANSI E1.2 (aluminum trusses & towers) Revision Task Group** no meeting scheduled

**BSR E1.6 (powered rigging) Task Group** no meeting scheduled

**BSR E1.17 (ACN) Task Group** Tuesday, 19 October 2004, 09:00 - 17:00; Wednesday, 20 October 2004, 09:00 - 17:00

**BSR E1.20 (RDM) Task Group** Monday, 25 October 2004, 09:00 - 18:00; Tuesday, 26 October 2004, 09:00 - 13:00

**BSR E1.21 (temporary stage roofs) Task Group** no meeting scheduled

**BSR E1.22 (fire curtain systems) Task Group** no meeting scheduled

**BSR E1.24 (stage pin connectors) Task Group** no meeting scheduled

**BSR E1.27-x (DMX cabling) Task Group** Thursday, 21 October 2004, 13:00 - 18:00

The January TSP meetings will be held at the Dallas/Ft. Worth Airport Marriott South in Ft. Worth, Texas, on Friday, Saturday, and Sunday, January 14 through 16, 2005.

## Standards Watch

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