

Arista 7500E Series Optical Connectivity Guide for MXP Triple-Speed Port

AEN 150, Revision: 1

This Application Engineering Note discusses the cabling of the Arista Networks 7500E series switch. In particular, this document focuses on cabling of the triple-speed 10/40/100G line card with integrated MXP (multi-speed-port) optics. This 24f-based port can be software configured on a per port basis delivering constant price-per-bandwidth at every port speed. The Arista 7500E Series delivers line rate non-blocking switching that enables faster and simpler network designs. The 7500E Series offers two choices for the datacenter a 4-slot 7504 and the 8-slot 7508.

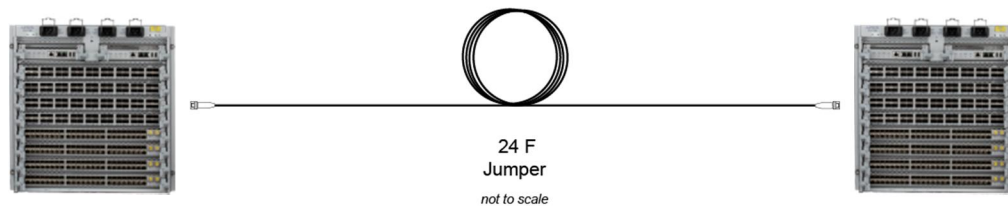
Figure 1: (left) 12 Port MXP Triple-speed line card for Arista 7500E Series switch
(right) Channel mapping for 24f MXP triple-speed port



100G Inter-switch Links

Inter-switch links (ISLs) would typically be the application where 100G Ethernet links would be deployed. Cabling can be accomplished as a Direct Connect or Inter-Connect cabling scheme. In a Direct Connect, a single 24f MTP jumper cable assembly directly connects the switch ports, as shown in Figure 2. This type of cabling would be deployed when the two switch ports are being connected are within the same row of cabinets.

Figure 2: 100G Connectivity with Direct Connect Cabling



Bill of Materials for Figure 2

Part Number	Description
JA6A624QPH-NAxxxM	24f Jumper; 24f (non-pinned) to 24f (non-pinned) MTP; Plenum cable with Clearcurve OM4 fiber; Type-A polarity; overall length xxx meters

In an Inter-Connect Structured cabling scheme larger fiber count MTP trunks (ranging from 24-144f within a single cabling sheath) are used to create more permanent cabling paths. The MTPs are installed into the backside of MTP patch panels that are mounted in a 19" rack-mounted enclosure. Then a MTP 24/12 "Y" jumper would create the connection from the patch panel to the switch port.

Structured cabling allows for network reconfiguration without needing to pull additional jumpers across the data center. Rather one would just add or reconfigure jumpers at the patch panel. In addition, the MTP Trunk cable construction is more robust than the jumper cable, thus can be placed in cable tray without concern of being crushed by the weight from other cabling, which can affect the optical performance of the link.

Figure 3: 100G Connectivity with Inter-Connect Structured Cabling



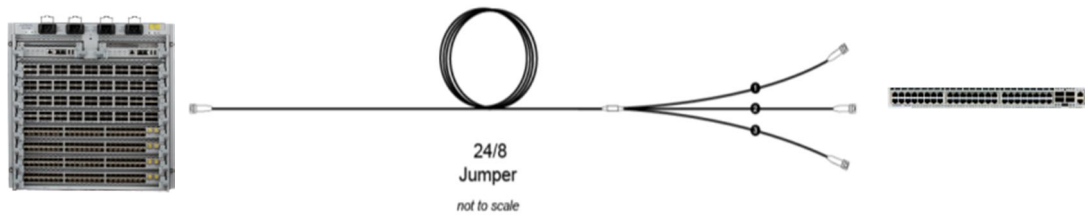
Bill of Materials for Figure 3

Part Number	Description
HA69324QPH-LZxxxM	24f 24/12 Jumper; 24f (non-pinned) to 12f (pinned) MTP; Plenum cable with Clearcurve OM4 fiber; Type Universal polarity; 12f leg length of 36"(L); overall length xxx meters
EDGE-CP48-E3	48-fiber (4-port) MTP Adapter Panel; installed in 19" rack mounted EDGE housing (example, EDGE-04U)
G757548QPNDUxxxF	48-fiber OM4 MTP Trunk; xxx feet (Note: Trunks available in fiber count from 12-144f)

Spine-to-Leaf Connectivity with 40G Fabric

The 24f MXP ports on the Arista 7500E series switch can also support a 40G fabric. Typically, this would be the deployment method when the Leaf switch has 40G connection ports to interface with the Spine layer. Figure 4 shows a Direct Connect cabling where the 24f MXP port is directly connected via a single cable assembly to three 40G ports.

Figure 4: 40G Connectivity with Direct Connect Cabling

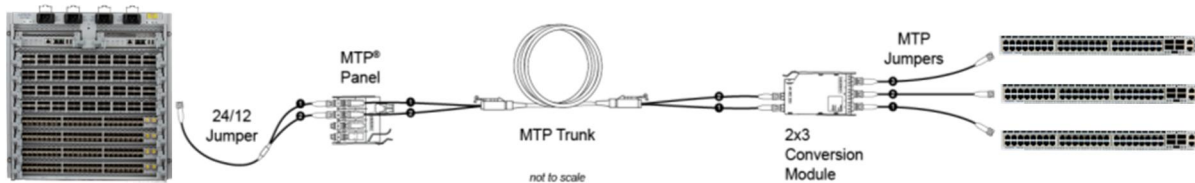


Bill of Materials for Figure 4

Part Number	Description
HA67524QPH-KAxxxM	24f 24/8 Jumper; 24f (non-pinned) to 8f (non-pinned) -MTP; Plenum cable with Clearcurve OM4 fiber; Type-A polarity; 8f leg length of 24" (K); overall length xxx meters

The more typical deployment would be an Inter-Connect cabling infrastructure, as shown in Figure 5. Each 24f MXP port in the 7500E spine switch is cabled to the server rows where the Leaf switch would reside. By deploying the 2x3 conversion module, each MTP jumper could be connected to 40G ports in the same or various Leaf switches within that server area. This allows for diversity of port connectivity to a given Leaf switch uplink.

Figure 5: 40G Connectivity with Inter-Connect Structured Cabling

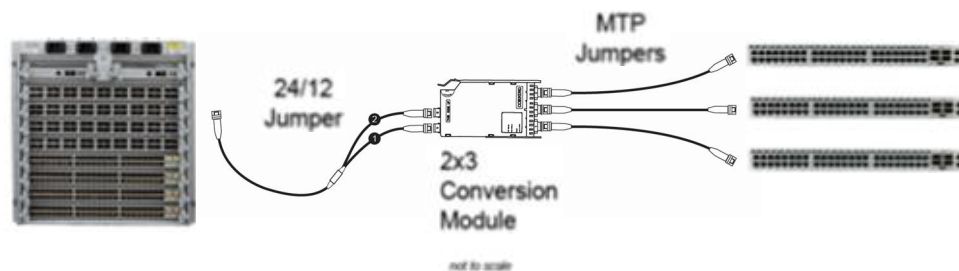


Bill of Materials for Figure 5

Part Number	Description
HA69324QPH-L8xxxM	24f 24/12 Jumper; 24f (non-pinned) to 12f (pinned) MTP; Plenum cable with Clearcurve OM4 fiber; Type-8 polarity; 12f leg length of 36”(L); overall length xxx meters
EDGE-CP48-E3	48-fiber (4-port) MTP Adapter Panel; installed in 19” rack mounted EDGE housing (example, EDGE-04U)
G757548QPNDUxxxF	48-fiber OM4 MTP Trunk; xxx feet (Note: Trunks available in fiber count from 12-144f)
ECM-UM24-93-93Q	EDGE 2x3 Conversion Module
J757512QE8-NBxxxF	12f MTP OM4 Jumper; MTP(non-pinned) to MTP (non-pinned); Type-B polarity; xxx feet

Another way to accomplish an Inter-Connect deployment would be by using a 2 x 3 conversion module to break out each 24f MXP port to three 40G ports. Figure 6 illustrates how a 2x3 conversion module would be deployed with the connectivity to the Leaf switches using MTP (non-pinned) to MTP (non-pinned) Type-B polarity jumpers. This configuration allows the MXP port to be broken out in three 40G 8-fiber ports near the 7500E switch, with MTP jumpers extending out to the Leaf switches. This application uses MTP jumpers as structured cabling, which is not ideal for larger deployments, but could be used in a smaller data center footprint.

Figure 6: 40G Connectivity with Inter-Connect Port Replication



Bill of Materials for Figure 6

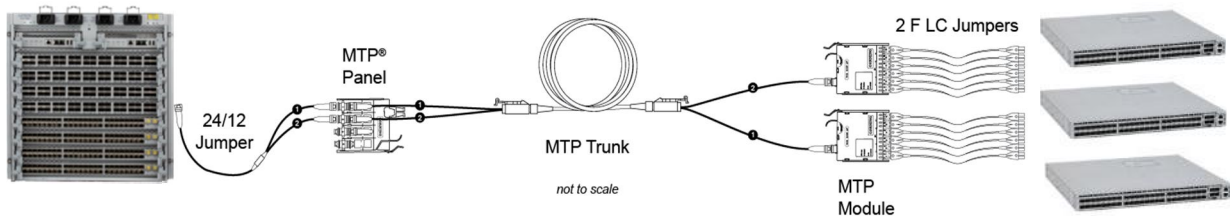
Part Number	Description
HA67524QPH-L6xxxM	24f 24/12 Jumper; 24f (non-pinned) to 12f (non-pinned) MTP; Plenum cable with Clearcurve OM4 fiber; Type-6 polarity; 12f leg length of 36”(L); overall length xxx meters
ECM-UM24-93-93Q	EDGE 2x3 Conversion Module; OM4
J757512QE8-NBxxxF	12f MTP OM4 Jumper; MTP(non-pinned) to MTP (non-pinned); Type-B polarity; xxx feet

Spine-to-Leaf Connectivity with 10G Fabric

The 24f MTP switch ports on the Arista 7500E series switch can also support a 10G fabric. Typically, this would be the deployment method when the Leaf switch has 10G connection ports to interface with the Spine layer, for example when using a 7050S-52 Leaf Switch.

However, this connectivity can also be deployed when a 10G fabric is desired but 40G ports are present in the Leaf switch. A 10G fabric allows for a larger scale out of the Spine and Leaf network. Figure 7 shows a cabling scheme that uses MTP-LC modules to breakout each 10G circuit. Then individual LC jumpers can be used to make the connection to the 10G ports in the Leaf switches. These 10G ports could be in various Leaf switches within the server row since the connection is being made with individual LC jumpers. This allows the ability to create the desired meshed environment required in a Spine and Leaf network.

Figure 7: 10G Connectivity with Inter-Connect Structured Cabling

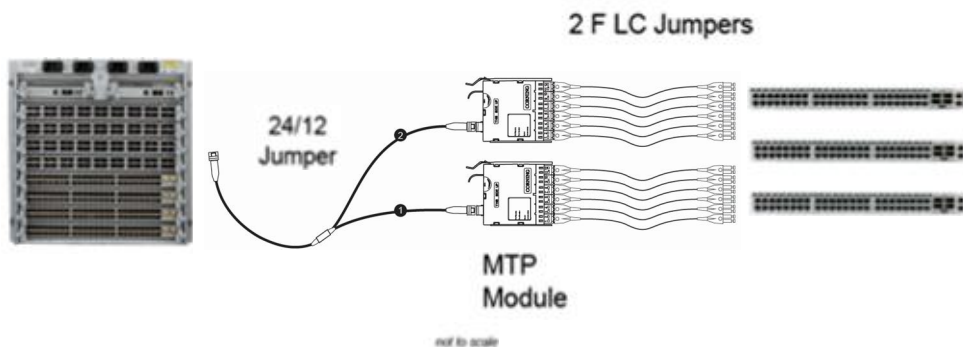


Bill of Materials for Figure 7

Part Number	Description
HA69324QPH-L9xxxM	24f 24/12 Jumper; 24f (non-pinned) to 12f (pinned) MTP; Plenum cable with Clearcurve OM4 fiber; Type-9 polarity; 12f leg length of 36”(L); overall length xxx meters
EDGE-CP48-E3	48-fiber (4-port) MTP Adapter Panel; installed in 19” rack mounted EDGE housing (example, EDGE-04U)
G757548QPNDUxxxF	48-fiber OM4 MTP Trunk; xxx feet (Note: Trunks available in fiber count from 24-144f)
ECM-UM12-05-93Q	EDGE 12f MTP/LC Connector Module; OM4
797902QD120xxxM	2f LC Uniboot Jumper; OM4; xxx meters

Another way to accomplish an Inter-Connect deployment would be by using MTP-LC modules to break out each 24f MXP port to twelve 10G ports. Figure 8 illustrates how MTP-LC modules would be deployed with connectivity to the Leaf switches using LC jumpers. This configuration provides the added advantage to be able to use various lengths of LC jumpers to connect to the Leaf switches which may not be located next to each other (directly above or below, continuous rack, etc.), but still located within the same area as the Spines switches. Again, this would be suggested for smaller network fabrics, where structured cabling using MTP trunks may not be required due to the short distance between devices.

Figure 8: 10G Connectivity with Inter-Connect Port Replication

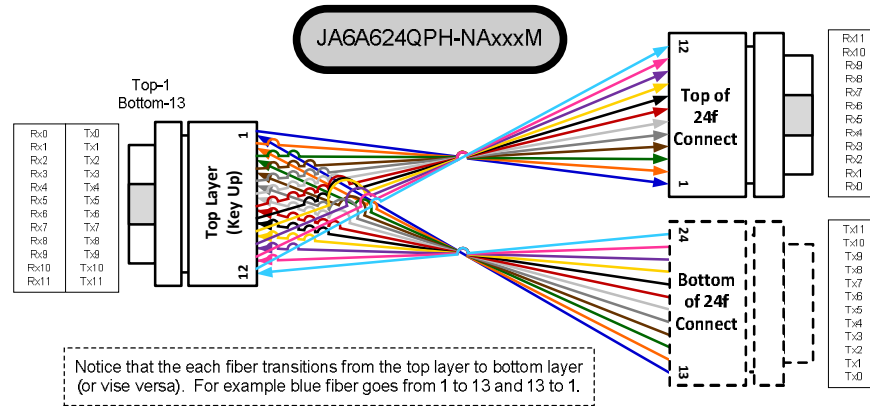


Bill of Materials for Figure 8

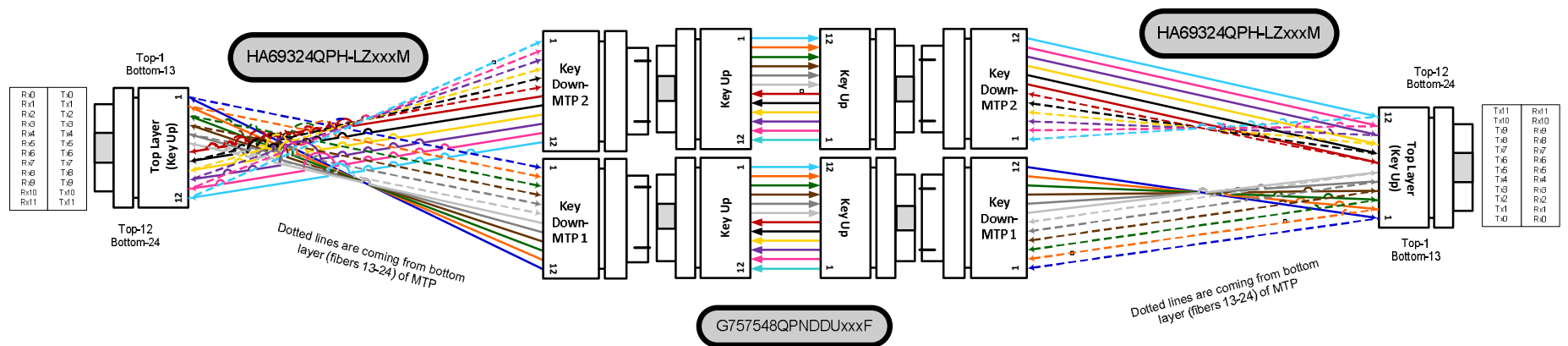
Part Number	Description
HA67524QPH-L7xxxM	24f 24/12 Jumper; 24f (non-pinned) to 12f (non-pinned) MTP; Plenum cable with Clearcurve OM3/4 fiber; Type-7 polarity; 12f leg length of 36”(L); overall length xxx meters
ECM-UM12-05-93Q	EDGE 12f MTP/LC Connector Module; OM4
797902QD120xxxM	2f LC Uniboot Jumper; OM4; xxx meters

Appendix A:

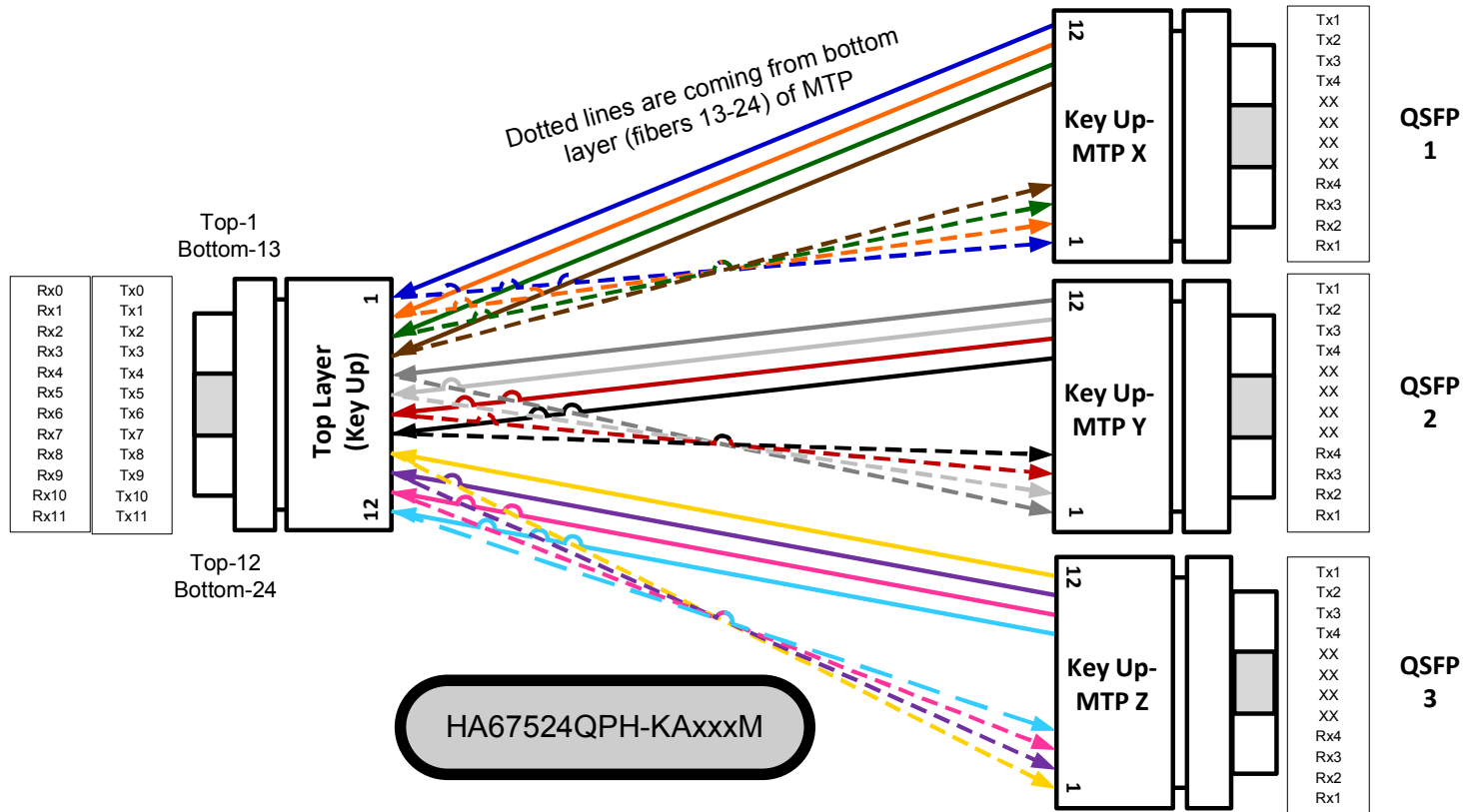
Polarity of Figure 2



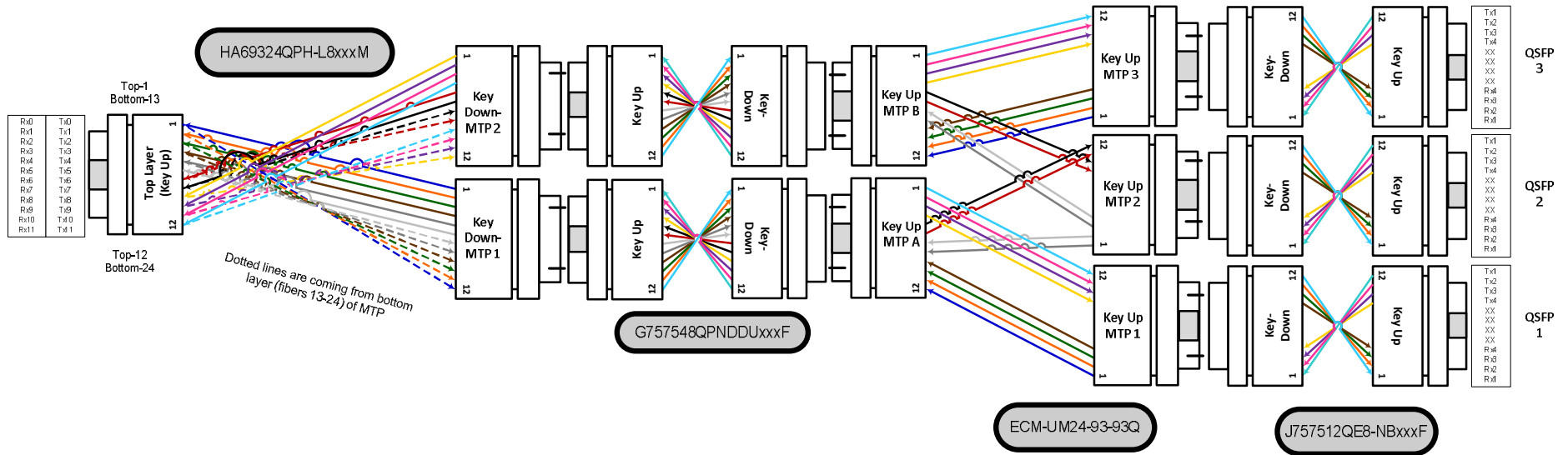
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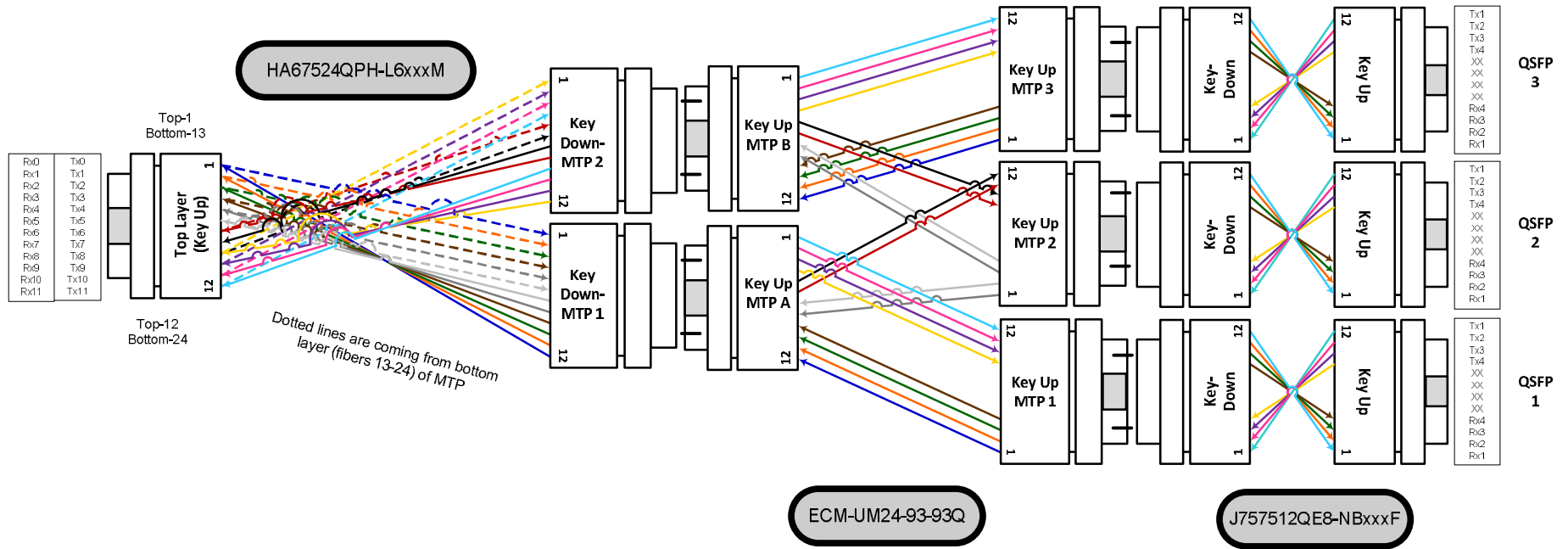
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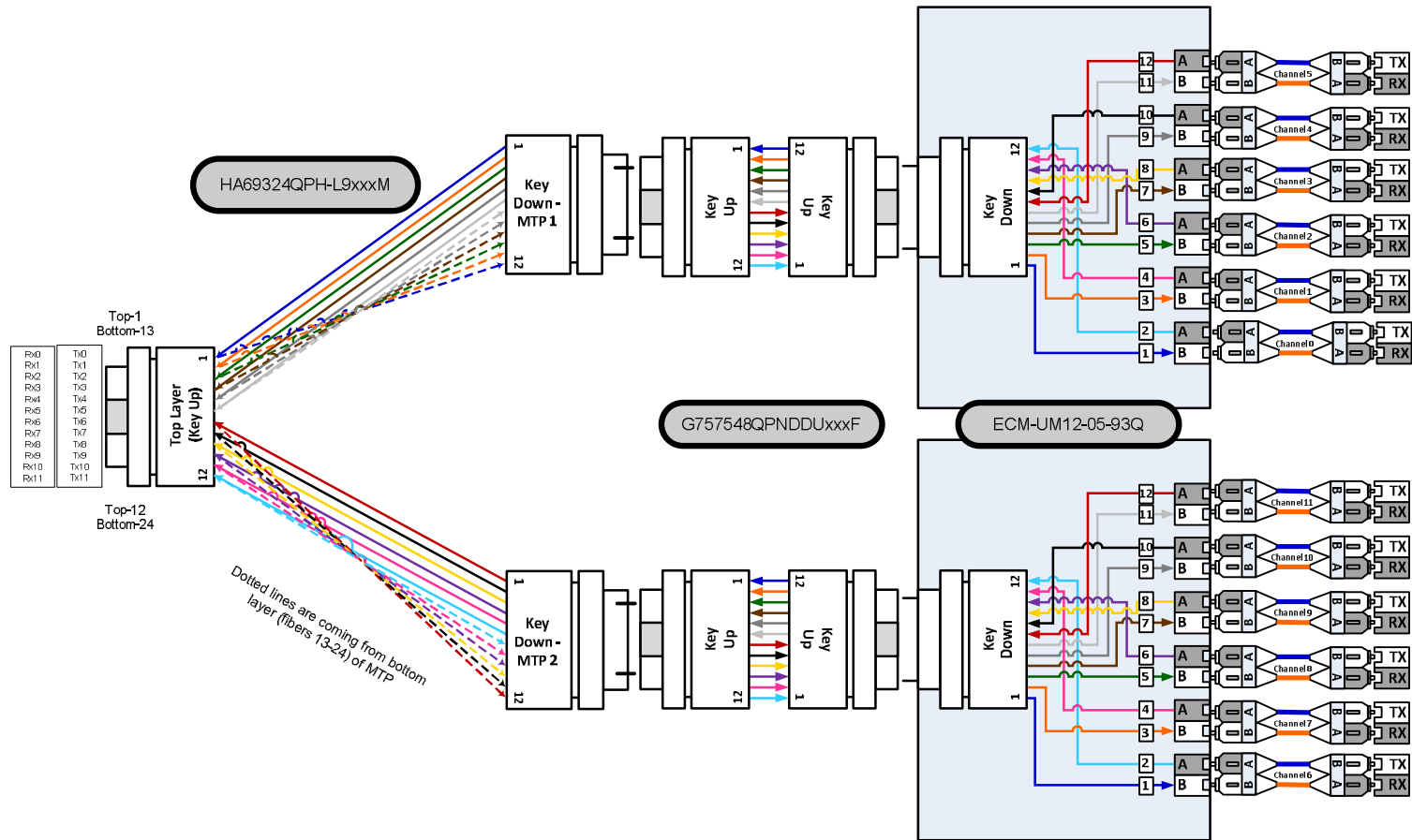
Polarity of Figure 5



Polarity of Figure 6



Polarity of Figure 7



Polarity of Figure 8

