Just the Technical Facts

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TIA Releases Guidelines for Maintaining Polarity Using Array Connectors

What is new?

ANSI/TIA-568-B.1-7-2006 Commercial Building Telecommunications Cabling Standard, Part 1 – General Requirements, Addendum 7 – Guidelines for Maintaining Polarity Using Array Connectors Standard was ANSI approved in January 2006 and should soon be available for purchase. The Standard is identified as Addendum No. 7 to TIA-568-B.1. Corning Cable Systems was an active participant in the development of this Standard.

What is the purpose of the Standard?

The Standard provides serial transmission or bi-directional fiber polarity guidance for systems using MTP® optical connectivity. Such guidance would be applicable to the LANscape® Plug & Play™ System Solution with MTP Connector modules.

Local area network (LAN) and data center storage area network (SAN) dense wiring requirements facilitate the use of array style connectors like the MTP Connector. These scenarios often utilize pre-assembled and field-terminated MTP-to-MTP connectorized cables called trunks. Since there are array connectors on both ends of these trunks and the end equipment typically has standard duplex transceiver ports, the trunks are plugged into factory-made breakout furcations called modules that transition from the MTP Connector to a duplex connector/adapter style.

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What is the purpose of the Standard? (continued)

Like simplex and duplex connectors and adapters, the MTP® Connectors and adapters are also keyed to ensure the proper orientation is maintained when connectors are mated. With MTP Connectors, this keying establishes the orientation of one fiber array in one connector relative to the array in the mating connector, but does not ensure that duplex fiber pair polarity is maintained.

The MTP Connector has 12 fibers and the Standard provides polarity guidance for serial transmission ... I'm confused..?

Data center backbones have migrated to higher-fiber-count optical ribbon cables to meet increasing system bandwidth needs as well as to provide the highest fiber density relative to cable size, maximize utilization of pathway and spaces and facilitate ease of termination. Each 12-fiber ribbon translates into six 2-fiber serial optical circuits that require polarity management that can be achieved using one of numerous methods.

How many polarity methods are included in the Standard and are they mandatory?

The Standard includes guidance on three sample methods identified as Method A, Method B and Method C. The Standard states in paragraph 3.1 that "While many methods are available to establish polarity, this Standard outlines sample methods that may be employed." The word "may" implies that alternate polarity methods are available to accomplish the same result that are not discussed or included in the Standard. Thus, the Standard shows three examples and recognizes that other valid methods also exist such as the Corning Cable Systems Plug & Play™ Systems Universal Polarity Management.

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What three methods are included in the Standard?

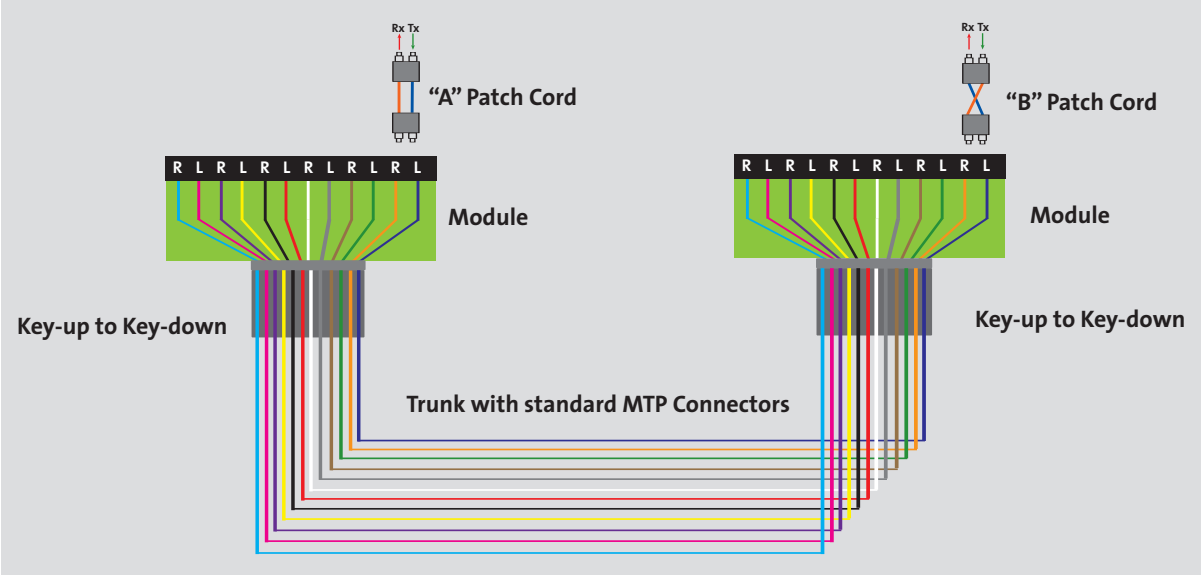

Figure 1. Method A | Drawing ZA-3026

Method A (Figure 1) uses a single module type wired in a straight through configuration and two different patch cords in an optical circuit. One patch cord is straight wired and the other with a pair-wise flip. All components in the channel are mated key-up to key-down. No guidance is included in the Standard to differentiate where the different type patch cords should be used and how it should be made so that it is easily recognizable from the regular duplex patch cord. Because polarity is addressed in the patch cords, the end-user is ultimately responsible for managing it.

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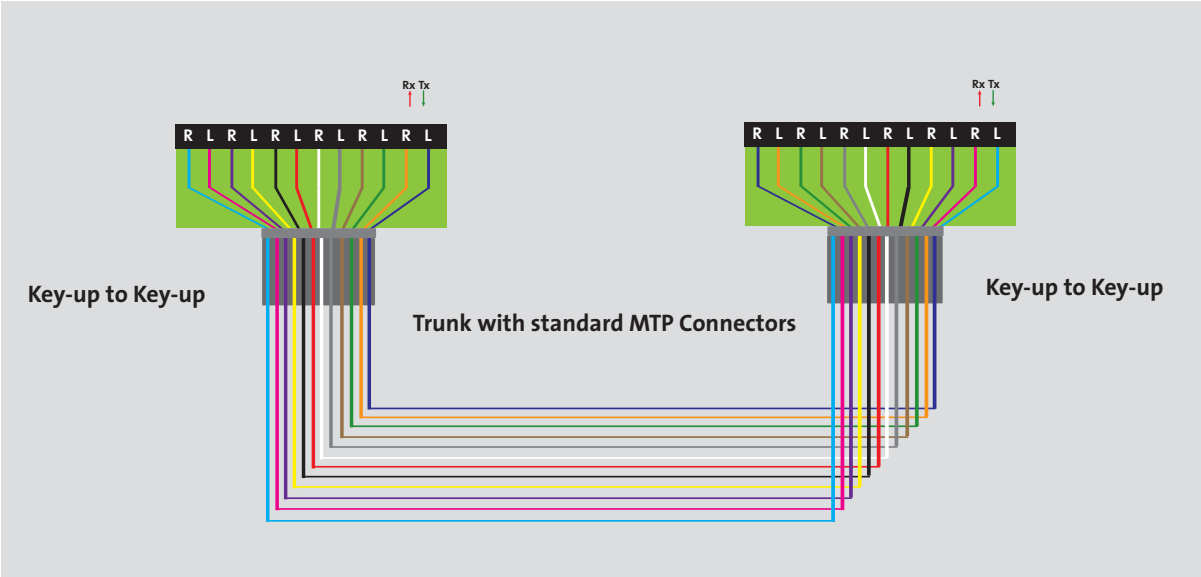

Figure 2. Method B | Drawing ZA-3027

Method B (Figure 2) uses a single module type wired in a straight through configuration and standard patch cords on both ends. The differences is that all components in the system are mated key-up to key-up. When the link is configured in this fashion, physical position #1 goes to physical position #12 on the other end. A module on one end is inverted so logically (label-wise) position #1 goes to position #1. This method requires advance planning for module locations in order to identify the module types and location of the inverted module in the optical link. This adds complexity to the polarity management. Using an MTP® Connector key-up to key-up configuration does not allow use of an angled polished (APC) single-mode connector. This method is similar to a legacy, dated and antiquated A-B module configuration.

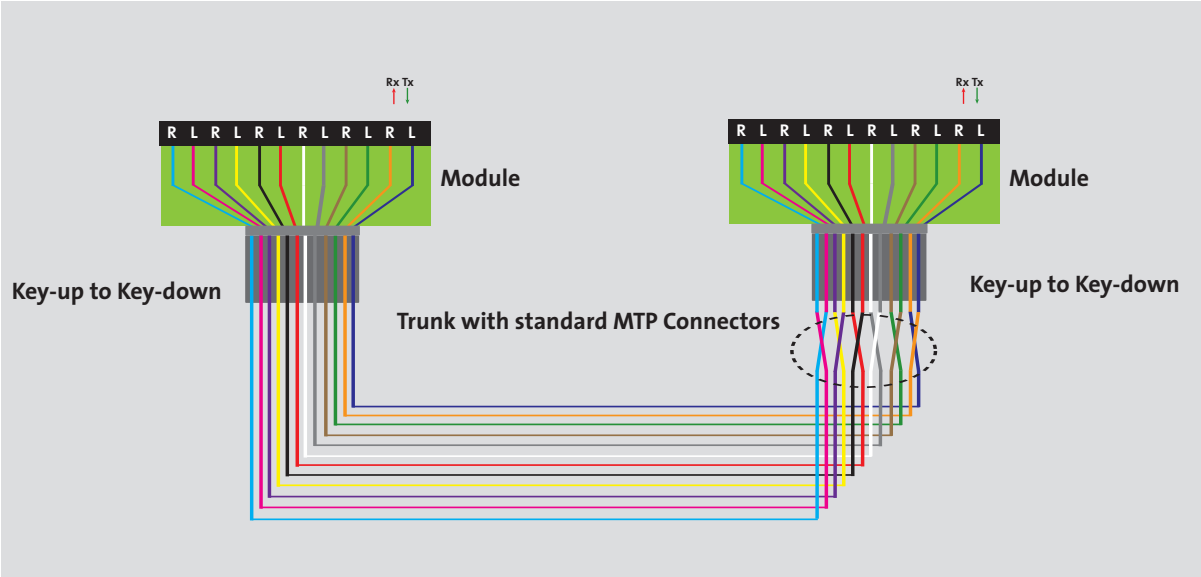

Figure 3. Method C | Drawing ZA-3028

Method C (Figure 3) uses a pair-wise fiber flip in the trunk cable to correct for polarity. This enables the use of the same module type on both ends of the channel and standard patch cords. Because polarity is managed in the trunk, extending the links requires planning of the number of trunks in order to maintain polarity. The Standard does not include text regarding the ability to migrate to parallel optics for Method C, but parallel optic capability can easily be achieved with a special patch cord to reverse the pair-wise fiber flips in the trunk. Method C is Corning Cable Systems' Plug & Play™ Systems classic solution, which has been the standard polarity method offering. However, Corning Cable Systems now offers the Plug & Play™ Universal System for substantially easier polarity management. Corning Cable Systems will continue to offer the classic polarity solution but encourages end-users to use the Plug & Play Universal System for universal polarity management.

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What is universal polarity management?

Universal polarity (Figure 4) is an exclusive Corning Cable Systems enhanced polarity management method. The method uses the same module and patch cord types at both ends with no inversion or reconfiguration needed to maintain polarity. The system is mated key-up to key-down. The method supports simple concatenation of multiple trunks without effecting polarity. The method easily accommodates all simplex/duplex connector types as well as single-mode fiber APC MTP® Connectors. Similar to Methods A, B and C, Plug & Play™ Universal Systems' polarity management easily facilitates migration to parallel optics. The wired modular system components enable fast and simple networking moves, adds and changes without polarity concerns associated with special polarity-compensating components used in Methods A, B and C.

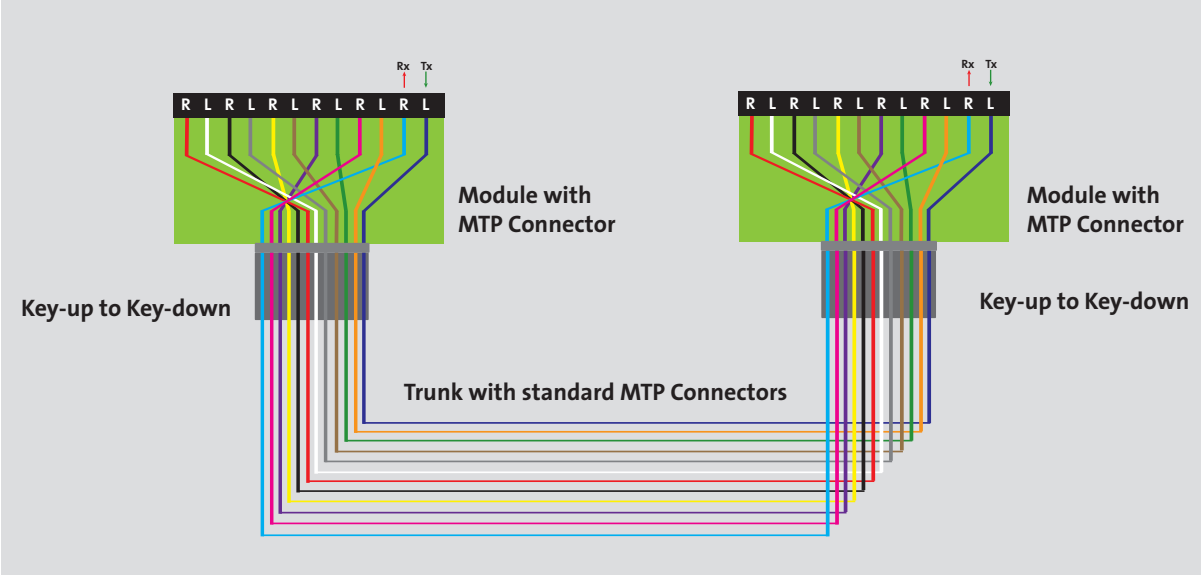

Figure 4. Universal Polarity Management | Drawing ZA-3029

Are the different polarity methods interoperable?

Each of the methods works when the rules of that method are followed. The user is cautioned, however, not to mix and mate component parts from the various methods. This will not necessarily work. The Addendum No. 7 Standard states that one method should be chosen and used throughout the network. Corning Cable Systems specifically includes identification markings on the cable trunk and modules to identify the universal polarity method.

Please contact Doug Coleman, Manager of Technology and Standards, at 828-901-5580 if you have any questions or require additional information.

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