Polarity F

Application Note

To ensure that a network functions properly, the transmit port on one end of a link must be connected to the receive port on the other. This can be accomplished through a variety of fiber polarity methods, such as the examples provided in the TIA standards—Method A, Method B, and Method C.

AFL Hyperscale also offers a unique polarity method, known as Polarity Method F or simply 'Polarity F'. Whereas most methods maintain polarity by configuring specific patch cords and/or trunks to accommodate pair flips, Polarity F uses one type of patch cord, cassette, and trunk cable throughout the entire system to maintain polarity.

The wiring within the cassette is managed to prevent the need for polarity-specific components, thus allowing for reduced complication in ordering, stocking, and installation. TIA standards call out two types of patch cords—an A-to-A style and an A-to-B style. Polarity F utilizes A-to-B type patch cords as depicted below in Figure 1. In this diagram, the red arrow shows light traveling from point A to point B.

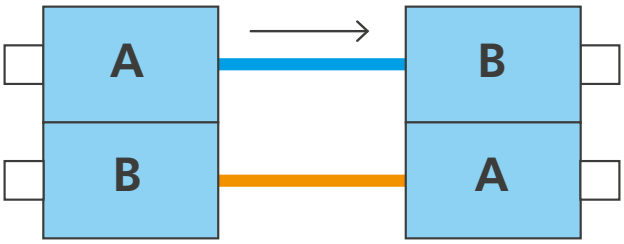

Figure 1: A-to-B Type Patch Cords

Polarity F requires that each cassette be internally configured in a way that pairs the first and last fibers of the array together for Tx/Rx pairs. The sequence is as follows: 1, 12, 2, 11, 3, 10, 4, 9, 5, 8, 6, 7. In a practical sense, this can be imaged by taking a 12-fiber array, folding it in half, and pairing the fibers together. Figure 2 shows how the wiring is configured inside of cassettes to establish Method F polarity.

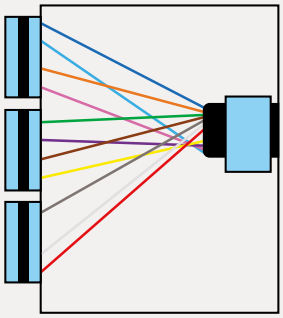

Figure 2: Method F Polarity Cassette Wiring

All MPO-to-MPO connections in a Method F network are mated Key-Up to Key-Down, as shown in Figure 3. As a result of this mating requirement, all trunk cable assemblies are configured Key-Up to Key-Up.

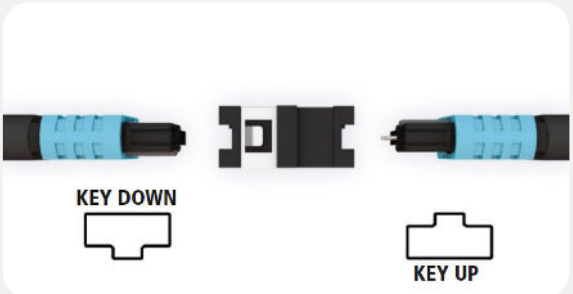

Figure 3: Key-Up to Key-Down Mating

Polarity F

Application Note

The configuration shown in Figure 4 represents two SFP transceivers connected by a single patch cord assembly. Because the patch cord is made with interconnect style cable, this method of connection is only advised for short distances where the cable will not be placed in a tray or rack with larger, heavier cables.

Figure 4: Basic SFP to SFP Connection

For longer distance connections, such as those made between cages or distribution areas, pre-terminated trunk cables are used. Figure 5 represents a network that utilizes a trunk cable assembly to span the majority of the distance between the two transceivers.

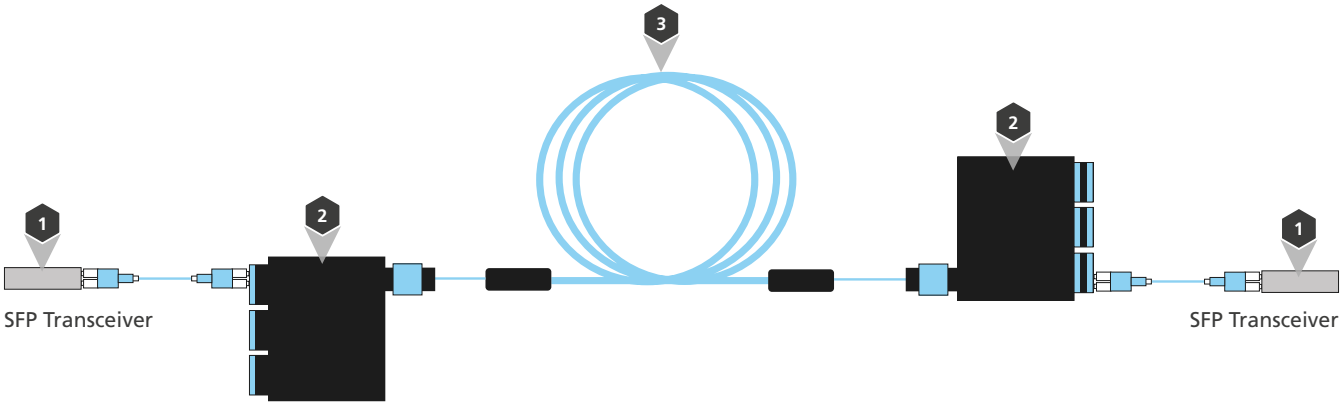

Figure 5: SFP to SFP Trunk Cable Connection

Item	Product
1	ASCEND Patch Cord
2	ASCEND Fanout Cassette
3	ASCEND Trunk Cable Assembly

The table corresponding to Figure 5 summarizes the numbered links in the connection. A patch cord runs from the left-most SFP transceiver to a Fanout Cassette, which features Polarity F. This fanout cassette is designed to fit inside of rack-mounted housing. A trunk cable assembly is then connected Key-Up to the MPO port of the cassette and is routed through to the next housing, where it connects Key-Up to another fanout cassette. A second patch cord is then used to complete the link from the cassette to the right-most SFP transceiver.

Polarity F

Application Note

Figure 6 uses red arrows to assist in visualizing the path that light takes from the transceiver to the receiver in systems such as the one discussed above. The white squares on the trunk MPO connectors indicate that the connectors are plugged in Key-Up.

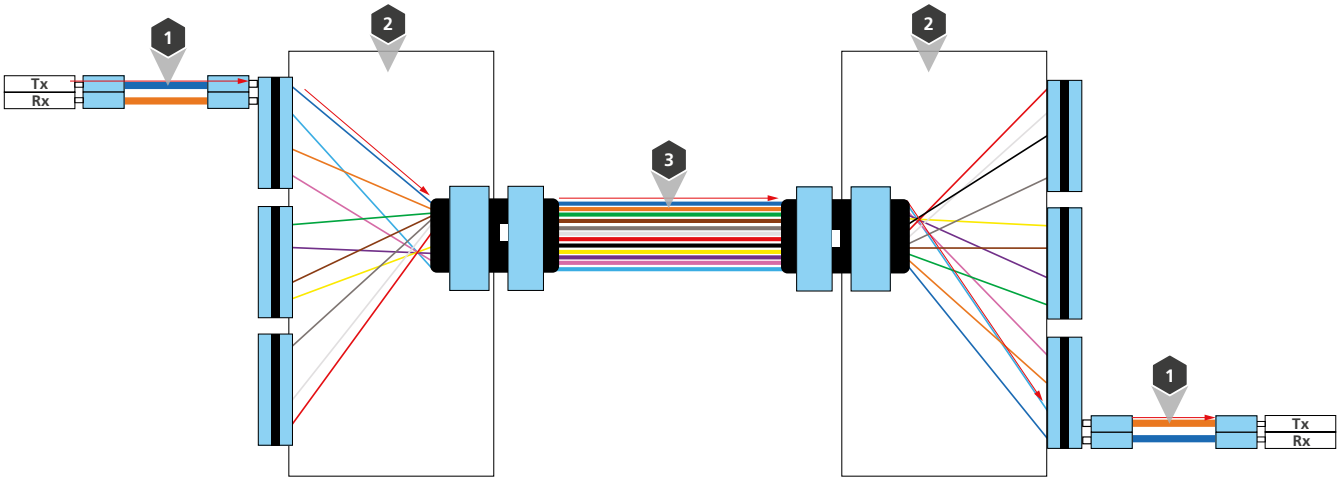

Figure 6: SFP to SFP Trunk Cable Connection Polarity

Polarity F QSFP (Quad Small Form-Factor Pluggable) transceivers follow similar logic to SFP transceivers with one major difference – rather than having a duplex transmission link between two transceivers, a parallel transmission link is introduced that allows for increased capacity of an SFP transceiver. Instead of connecting patch cords terminated with duplex LC connectors to the transceiver, MPO patch cords are used. Figure 7 depicts a QSFP-to-QSFP network that is connected using MPO patch cords, MPO patch modules, and an MPO trunk cable assembly. The table corresponding to Figure 7 summarizes the links in the QSFP-to-QSFP network.

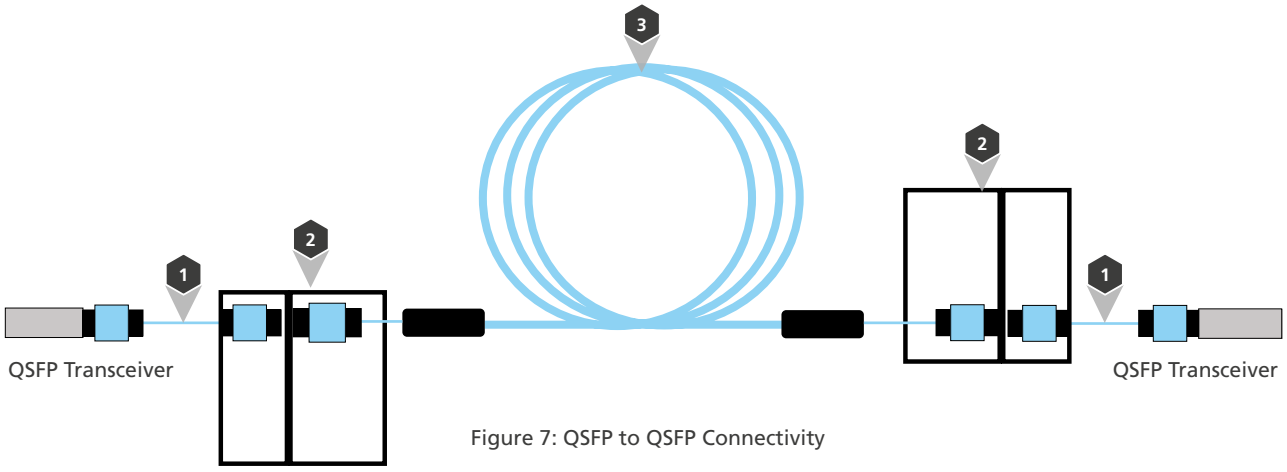

Figure 7: QSFP to QSFP Connectivity

Item	Product
1	ASCEND Patch Cord
2	ASCEND Fanout Cassette
3	ASCEND Trunk Cable Assembly