

The Standards Report

Quarter 1 | 2023

The latest industry changes and what they mean to you

IEEE 802.3 (Ethernet)

IEEE 802.3 COPPER PROJECTS:

Recent Publications:

IEEE Std P802.3dd (published August 2022) Amendment 1: Power over Data Lines of Single Pair Ethernet (Maintenance) - Published August 2022

This amendment to IEEE Std 802.3-2022 makes editorial and technical corrections, refinements, and clarifications to Clause 104 Power over Data Lines of Single Pair Ethernet, and related portions of the standard. No new features are added by the amendment.

IEEE 802.3de Amendment 5: Enhancements to IEEE Std 802.3ck-2022 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces - Published December 2022

This amendment specifies additions to, and appropriate modifications of, the IEEE Std 802.3 MAC Merge function and the Time Synchronization Service Interface (TSSI) to support 10 Mb/s Single Pair Ethernet point to point PHYs, published December 2022.

IEEE 802.3ck Amendment 4: Physical Layer Specifications and Management Parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces Based on 100 Gb/s Signaling - Published March 2022

This project specifies additions and appropriate modifications to IEEE Std 802.3 to add Physical Layer specifications and Management Parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s electrical interfaces based on 100 Gb/s signaling. Clause 161 through Clause 163, Annex 120F, Annex 120G, and Annex 162A through Annex 162D, Annex 163A, and Annex 163B has been added to the document. This amendment includes Physical Layer specifications and management parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s electrical interfaces based on 100 Gb/s signaling. Note: this amendment is also relevant to fiber optic cabling in that this electrical interface is often used to connect to fiber interface modules.

Active projects:

- **IEEE P802.3da 10 Mb/s Single Pair Multidrop Segments Enhancement**
 - This project supports 10 Mb/s single pair Ethernet mixing segments (multi-drop), including optional power delivery supporting multiple powered devices.
 - The task group is still at draft 0.6 but continues to develop incremental drafts leading to Draft 1.0 that will be officially circulated for comments. Content regarding mixing segments is being developed. The new estimated publication date is now Q3 2024.
 - Noted some pushback to specifying only one type of MDI connector.

- **Greater than 10 Mb/s Long-Reach Single Pair Ethernet Study Group**

- Ethernet **Study Group**: With the approval of the IEEE P802.3dg PAR on 24 March 2022, the IEEE 802.3 **Greater than 10 Mb/s Long-Reach Single Pair Ethernet Study Group** has completed its charter and transitioned to the IEEE P802.3dg 100 Mb/s Long-Reach Single Pair Ethernet Task Force.

- **IEEE P802.3dg 100 Mb/s Long-Reach Single Pair Ethernet Task Force**

- Link segment IL Baseline was established at the November 2022 meeting.
- Frequency range specified is 0.3 to 60 MHz
- It is anticipated that system reach will be ~400 m using 18 AWG SO cabling and ~500 m using 16 AWG.
- Draft 1.0 completed in March 2023. Draft 2.0 target WG ballot July 2023
- Draft 3.0 SA (Standards Association) ballot anticipated January 2024, ballot completion June 2024.

IEEE 802.3 FIBER OPTIC PROJECTS:

Recent Publications:

IEEE Std 802.3cs-Increased-reach Ethernet optical subscriber access (Super-PON) - published November 2022

This amendment adds physical layer specifications and management parameters for optical subscriber access supporting point-to-multipoint operations using wavelength division multiplexing over an increased-reach (up to at least 50 km) passive optical network (PON). Super-PON optical subscriber access networks, which are in the family of Ethernet passive optical networks (EPONs), are defined in this amendment to IEEE Std 802.3-2022. Super-PON has a reach of up to 50 km and up to 1024 ONU's over a point-to-multipoint passive optical distribution network (ODN) through wavelength division multiplexing (WDM). A Super-PON ODN contains a passive wavelength router that determines the channels used by the ODN. This standard specifies the Super-PON Reconciliation Sublayer (RS), Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and Physical Medium Dependent (PMD) sublayer at a MAC data rate of 10 Gb/s in the downstream direction and of 10 Gb/s or 2.5 Gb/s in the upstream direction.

IEEE 802.3db Standard for Ethernet - Amendment 3: Physical Layer Specifications and Management Parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s Operation over Optical Fiber using 100 Gb/s Signaling- (Maintenance 16) - Published December 2022

This revision incorporates amendments and accumulated maintenance changes since publication of the 2018 standard. The amendment to IEEE 802.3 adds Physical Layer specifications and management parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s Ethernet optical interfaces based on 100 Gb/s per wavelength optical signaling over multimode fiber.

Clause 30, Clause 45, and Clause 90 are modified and Annex 90A added to enhance support for time synchronization protocols by providing options for sub-nanosecond reporting of the transmit and receive path data delays, selection of the data delay measurement point, and dynamic reporting of path data delay variation.

Active Projects:

IEEE P802.3cw 400 Gb/s over DWDM systems

- This standard supports 400 Gb/s operation on a single wavelength of at least 80 km over a DWDM system.
- Comments to Draft 2.0 were discussed at the Oct 2022 meeting. Target publication is March 2024.

• IEEE P802.3cy Greater than 10 Gb/s Electrical Automotive Ethernet

- This project will support point-to-point link segments up to 11 m with 2 inline connectors for speeds of 25 Gb/s, 50 Gb/s, and 100 Gb/s for media and operating conditions for applications in the automotive environment.
- The Task Group is working with Draft 3.1. Estimated publication is between June and September 2023.

• IEEE P802.3cz Multi-Gigabit Optical Automotive Ethernet

- This project will specify additions to, and appropriate modifications of, IEEE Std 802.3 to add Physical Layer specifications and management parameters for multi-gigabit optical Ethernet for application in the automotive environment.
- Draft 3.2 is submitted to RevCom. Target publication is July 2023.

• IEEE 802.3df 400 Gb/s and 800 Gb/s Ethernet Task Force

- This project supports 400 Gb/s and 800 Gb/s using 100G per lane signaling.
- Committee working on voting to Draft 3.0. Estimated publication is June 2024

• IEEE 802.3dj 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Task Force

- This project supports 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s using 200 Gb per lane signaling.
- Meetings are currently being held jointly with 802.3df. The 200 Gb/lane objectives were originally part of 802.3df but were split off to allow the lower data rate to reach completion faster.
- Estimated publication is March 2026

• Next Meetings:

- Interim - May 15-18, 2023 - San Antonio, TX (hybrid best effort)
- Plenary - July 10-13, 2023 - (TBD)

IEEE 802.11 (Wireless)

ACTIVE IEEE 802.11 PROJECTS:

• IEEE P802.11be Extremely High Throughput WLAN (Wi-Fi 7)

- The target publication date is May 2024.
- This standard supports wireless Ethernet operations in the 1 GHz, 7.25 GHz, 2.4 GHz, 5 GHz, and 6 GHz frequency bands, with a maximum throughput of 30 Mb/s.

TIA TR 42

Recently Published

- **ANSI/TIA-5071 Requirements for Field Test Instruments and Measurements for Balanced Single Twisted-Pair Cabling**
 - Specifies test requirements and accuracy performance requirements of field testers for balanced single twisted-pair cabling measurements specified in 568.5 (Commercial) and 568.7 (Industrial)
 - Requirements for SP-I specified from 1 MHz to 20 MHz
 - Requirements for SP-II specified from 1 MHz to 600 MHz
 - Also contains methods for comparing field instrument measurements to laboratory measurements specified in ANSI/TIA-568
 - Document in process of being published
- **TIA-526-14-D Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 edition 3, Fiber-Optic Communications Subsystem Test Procedures-Part 4-1: Installed Cable Plant - Multimode Attenuation Measurement**

TR 42.1 - Generic Telecommunications Cabling and Premises Cabling

- **ANSI/TIA-758-C (Outside Plant):** Industry Ballot comments were resolved. The document was approved to be published.
- **ANSI/TIA-4996-1 (Education Addendum 1):** Industry Ballot comments were resolved. The document was approved to be published.
- **ANSI/TIA-1179-A (Healthcare):** Industry ballot comments were resolved. The document will be issued as a default ballot.
- **ANSI/TIA-942-C (Data Centers):** Industry ballot comments were resolved. The committee approved another industry ballot.
- **ANSI/TIA-568.1-E-1 (Commercial Buildings, Addendum 1):** This addendum will include single pair Ethernet cabling and provide additional WAP cabling guidance. Industry ballot comments were resolved. The document was approved to be published.
- **ANSI/TIA-570-E (Residential Cabling Standard):** Reviewed draft. Approved industry ballot.
- **ANSI/TIA-5017-A (Physical Security):** Began comment resolution, will continue at next meeting.

The committee discussed the possible consolidation of 568.0, 568.1, and 862 (intelligent building) documents into one since there is a certain amount of redundancy in them. At the June meeting two different outlines for this will be presented and reviewed. If agreed, a project authorization request will be submitted to begin this work.

TR-42.3 - Telecommunications Administration, Pathways, Spaces, Bonding and Grounding

- **ANSI/TIA-569-E (Pathways and Spaces)** The committee reviewed the potential impact on this document if TIA-568.0 and TIA-568.1 are merged. Editor was authorized to create draft of TIA-569-F to be put forward if TIA-568.0 and TIA-568.1 are merged. This draft would remove pathway and spaces content from TIA-568.1 and put it back in TIA-569.
- **ANSI/TIA-607-D (Bonding and Grounding)** - Approved a PAR to create a -E revision and approved a 1st industry ballot

TR-42.7 - Telecommunications Copper Cabling Systems

- **ANSI/TIA-568.5 addendum 1: Balanced Single Twisted-Pair Telecommunications Cabling and Components Standard Addendum 1: Technical Corrections to Transmission Requirements** - Correction of PSAFEXT requirements and PSAACRF specifications, and ELTCTL adjustments. Comments were reviewed and a 3rd industry ballot was approved.

- **ANSI/TIA-1183-B: Measurement Methods and Test Fixtures for Balun-less Measurements of Balanced Components and Systems** 5-year maintenance to ANSI/TIA-1183-A included minor editorial changes and no changes were made to the default ballot, so it was approved for publication.
- **TIA-TSB-184-A-2: Guidelines for Supporting Power Delivery over Balanced Single Twisted-Pair Cabling** Ballot comments from the second committee ballot were reviewed. It was agreed to send the document out for a third committee ballot the results of which will be reviewed at the next meeting in June 2023.
- **ANSI/TIA-568.6 Single Pair Multi-Drop (SPMD) Cabling and Component Specification** Implementing cabling for SPMD is significantly more complex than implementing point-to-point systems as has traditionally been done in IEEE and TIA. It may not be possible to create a generic standard to cover multi-drop. If this is ultimately found to be the case, the project may be cancelled at TIA or modified into writing a document to give general engineering guidance on how to implement SPMD cabling.
- **ANSI/TIA-568.2-E Balanced Twisted-Pair Telecommunications Cabling and Components** - the 5-year maintenance of the 568.2-D document began with an initial draft of a proposed updated document being presented and discussed. A second draft will be discussed at the next meeting in June.

TR 42.9 – Industrial Telecommunication Infrastructure

- **ANSI/TIA-1005-B: Telecommunications Infrastructure Standard for Industrial Premises** - Comments to the second committee ballot for 1005-B were reviewed and changes made to the document as deemed necessary, based on the consensus of the group. It was decided to send the updated document out for its first industry ballot, the results of which will be reviewed at the upcoming meeting in June 2023.
- **ANSI/TIA-568.7 Balanced Single Twisted-Pair Communications Cabling and Components Standard for Industrial Premises** - Comments from the fourth committee ballot of ANSI/TIA-568.7 were reviewed but not all were resolved during the plenary meeting. A teleconference was held on March 13 to resolve the remaining ballot comments. Changes were made to the document as deemed necessary based on consensus including updates to tables 28 and 29 that specify ELTCTL cable requirements for E1, E2, and E3 environments.
- It was decided to send the document out for its first industry ballot.

TR-42.11 – Optical Fiber Systems

- **ANSI/TIA-526.14-D - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant** was published on November 15, 2022.
- **ANSI/TIA-568.3-E-1, Optical Fiber Cabling and Components addendum**, a task group has been formed regarding the “tier testing” of installed fiber optic cable. There is solid agreement in the committee that LSPM (light source power meter) testing is the most accurate and should be considered the reference test method. The allowance of OTDR test data for cabling certification could be allowed if agreed by the parties. Another ad hoc meeting will be scheduled to discuss further with the intent to have a specific recommendation for the larger group.

TR-42.12 –Optical Fibers and Cables

- **ANSI/TIA-4920000-C - Generic fiber**, adopt with modifications of the IEC 60793-2:2019, is out for ballot.
- **TIA-455-3 (FOTP-3) Temperature Ramps and Precision** - is in re-ballot and will publish if there are not any “Technical No’s”

TR 42.13 – Passive Optical Devices and Fiber Optic Metrology

- **ANSI/TIA-622.4 (Adoption of IEC 61755-2-4:2015) non-angled, reference connection**
TIA Industry ballot closed on July 5, 2022. Ballot passed. Motion to publish.

- **ANSI/TIA-622.5 (Adoption of IEC 61755-2-5:2015) angled, reference connection**
TIA Industry ballot closed on July 5, 2022. Ballot passed. Motion to publish.

Next Meetings:

- Plenary - June 5 - 9, 2023 - Hybrid
- Plenary - September 25 - 29, 2023 (TBD) - Hybrid

ISO/IEC

ISO/IEC JTC1/SC25 WG3 – CUSTOMER PREMISES CABLING

Active Projects:

- **ISO/IEC 11801-1 Amendment** [Single-pair components & channels for Generic Cabling]
 - The next step for this amendment to 11801-1 is a Committee Draft for Vote (CDV), with a voting period until end of August 2023.
- **ISO/IEC 11801-9903** [Matrix Modeling of Channels and Links]
 - A next working draft will be distributed for comment by the end of April 2023.
- **ISO/IEC 11801-9906** [Application Specific SPE Channels]
 - The document will go as a CD for commenting prior to the October 2023 meeting.
- **ISO/IEC 11801-9911** [SPE Cable Sharing]
 - There will be an interim meeting in March/April 2023 to resolve the remaining comments. After which, a working draft will be distributed, with the goal to get to a Draft Technical Report after the October 2023 meeting in Berlin.
- **ISO/IEC 14763-2** [Cabling installation]
 - The second working draft, to include issues relating to 2 amp, is being planned for the start of April 2023 with an 8-week commenting period. An interim ad hoc meeting will then follow by the end of June 2023 for this document, to be followed by a 3rd working draft for comments prior to the next WG3 meeting in Berlin on the 9 October, 2023.
- **ISO/IEC 14763-5** [Sustainability]
 - A new committee draft will be distributed by mid-April, to circulate for a 16-week commenting period prior to the October meeting.
- **ISO/IEC 24383** [Infrastructure Security]
 - A new Committee Draft will be distributed by the editor for comment at the next stage in progressing this standard.

IECSC48B CONNECTORS

Recent Publications:

- **IEC 63171-4 ED1: SPE 1-pair (up to 4X) copper IP20 connector**
- Connector manufactured by BKS Digital Connectivity Solutions, Switzerland
- Covers fixed and free connectors: shielded up to 600 MHz, and unshielded up to and above 3000 MHz.
- Specifies common dimensions, mechanical, electrical, transmission characteristics, and environmental requirements as well as test specifications, respectively.
- The form factor of these connectors allows their use for cable sharing with TOs (Telecommunications Outlet) for structured cabling.
- Supports Power over Data line (PoDL) power supply according to IEEE 802.3bu.
- Published August 2022



- **IEC 63171-5 ED1:** SPE 1-pair IP67-style connector suitable for harsher environments
 - Defines both fixed and free connector; shielded or unshielded circular connectors with IP65/IP67 M8 or M12 locking.
 - Typically used for balanced single-pair data transmission with frequencies up to 600 MHz and with current-carrying capacity up to 4 A.
- **Published September 2022**

Active Projects:

- **IEC 63171-1 ED2:** SPE 1-pair copper LC-style connector targeted for use in enterprise applications. The following technical changes have been made:
 - Information on obtaining a licensing agreement has been updated.
 - Connector characteristics and test requirements aligned with IEC 63171 ED2 where possible.
 - Requirements for Polarizing method and Dynamic stress to align with IEC 63171 ED2 143 d).
 - Test group for moisture test to align with IEC 63171 ED2.
 - Document currently in pre-release stage. Anticipated publication is now May 2024.
- **IEC 63171-7 ED1:** SPE 1-pair copper M12-style connector targeted for use in industrial applications. A 1st Committee Draft (CD) is circulating with comments to be reviewed at the March 2022 meeting.
 - Pre-release document has been issued. Anticipated publication is July 2023
- **IEC 61076-2-101 ED4: Connectors for electronic equipment - Product requirements - Part 2-101: Circular connectors - Detail specification for M12 connectors with screw-locking** Standard replaces the third edition of IEC 61076-2-101 (2012). The following significant technical changes have been made:
 - Document has been adapted to the new IEC template for 253 standards.
 - New subchapters have been added. In Clauses 5-dimensional information and characteristics technical specifications have been updated.
 - A new style NF (free connectors) has been added: 259c.
 - Fixed connectors with glass to metal 260 seals (former styles WM, XM, YM, ZM). 261d removed from document.
 - M12 P-coding connectors removed. 262e: Annex B (informative) Steel conduit thread, sizes have been deleted and a new Annex B 263 (informative) Orientation of cable outlet in relation to coding has been added.
 - Document currently in CD stage - Anticipated publication June 2024

Key Cabling Standards

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- **IEEE Std. 802.3-2022** Standard for Ethernet*
- **IEEE Std. 802.3bt-2018** 4-pair POE (up to 90 watts)
- **IEEE Std. 802.3cg-2019** 10Mb/s Single Pair Ethernet
- **IEEE Std. 802.3ck-2022** 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces
- **IEEE Std. 802.3db-2022** 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber
- **IEEE Std. 802.11-2020** Wireless LAN*
- **IEEE Std. 802.11ax-2021** High Efficiency WLAN (Wi-Fi 6)

* Every 3 years, IEEE 802.3 and IEEE 802.11 are revised to include all amendments and maintenance work since the last publication.



Generic Standards

- **ANSI/TIA-568.0-E** Generic Premises Cabling
- **ANSI/TIA-569-E** Pathways and Spaces
- **ANSI/TIA-606-D** Administration
- **ANSI/TIA-607-D** Grounding and Bonding
- **ANSI/TIA-758-B** Outside Plant
- **ANSI/TIA-862-C** Intelligent Building Systems
- **ANSI/TIA-5017** Physical Network Security

Premises Standards

- **ANSI/TIA-568.1-E** Commercial Cabling
- **ANSI/TIA-570-D** Residential
- **ANSI/TIA-942-B** Data Center Cabling
- **ANSI/TIA-1005-A** Industrial Cabling
- **ANSI/TIA-1179-A** Healthcare
- **ANSI/TIA-4966** Education

Component Standards

- **ANSI/TIA-568.2-D** Copper Components
- **ANSI/TIA-568.3-E** Fiber Components
- **ANSI/TIA-568.4-D** Coaxial Components
- **ANSI/TIA-1152-A** Field Test Equipment 2GHz
- **ANSI/TIA-1183-B** Lab Test Equipment

Telecommunications System Bulletins

- **TIA TSB-162-B** Cabling for WAPs
- **TIA TSB-184-A** Power Delivery
- **TIA TSB-5018** DAS



Performance and Design

- **ISO/IEC 11801-1 ED1: 2017** Generic Cabling Systems
- **ISO/IEC 18598:2016+A1:2021** Management Systems
- **ISO/IEC 30129:2015+A1:2019** Grounding and Bonding

Premises Standards

- **ISO/IEC 11801-2 ED1: 2017** Office Premises Cabling
- **ISO/IEC 11801-3 ED1: 2017** Industrial Cabling
- **ISO/IEC 11801-4 ED1: 2017** Residential Cabling
- **ISO/IEC 11801-5 ED1: 2017** Data Center Cabling
- **ISO/IEC 11801-6 ED1: 2017** Distributed Building Cabling

Technical Reports

- **ISO/IEC TR 11801-9904:2017** 2.5G and 5GBASE-T Cabling
- **ISO/IEC TR 11801-9910:2020** MPLT Cabling

Implementation

- **IEC 14763-2 ED2: 2019** Planning and Implementation

Testing and Validation

- **IEC 61935-2 ED3: 2010** Testing Copper Cables (4-pair)
- **ISO/IEC 14763-3 ED2: 2014** Testing of Optical Fibre



- **BICSI 001** Educational Facilities
- **BICSI 002** Data Center Design
- **BICSI 003** BIM
- **BICSI 004** Healthcare
- **BICSI 005** ESS
- **BICSI 006** Distributed Antenna Systems (DAS)
- **BICSI 007** IoT/Intelligent Buildings
- **BICSI 008** WLAN
- **BICSI 009** Data Center Operations
- **BICSI N1** ICT Installation
- **BICSI N2** PoE Installation
- **BICSI N3** Bonding & Grounding
- **BICSI G1** Outside Plant (OSP) General Practices
- **BICSI G2-1** OSP: Pole Setting
- **BICSI G2-2** OSP: Aerial Cable Installation
- **TDMM-2020** Telecommunications Distribution Methods Manual
- **ITSIMM-2022** Information Technology Systems Installation Methods Manual
- **TPMM-2016** Telecommunications Project Management Manual
- **OSPDRM-2018** Outside Plant Design Reference Manual