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LAN Standards News & Trends

Herbert V. Congdon II, PE
Standards Chair, Fiber Optics LAN Section

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Fiber Optics LAN Section (FOLS)

- Founded in 1993 as a Section of the TIA's Fiber Optics Division.
- Mission: to educate system designers, architects, consultants, engineers, contractors, end users and the media about the technical advantages that optical transmission brings to customer-owned networks.
- FOLS also stimulates the development of new fiber standards and the promotion of optical-based applications in customer-owned networks.

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FOLS Members

- Berk-Tek, a Nexans Company
- CommScope
- Corning
- Draka Communications
- Fluke Networks
- OFS
- Ortronics/Legrand
- Panduit
- Sumitomo Electric Lightwave
- Tyco Electronics

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FOLS Activities

- Stimulates the development of standards (short wavelength fast ethernet)
- Created a free interactive cost model to help users compare infrastructure choices.
- Source for White Papers on Industry Issues.
- Helps Interpret Standards and Architectures through articles and presentations at industry conferences.
- Presents Web conferences on current market trends and developments.
- Provides a resource for training organizations, willing to help develop training materials.
- Provides a forum for industry discussions.

- Maintains www.fols.org as an industry resource.

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www.fols.org

- Current information on the state of fiber optic technology and standards.
- Access to our exclusive free interactive cost model.
- Answers to fiber FAQs.
- Application case histories.
- Technology information.
- “Ask the Expert” Column.
- Conference presentations.
- A compilation of industry articles.
- White papers.
- Copies of FOLS Web conferences.

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Today's Objectives

- Overview of Standards
- Review the recent events and activities of the TIA TR-42 Subcommittees
  - Most recent meetings held in early February 2009
- Review the recent events and activities of the LAN application Subcommittees

Standards Overview

- **Who Develops Standards?**
  - IEEE focuses on the Ethernet applications,
  - Telecommunications Industry Association (TIA), focuses on the passive network to support applications like Ethernet.

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Standards Overview

- What is the process for developing a standard?
  - Standards projects and technical documents at TIA are formulated according to the guidelines established by ANSI and in the association's Engineering Manual.
  - Potential projects are initiated by a technical contribution to one of the engineering committees or subcommittees from an individual or company requesting the creation of a new standard or technical document in a particular area of technology.

Standards Overview

- What is the process for developing a standard?
  - Developing a new standard can take anywhere from a few months to many years (the TR-42.9 subcommittee, for example, has been working in excess of 10 years on an industrial cabling standard).
  - Once a project has been approved, contributions are reviewed in subcommittee, draft documents are created then balloted to remove or resolve contentious issues. When there is consensus that the document is ready for publication, the subcommittee can release the document

Standards Overview

- **How long are standards valid?**
  - Standards are living documents, which must constantly be revised to reflect emerging market needs. ANSI mandates a maximum 5-year lifespan for standards, after which they must be revised, re-affirmed or withdrawn.
  - During that lifespan, many addenda may be added to keep the document growing with advances in technology. These addenda may then be incorporated into the new revision of the standard.

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Standards Overview

- EIA/TIA-568, the Commercial Building Cabling Standard, was first ratified in 1991.
  - Specifies a structured cabling system that provides a minimum level of performance, supports a multi-vendor environment
  - Provides direction for the design of telecommunications equipment and cabling products,
  - Establishes performance and technical criteria for various types of cable and connecting hardware.
  - Specifies a projected usable life of at least 10 years.

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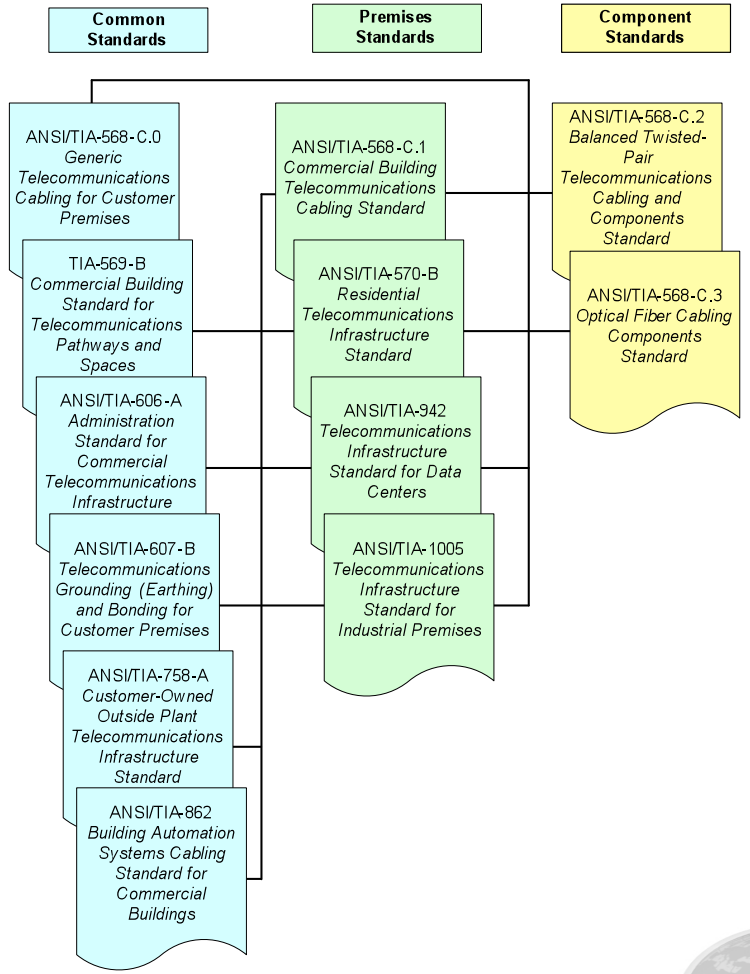
TR-42 Suite

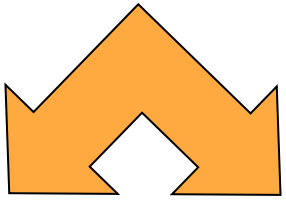
- **Common Standards**
  - End-users
  - Broadly Applicable
- **Premises Standards**
  - End-users
  - Narrow Focus
  - Exceptions/Allowances to Common Standards
- **Component Standards**
  - Manufacturers



TR-42.1 – The 568-C Series

Splitting 568-B.1

568-B.1
(94 pgs)



568-C.0
Generic
(60 pages)

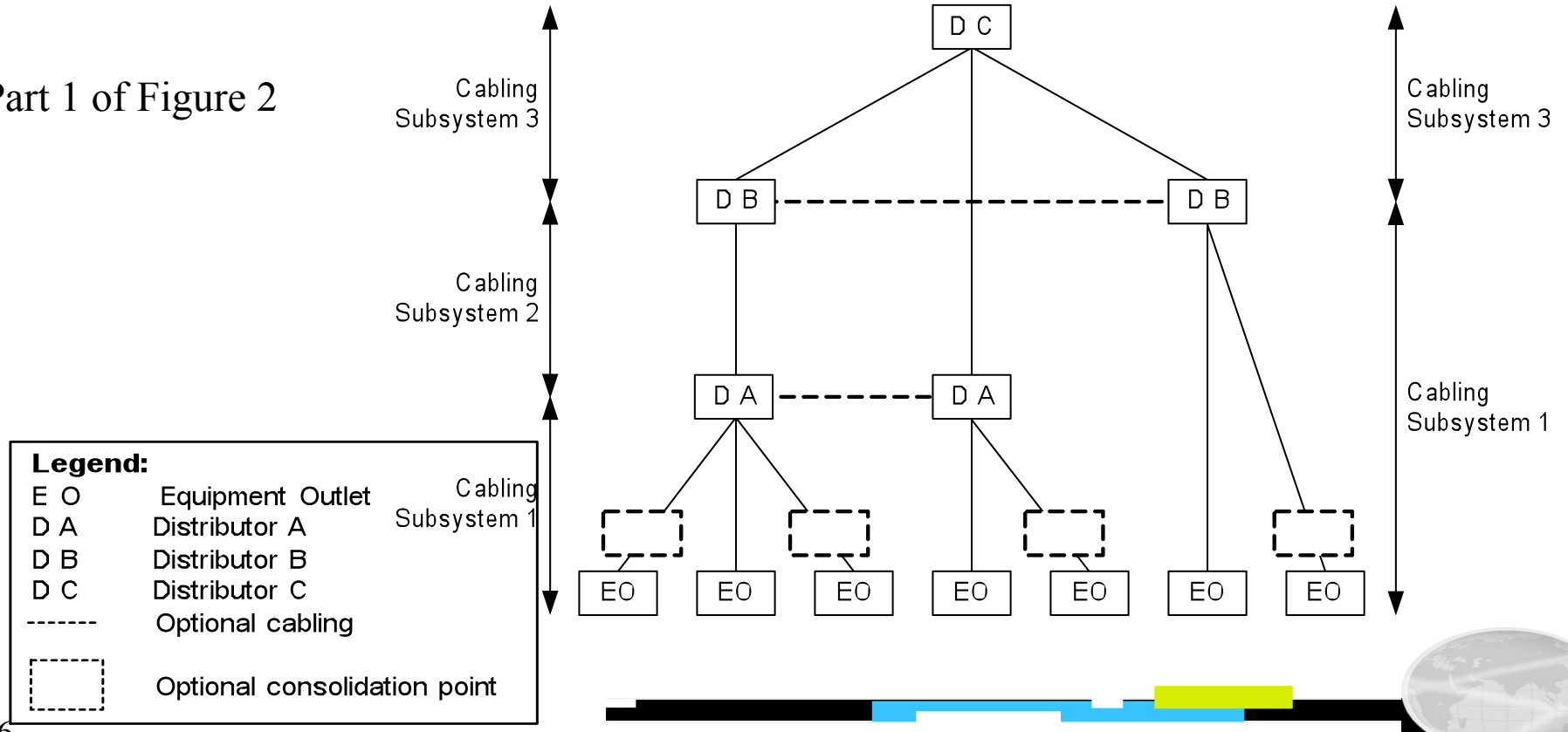
568-C.1
CBC
(35 pages)

568-C.0

- **568-C.0 Generic Cabling**
  - Information common to structured cabling networks
    - Establishes How a Star Network Topology Is Constructed
    - Establishes Cabling Requirements
      - Applicable to all premise Standards unless noted as an exception or allowance
  - 568-C.0 Uses Generic Cabling Nomenclature
    - Cabling Subsystem 1, Cabling Subsystem 2 and Cabling Subsystem 3
    - Distributor A, Distributor B, Distributor C and Equipment Outlet
    - Specific nomenclature assigned in premises Standards

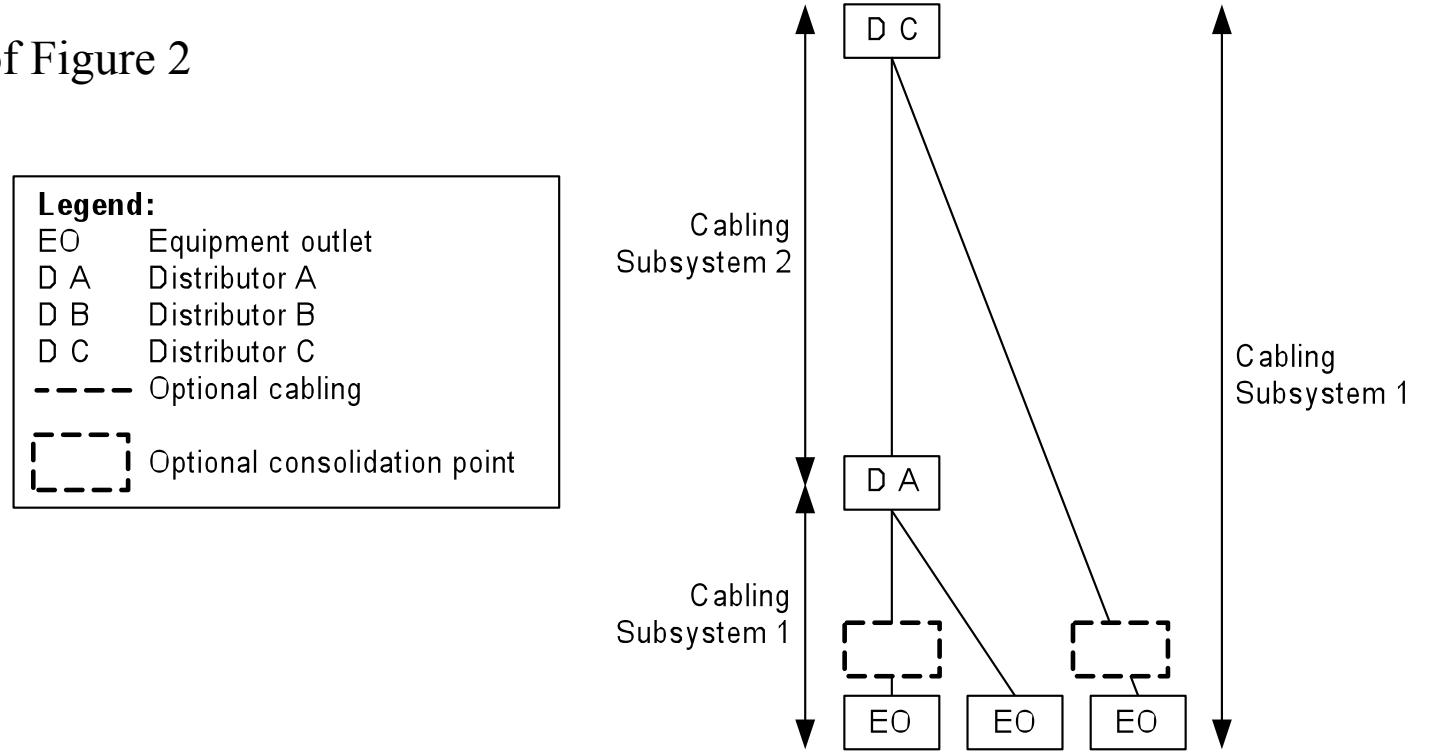
568-C.0 Generic Cabling Topology

Part 1 of Figure 2



568-C.0 Generic Cabling Topology

Part 2 of Figure 2



568-C.0 - Stewardship

- Telecommunications infrastructure affects raw material consumption. The infra-structure design and installation methods also influence product life and sustainability of electronic equipment life cycling. These aspects of telecommunications infrastructure impact our environment. Since building life cycles are typically planned for decades, technological electronic equipment upgrades are necessary. The telecommunications infrastructure design and installation process magnifies the need for sustainable infrastructures with respect to building life, electronic equipment life cycling and considerations of effects on environmental waste. Telecommunications designers are encouraged to research local building practices for a sustainable environment and conservation of fossil fuels as part of the design process.

Where would 568-C.0 Apply?

- **Foundation Document**
  - Applies to 568-C.1
  - Will apply to all premises standards as revisions are released
- **Generic Document**
  - Applies to premises without a premise standard
  - Examples
    - Non-office oriented areas of an airport
    - Non-office oriented areas of a stadium

568-C.0

- 568-C.0
  - Recognizes single-mode fiber in Cabling Subsystem 1
  - Includes:
    - optical fiber field testing
    - attenuation allowance
    - polarity
      - duplex
      - array

568-C.0

- **568-C.0 – Generic Cabling – Status**
  - Document approved for publication
  - Available for purchase
    - $176 Alone
    - $812 for 568-C Set

568-C.1

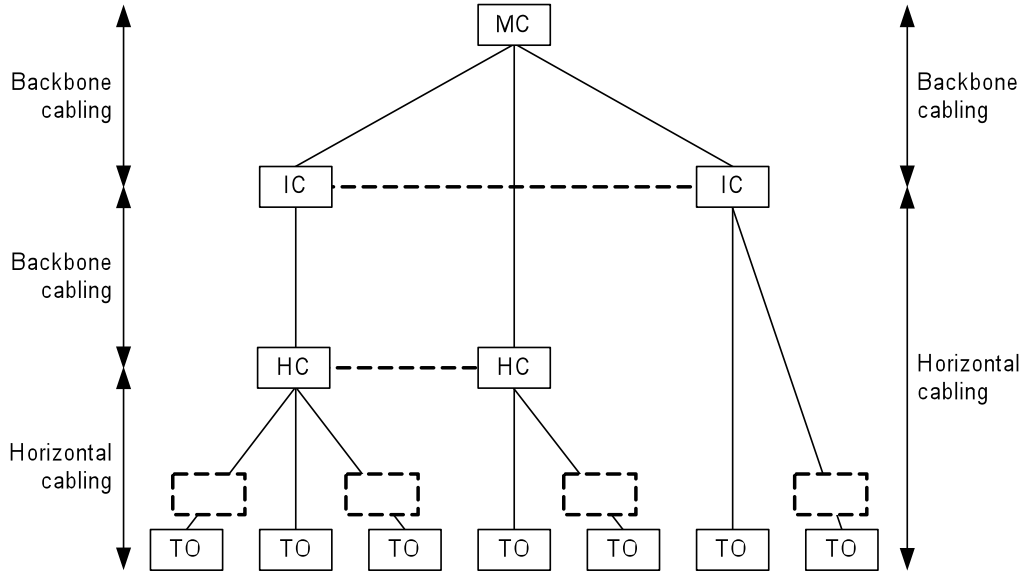
- 568-C.1 – (Office-oriented) Commercial Building
  - Builds on information in 568-C.0
  - Allowances and exceptions specific to office-oriented buildings and office-oriented parts of buildings

568-C.1

- Retains use of 568-B.1 nomenclature
  - Main Cross-connect (Distributor C in 568-C.0)
  - Interbuilding backbone cabling (Cabling Subsystem 3 in 568-C.0)
  - Intermediate Cross-connect (Distributor B in 568-C.0)
  - Intrabuilding backbone cabling (Cabling Subsystem 2 in 568-C.0)
  - Horizontal Cross-connect (Distributor A in 568-C.0)
  - Horizontal cabling (Cabling Subsystem 1 in 568-C.0)
  - The Telecommunications Outlet (Equipment Outlet in 568-C.0)

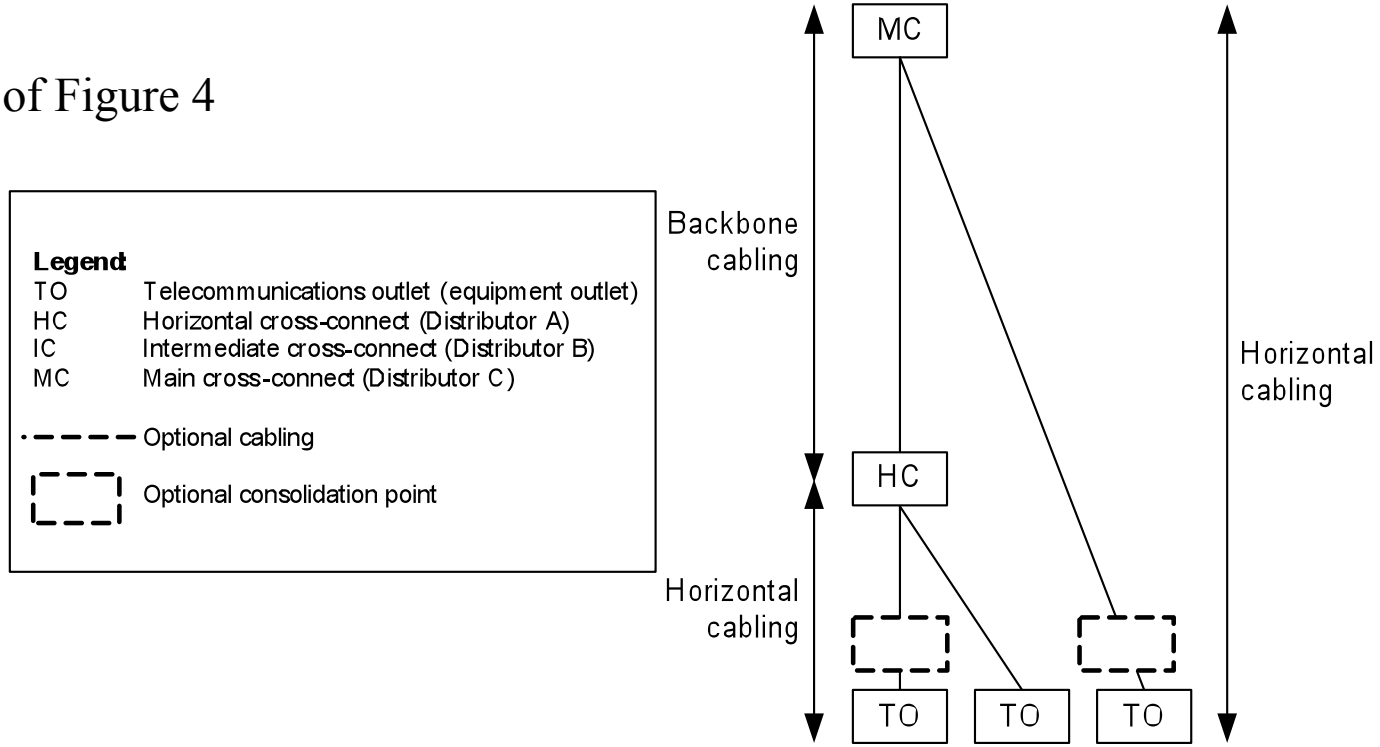
568-C.1

Part 1 of Figure 4



568-C.1

Part 2 of Figure 4



568-C.1 – Technical Changes

- From Addenda
  - Inclusion of telecommunications enclosures (TEs)
  - Inclusion of 850 nm laser-optimized 50/125 µm MM fiber
- A recommendation to select 850 nm laser-optimized 50/125 µm as the multimode fiber for commercial buildings
- Removal of balanced twisted-pair cabling performance and test requirements
  - These will be in the ANSI/TIA-568-C.2 document

568-C.1

- **568-C.1 – Commercial Building Cabling – Status**
  - Document approved for publication
  - Available for purchase
    - $124 alone
    - $812 for 568-C suite

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TR-42.1

- **Building Automation Systems (BAS)**
  - Update the TIA-862 document and harmonize with the 568-C series
    - Committee Ballot issued

Healthcare Facility Cabling

- Healthcare Facility Cabling Task Group has been Reactivated
  - Herb Congdon appointed chair
- Task Group will create a draft standard for healthcare facilities based on using the 568-C.0 document as a foundation
  - Soliciting contributions on what makes healthcare facility cabling different from traditional commercial building cabling
- TR-49 is a new TIA Engineering Committee for Healthcare Communications Technology

TR-42.2: Multi-tenant/Multi-dwelling Units

- **TR-42.2, TR-42.12 and TR-42.13 looking at this emerging vertical**
  - Optical cabling standards in wiring multiple-dwelling units to extend the reach of single-mode fiber (“FTTx”) services
  - Define the optical infrastructure for both MDU residential (apartments, townhouses, condominiums) and MTU commercial properties including mixed-use buildings
  - TR-42.2, TR-42.12 & TR-42.13 will evaluate and present a list of impacts on TR-42 standards in a joint meeting in February 2009
    - TIA-568-C.0, TIA-568-C.3
    - TIA-570-B, TIA-758 and maybe others
  - No decision yet

TR-42.3

- **Third Revision Project Initiated**
  - Will be ANSI/TIA-569-C
  - Will broaden scope (beyond commercial building)
  - Will align with ANSI/TIA-568-C.0

TR-42.4

- **Opened Revision Project (758-B)**
  - Recognize the existence of 568-C.0
  - New information or technology
- **First draft created and being circulated**

TR-42.7

- **568-C.2, Copper Cabling Components**
  - Ballot will close in March
  - Comment resolution at interim meeting in May
  - TR-42.7 requested approval to publish if no technical changes are made as a result of comment resolution
    - not likely, but possible
    - plans to publish by October 2009 are still viable

TR-42.7

- **TIA-1152, Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling**
  - Send out for industry ballot
  - Conditional approval for publication in May

TR-42.8

- Review of 568-C.3 status
  - Errata approved (20 items)
    - Formatting and corrupted references to tables and clauses
  - Posted document (for purchase)
    - Modified to incorporate errata
  - If purchased between June 2008 and December 2008, check to see if you received erratum

TR-42.9

- Publication of TIA-1005, Telecommunications Infrastructure Standard for Industrial Premises, was approved in October
  - Available for purchase ($99)
- Approved project to revise ANSI/TIA-1005
  - Align with 568-C.0
  - Include new technologies
    - POF is being considered

TR-42.11

- OFSTP-14A, *Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant*
  - Will be revised with the intent to adopt IEC 61280-4-1 ed.2 when at FDIS, expected Spring 2009
- FOTP-243
  - New results on multiple PMD methods and multiple installed links
  - Issued as a committee ballot

TR-42.12

- New projects
  - Skew measurement
  - Revise FOTP-204 on multimode bandwidth
- Documents for ballot
  - FOTP-244, temperature cycling of tubes expressed in pedestals
    - Committee ballot
  - TIA-492AAAD, OM4 fiber specification
    - Committee ballot

TR-42.16

- **J-STD-607-A is at it's five-year life limit**
  - A revision is necessary to cover more than the current document
- **Working on first draft of what will become J-STD-607-B**
  - Section 7 revision
  - Design information in NECA/BICSI-607 (design info from busbar to equipment)
  - Grounding busbar task group (performance based, alloys)
  - EMI annex content task group
  - Another task force on supplementary grounding methods (star grounding, mesh, and ground mats)

Other TR-42 Notes

TIA Going Green

- Task Group formed in TR-42.3
  - Summary of findings presented to all TR-42 subcommittees
- “Stewardship” paragraph drafted and out for review
  - Maybe for inclusion in 568-C.0
- Liaison letter to IEEE looking for opportunities to join forces
- Working with BICSI and USGBC for LEED credit support of structured cabling

Next Meeting

- Interim meeting scheduled for May
  - Only TR-42.7 will meet that week
- Most subcommittees will be having interim teleconferences
- Next full TR-42 meeting will be in August

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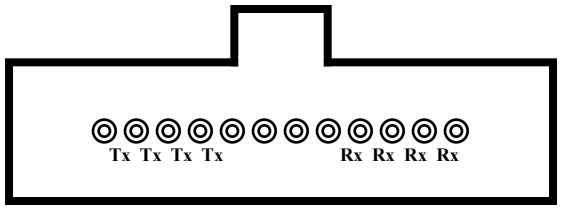
Applications Standards Activity

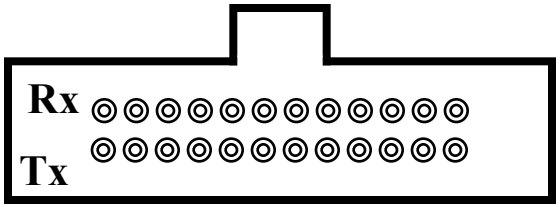
IEEE 802.3ba – 40G/100G

- **Provide Physical Layer specifications which support 40 Gb/s over:**
  - at least 10km on SMF
  - at least 100m on OM3 MMF
  - at least 10m over a copper cable assembly
  - at least 1m over a backplane
- **Provide Physical Layer specifications which support 100 Gb/s over:**
  - at least 40km on SMF
  - at least 10km on SMF (note: will be CWDM)
  - at least 100m on OM3 MMF
  - at least 10m over a copper cable assembly

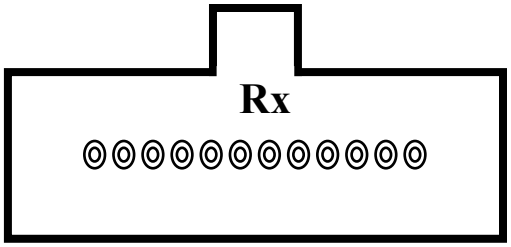
IEEE 802.3ba

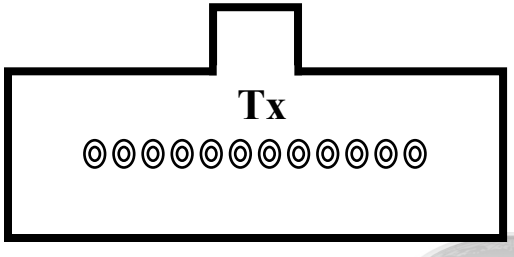


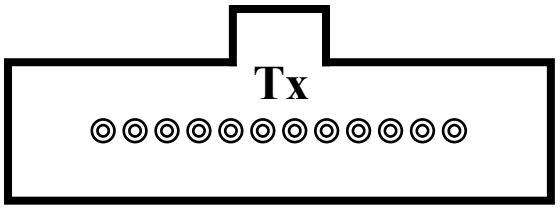
Multimode solutions will be parallel
- 4 TX and 4 RX for 40G
- 10 TX and 10 RX for 100G

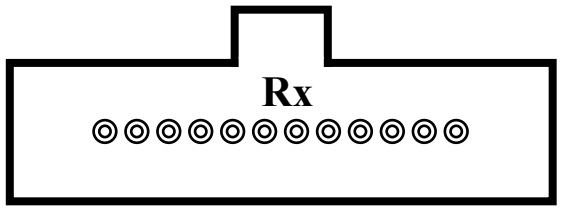


3 Options
- 2 MPO side by side
- 2 MPO top and bottom
- 1 MPO









NOTE: all views are looking into transceiver

IEEE 802.3ba

- No lane assignments (1-4 or 1-10)
  - Protocol will self-detect
  - Reduces importance of polarity for these applications
- Skew budget very generous
  - Not likely to be a concern unless building with duplex links with a length differential more than 15 meters
- Longer distances on “OM4” fiber under consideration
  - Minimal support in the full task group
- Timeline shows publication in June 2010

IEEE 802.3az – Energy Efficient Ethernet

- **Task Group IEEE 802.3az**
  - Define a mechanism to reduce power consumption during periods of low link utilization for the following PHYs
    - 100BASE-TX (Full Duplex)
    - 1000BASE-T (Full Duplex)
    - 10GBASE-T
    - 10GBASE-KR
    - 10GBASE-KX4
  - Define a protocol to coordinate transitions to or from a lower level of power consumption
  - Timeline shows publication in early 2010

Purchasing Standards

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Purchasing Standards

- TIA releases published documents to Global Engineering Documents
- Global Engineering Documents acts as a clearing house for order processing for multiple Standards Developing Organizations (SDOs)
- News:
  - Now Global Engineering Documents is “IHS”
  - www.ihs.com

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