COMMSCOPE®

Application note

InstaPATCH® 360 2x3 Conversion Module

100% use of your 12-fiber backbone in a 40G network

March 2015

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InstaPATCH® 360 2x3 Conversion Module

Overview

InstaPATCH 360 products provide plug-and-play connectivity for multiple two-fiber and parallel optics applications at data rates from 10Mb/s to 100Gb/s and beyond. CommScope's innovations provide elegant and efficient migration paths within these platforms. This paper explains how the InstaPATCH 360 2x3 Conversion Module provides connectivity for parallel applications that use eight fibers (four lanes in each direction) to achieve 100 % utilization of 12-fiber array cabling.

4x4 parallel applications

Applications such as 40Gb/s Ethernet (40GBASE-SR4) and InfiniBand 4x (IB-4x-SDR, IB-4x-DDR, IB-4x-QDR) employ four quarter-rate lanes in each direction that travel on separate fibers, for a total of eight fibers per channel. CommScope refers to these applications as 4x4 parallel applications.

Two transceiver form-factors are poised to deliver these 4x4 parallel applications, the QSFP (Quad Small Form-factor Pluggable) and the CFP (100G1 Form-factor Pluggable). The QSFP can contain a single 4x4 parallel transceiver, while the larger CFP can contain up to three 4x4 parallel transceivers. Both of these form-factors accept one unpinned MPO connector for each transceiver.

Figure 1 shows the optical transmit and receive lanes at the MPO interface inside the QSFP transceiver. When viewed with the keyway on top, the four transmit lanes are on the left and four receive lanes are on the right. The center four fibers are not used. The lane assignments of the CFP are identical to those of the QSFP. Consequently, cabling connectivity is the same whether connecting QSFP to QSFP, CFP to CFP, or QSFP to CFP.

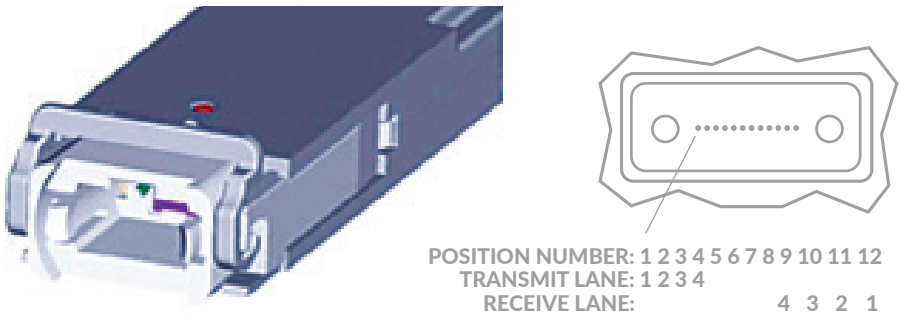

Figure 1: QSFP Transceiver and Lanes

A conventional 12-fiber MPO channel mated to a QSFP or CFP transceiver would result in the center four fibers not being used, or 1/3 of the fibers in the cable being dark.

The InstaPATCH 360 2x3 Conversion Module allows full utilization of the four center fibers by combining channels from three 4x4 parallel transceivers onto two 12-fiber trunks, maximizing trunk cable utilization.

[1] C = 100 in Roman numerals; Centum

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2x3 Conversion Module design

Figure 2 shows the InstaPATCH 360 2x3 Conversion Module front equipment side and rear trunk side ports.

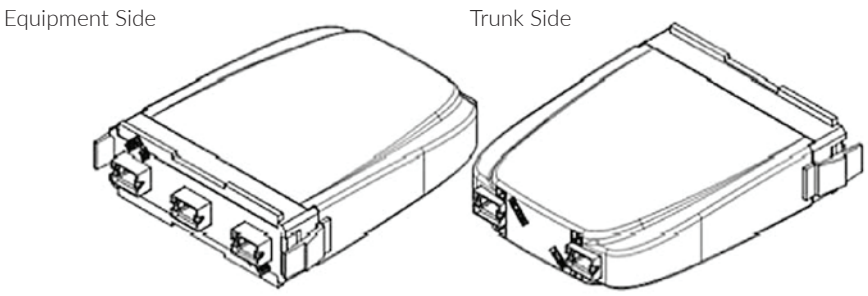

Figure 2: 2x3 Conversion Module

There are three pinned MPO ports on the front equipment side that accept unpinned MPO plugs from cords, and two pinned MPO ports on the rear trunk side that accept unpinned trunk plugs. The fan-out inside the module combines all the active 4x4 parallel application lanes from the three equipment side MPO ports onto all the fibers of the two trunk side MPO ports.

The module is compatible with the array polarity of TIA 568-C.0 and CENELEC EN-50174-1 structured cabling standards. As shown in Figure 3, the ALPHA and BETA orientations used by InstaPATCH products are marked on the front and rear surfaces of the module to assist in installation.

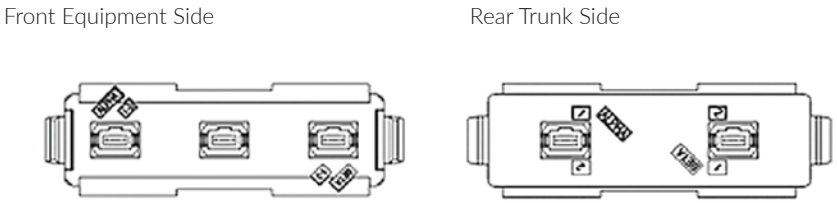

Figure 3: Front and Rear Panels

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The chart and illustration in Figure 4 detail the complete signal routing within the module in the Alpha orientation. The chart on the left provides the connectivity for each individual lane, while the physical layout on the right groups the lanes into collections of four.

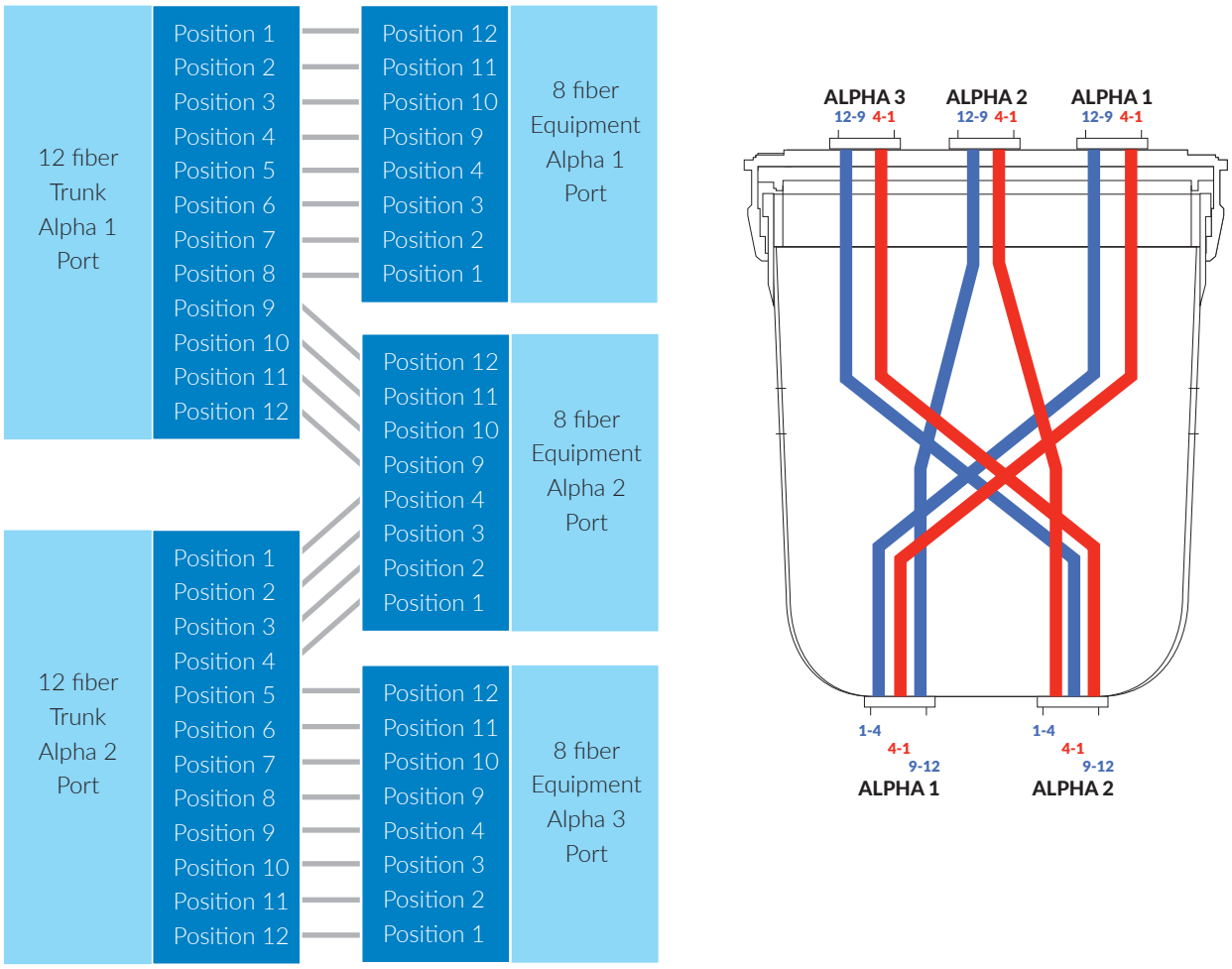

Figure 4: 2x3 Conversion Module connectivity map and physical layout

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Network Example

Figure 5 illustrates a top view perspective of the signal connectivity when using 2x3 Conversion Modules in a network.

The transceiver interfaces show the positions of transmit lanes (T1-4) and receive lanes (R9-12). The transceivers are depicted with the keyways up.

The module on the left is in the Alpha orientation (keyways up). The module on the right is in the Beta orientation (keyways down).

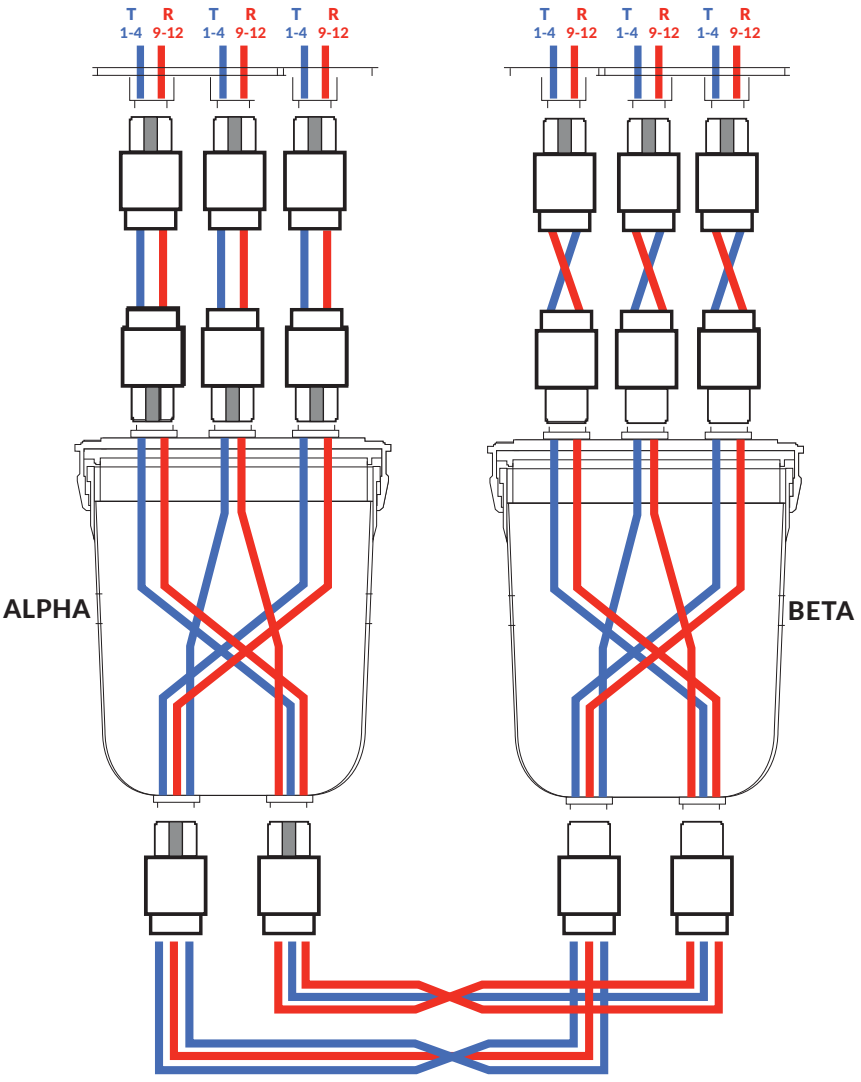

Figure 5: Network example

The twist shown in the equipment cords on the right and in the trunk cables will naturally occur due to the keyway orientation of modules. CommScope InstaPATCH cables and cords use robust loose-tube round cordage (not flat ribbon cordage) that easily accommodates twists.

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From this illustration it is easy to see the gain in efficiency by using the InstaPATCH 360 2x3 Conversion Module. Rather than requiring three 12-fiber trunk cables in this network with 67% utilization, only two 12-fiber trunk cables are required achieving 100% utilization.

If the deployment requires an even number of 4x4 parallel application channels, InstaPATCH 360 products provide options. Trunk cables in the backbone can be used without the 2x3 Conversion Modules by connection through InstaPATCH 360 MPO Panels with array cords. Another option is to use only equipment ports 1 and 3 of the 2x3 Conversion Modules leaving equipment port 2 for future expansion. Regardless of the choice of 2x3 Conversion Modules and/or MPO Panels, CommScope products guarantee correct polarity throughout the network.

Ordering Information

InstaPATCH® 360 2X3 Conversion Module

Material ID	Product Number	Description
760136663	360DM-2X3P-LS	InstaPATCH® 360 2x3 LazrSPEED® Standard Parallel Module, 3 MPO male ports

Everyone communicates. It's the essence of the human experience. *How* we communicate is evolving. Technology is reshaping the way we live, learn and thrive. The epicenter of this transformation is the network—our passion. Our experts are rethinking the purpose, role and usage of networks to help our customers increase bandwidth, expand capacity, enhance efficiency, speed deployment and simplify migration. From remote cell sites to massive sports arenas, from busy airports to state-of-the-art data centers—we provide the essential expertise and vital infrastructure your business needs to succeed. The world's most advanced networks rely on CommScope connectivity.

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Visit our website or contact your local CommScope representative for more information.

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