

SYSTIMAX® InstaPATCH® 360 and ULL Configuration Guideline



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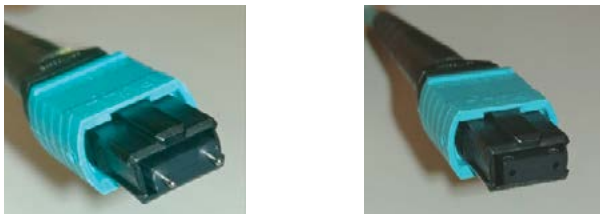
Introduction

SYSTIMAX InstaPATCH 360 and Ultra-Low Loss (ULL) factory-terminated cabling systems provide high-performance, rapid installation and agile configuration utilizing MPO array fiber connectivity. Both systems utilize Method B trunk polarity, enabling flexible implementation of array fiber connectivity. Network designers have complete design freedom for many common topology requirements with an extensive array of fiber types, MPO fiber counts and module configurations.

This application guide provides information explaining the common items and differences between SYSTIMAX InstaPATCH 360 and ULL. Detailed instructions outline the design and deployment of SYSTIMAX preterminated fiber infrastructure systems.

MPO connectors, pins and keys

The MPO connector was developed by NTT-AT in the mid-1980s and is internationally standardized in IEC 61754-7 as well as ANSI/TIA-604-5 and ANSI/TIA-604-18. All SYSTIMAX MPO connectors are factory terminated in pinned and unpinned versions, as shown in Figure 1.



MPO pinned connector

MPO unpinned connector

Figure 1. Pinned and unpinned MPO connectors

NOTE: The terms “MX” and “MP” are used in Commscope part numbers to differentiate the two MPOs – “MX” is pinned and “MP” is unpinned.

With the exception of the pins, the pinned and unpinned MPO connectors are identical. A pair of MPO connectors are joined by aligning the precision guide pins on the pinned MPO connector with the pin holes in the unpinned MPO connector.

The single-mode MPO connector angle orientations are different between InstaPATCH 360 and ULL, hence the two systems are incompatible. See [InstaPATCH 360 Method B single-mode ferrule angle](#) and [ULL Enhanced Method B single-mode ferrule angle](#) for more details.

Depending on the application, MPO connectors are available in 8-fiber, 12-fiber or 24-fiber configurations (See Figure 2), and they are identified by different connector body and/or connector boot colors. For illustration purposes, only OM4 MPO connectors (Aqua) are shown below. Refer to the Commscope white paper [“Parallel Connectivity Color Identification” \(CO-115351-EN\)](#) for the complete MPO connector color code.



Figure 2. MPO connector fiber counts

SYSTIMAX trunks and modules are available in various fiber counts MPOs (see Table 1 below).

	Multimode	Single-mode
InstaPATCH 360 Trunks and Modules	Available in 8-fiber and 12-fiber MPOs	Available in 8-fiber and 12-fiber MPOs
ULL Trunks and Modules	Available in 8-fiber, 12-fiber and 24-fiber MPOs	Available in 8-fiber and 12-fiber MPOs

Table 1. Product availability

Figure 3 illustrates the ULL multimode trunks with three boot colors differentiating the fiber counts – grey (8-fiber), black (12-fiber) and red (24-fiber). For the complete MPO connector color code, refer to the CommScope white paper [“Parallel Connectivity Color Identification” \(CO-115351-EN\)](#).

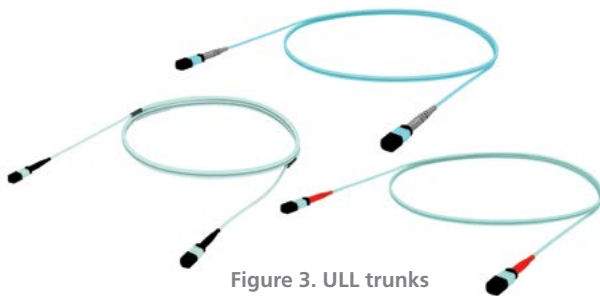


Figure 3. ULL trunks

MPO adapters

The MPO adapter provides coarse connector alignment and orientation, and includes retention features to secure the connectors. It is a passive device; it has no active components, no optical components and no precision alignment features (no pins, holes or sleeves). Two commonly used MPO adapters are the aligned-key and opposed-key adapters. Aligned-key adapters are easily recognized by their light gray color; opposed-key adapters are black in color, as shown in Figure 4.

Note that two unpinned MPO connectors will insert and latch in an MPO adapter; however, due to the lack of the precision guide pins required for proper alignment, the two connectors will be misaligned-resulting in significant channel loss. Conversely, two pinned MPO connectors will not insert and latch in an adapter without inflicting permanent damage to one or both of the connectors. Proper connection shall be an unpinned MPO connecting to a pinned MPO (See Figure 5).

MPO connectors and adapters have interlocking lugs and notches (commonly referred to as “keys”) that ensure proper orientation of the jointing connectors. MPO keys are critical components of the SYSTIMAX systems in assuring both proper polarity management and single-mode angle management.

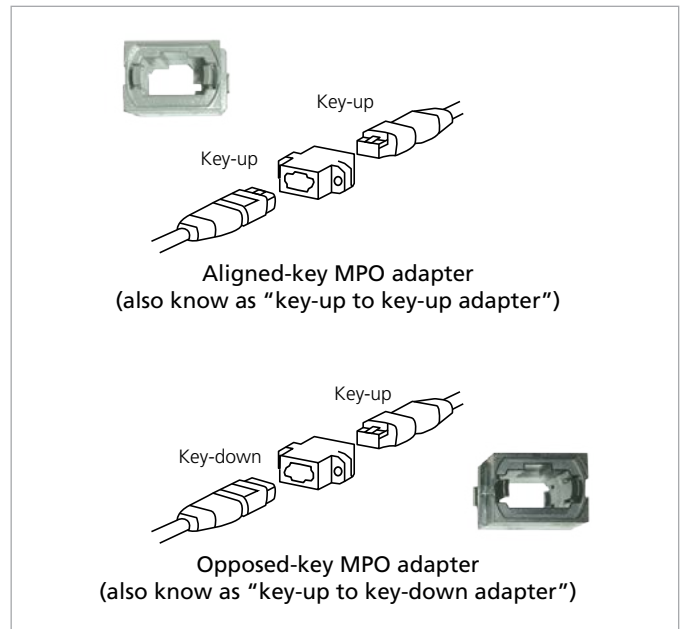


Figure 4. MPO aligned-key and opposed-key adapters

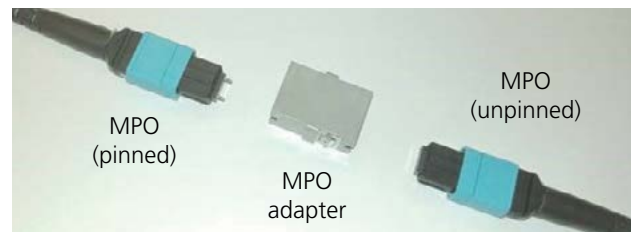


Figure 5. Proper MPO connection – pinned and unpinned

Key orientation on MPO connectors is established in the factory to implement specific polarity design criteria. All SYSTIMAX systems use “aligned key” MPO adapters in compliance with TIA FOCIS 5 adapter keying option k=2 (commonly referred to as “aligned keys” or “key-up to key-up.”). Therefore, an aligned-key adapter shall be present for each joint pair of MPO connectors in a InstaPATCH 360 or ULL link.

Product Descriptions

Distribution Modules (DMs)

SYSTIMAX DMs are self-contained cable assemblies, within a plastic housing, that transition MPO connectors on the back into duplex LC connectors on the front.

InstaPATCH 360 DMs contain pinned MPO connectors and are intended to be used with InstaPATCH 360 trunk cables.

ULL DMs contain unpinned MPO connectors and are intended to be used with ULL trunk cables.

DM Type	Front Connector	Rear Connector
InstaPATCH 360 DMs	LC or SC	Pinned MPO
ULL DMs	LC	Unpinned MPO

InstaPATCH 360 DMs use sequential fibers from the MPO to form duplex LC pairs. This fiber routing requires the modules to be marked with ALPHA and BETA port numbers. The same type of module is used on each end of a link, but one of the modules is in ALPHA position (right side up) and the module on the other end of the link is in BETA position (upside-down). Port 1 will appear at the bottom left position of the module on both ends of the link (see Figure 19).

The internal fiber routing of ULL DMs eliminate the need for ALPHA/BETA module marking. ULL systems use the same modules on both ends of the link in the same orientation, right side up (no need to flip upside-down).

Visual identification of DMs

InstaPATCH 360 DMs have a rounded housing with a small color icon on the back, which denotes fiber type. The front LC bezel color also denotes the fiber type. ALPHA/BETA labeling and may have either 1 or 2 MPO adapters on the back; see Figure 6.



Figure 6. InstaPATCH 360 DM (OM4 – Aqua)

ULL DMs have a squared-off housing with a large, colored rear bulkhead that denotes fiber type and may have 1, 2 or 3 MPO adapters. Similarly, the front LC bezel color also denotes the fiber type. ULL DMs may also be identified by gray-colored latch assists on the front; see Figure 7.



Figure 7. ULL DM (OM5 – Lime)

The DMs follow the same color code as the MPO connectors mentioned previously. Refer to the [CommScope parallel connectivity color identification guide \(CO-115351-EN\)](#) for the complete color code.

ULL DMs variations

In addition to multiple fiber types, ULL DMs are also available with one 24-fiber (DM24, for multimode only), two 12-fiber (DM12), or three 8-fiber (DM08) MPOs on the back. The 24 LCs on the front are all arranged in 12 duplex pairs. The MPO to LC port pairings differ based on module type.

ULL DM12's contain two MPO's numbered 1 and 2; and the duplex LC ports are numbered 1-6 starting on the lower left corner; and duplex LC ports are numbered 7-12 starting on the upper left corner. Fibers in MPO port 1 correspond to duplex LC ports 1-6 (bottom row), whereas fibers in MPO port 2 correspond to duplex LC ports 7-12 (top row); see Figure 8.



DM12-24LC-SM-ULL

Figure 8. ULL 12-fiber MPO module

ULL DMs are also available with a single 24-fiber MPO on the back (DM24). The duplex LC ports are numbered 1-12 starting on the lower left corner (same as 12-fiber MPO version); see Figure 9.



Figure 9. ULL 24-fiber MPO module

ULL DMs are also available with three 8-fiber MPOs on the back (DM08). On this version, the duplex LC ports are arranged differently. They are arranged in three groups of four duplex LC pairs, identified by the color of the LC shutter doors. The duplex LC ports within each group are numbered 1-4, starting in the upper left corner and ending in the lower right. Each group of LC ports corresponds to one of the 8-fiber MPOs on the back. Starting on the left, the first group of LC ports correspond to MPO 1; the middle group to MPO 2; and the last to MPO 3; see Figure 10.



DM08-24LC-WB-ULL

Figure 10. ULL 8-fiber MPO module

MPO adapter panels (pass-through panels)

MPO adapter panels are panels that mount into shelves- similarly to modules and contain up to 8 aligned-key MPO adapters. These are used to connect trunk cables to equipment cords, fanout cables and trunk extensions. InstaPATCH 360 and ULL use the same MPO adapter panels; see Figure 11.



360DP-8MPO

Figure 11. MPO adapter panel

EHD Modules

Two EHD distribution modules fit into one EHD blade. Cassettes are available in LazrSPEED 550 OM4, LazrSPEED 550 WB OM5 and TeraSPEED single-mode fiber.

EHD TeraSPEED single-mode modules are available in 2X12F to 24LC and 3X8F to 24LC. EHD LazrSPEED 550 OM4 and 550 WB OM5 are available in 1X24F to 24LC, 2X12F to 24LC and 3X8F to 24LC.

EHD Splice modules are available in LazrSPEED 550 OM4 and TeraSPEED single-mode with stranded and ribbon fiber options.



Figure 12.
EHD08-DM-24LC-LS-B-ULL



Figure 13.
EHD12-DM-24LC-SM-B-ULL



Figure 14.
EHD12-DM-24LC-WB-B-ULL



Figure 15.
Splice module

Conversion Modules (CMs)

Conversion modules are modules that have pinned MPO connectors on the front and unpinned MPO connectors on the rear. The purpose of a conversion module is to convert from an 8-fiber system to a 12-fiber system. This allows for 100% fiber utilization when sending signals from 8-fiber transceivers, such as QSFP, over 12-fiber trunks. A CM allows for three 8-fiber transceivers to use two 12 fiber trunks without any dark fiber.

CM Type	Front	Rear
InstaPATCH 360	Pinned MPO	Pinned MPO
ULL	Pinned MPO	Unpinned MPO

InstaPATCH 360 CMs must be used in pairs in an ALPH/BETA configuration.

InstaPATCH 360 CMs come in both single-mode and OM4 multimode. They are both available in a 2x3 or double density 4x6 configurations. The InstaPATCH version can be visually identified by black-colored latch assists on the front.

Two EHD distribution modules fit into one EHD blade. Cassettes are available in LazzSPEED 550 OM4, LazzSPEED 550 WB OM5 and TeraSPEED single-mode fiber.

ULL CMs variations

ULL CMs use the same square-back housing as the InstaPATCH CMs. The ULL version can be visually identified by grey-colored latch assists on the front and they do not have ALPA/BETA port labelling. They have pinned MPO connectors on the front and unpinned MPO connectors on the rear.

ULL CMs are available in OM4 (Aqua), OM5 (Lime Green) and single-mode (Blue). ULL CMs are available with either two 12-fiber MPOs or a single 24-fiber MPO on the back.



Grey latches

CM12-2x3-LS-ULL



Grey latches

CM12-4x6-SM-ULL



Black latches

360CM12-2x3-LS



Black latches

360CM12-4x6-TS

CommScope fiber-optic cable

InstaPATCH 360 products are available with CommScope LazrSPEED® 300 (OM3), LazrSPEED® 550 (OM4), LazrSPEED® 550 wideband (OM5), and TeraSPEED® single-mode (OS1a and OS2) fiber.

ULL products are available with LazrSPEED 550 (OM4), LazrSPEED 550 wideband (OM5) and TeraSPEED single-mode (OS1a and OS2) fiber.

Refer to the [CommScope parallel connectivity color identification guide \(CO-115351-EN\)](#) for the fiber optical cable color code.

InstaPATCH 360 cable assemblies are available in 12-fiber round (IPD) cordage types up to a total fiber count of 144 fibers. ULL cable assemblies are available in 8-fiber, 12-fiber and 24-fiber round (IPD) cordage types up to a total of 288 fibers for multimode and 1728 fibers for single-mode.

MPO-MPO trunk cables

Trunk cables are high-density ruggedized fiber cables used to distribute large numbers of fiber from one area of installation to another. Trunk cables have between 1 and 12 subunits surrounded by a ruggedized over-jacket. Subunits can contain 8, 12 or 24 fibers. InstaPATCH 360 has fiber counts in multiples of 12, up to a total of 144 fibers, whereas ULL trunks are available in multiples of 8, 12 or 24 fibers, up to a total of 288 fibers for multimode and 1728 fibers for single-mode.

All SYSTIMAX trunk cables follow Type B polarity. InstaPATCH 360 trunks are low-loss, whereas ULL trunks are ultra-low-loss performance.

InstaPATCH 360 trunk cables (Unpinned-Unpinned)

MPO-MPO trunk cables	End A	End B
Connects to	InstaPATCH 360 modules or MPO adapter panels	InstaPATCH 360 modules or MPO adapter panels
Connector type	Unpinned MPO	Unpinned MPO

ULL trunk cables (Pinned-Pinned)

MPO-MPO trunk cables	End A	End B
Connects to	ULL modules or MPO adapter panels	ULL modules or MPO adapter panels
Connector type	Pinned MPO	Pinned MPO

MPO-MPO trunk extension cables

Extension cables are used to extend the reach of a trunk cable. Extension cables share the same construction and are available with the same options as trunk cables, with one exception: trunk extensions have unpinned MPOs on one end and pinned MPOs on the other. One end will be connected to a trunk cable and the other end can be connected to a module, fanout or equipment cord.

InstaPATCH 360 trunk extension cables (Pinned-Unpinned)

MPO-MPO trunk extension cables	End A	End B
Connects to	InstaPATCH 360 trunk cables	InstaPATCH 360 modules or MPO adapter panels
Connector type	Pinned MPO	Unpinned MPO

ULL trunk extension cables (Unpinned-Pinned)

MPO-MPO trunk extension cables	End A	End B
Connects to	ULL trunk cables	ULL modules or MPO adapter panels
Connector type	Unpinned MPO	Pinned MPO

All extension cords also use Type B polarity, except those with 24-fiber MPOs. The 24-fiber versions are “straight-through” cables that do not alter fiber polarity from one end to the other; see Figure 16.

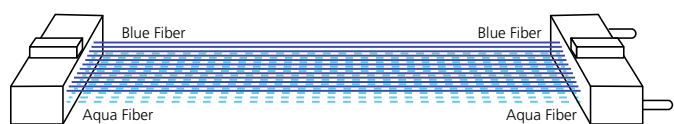


Figure 16. 24-fiber trunk extension fiber polarity

MPO-MPO cross-connect/patch cables

Cross-connect cables serve the function of an array “jumper” between two MPO trunks terminated in MPO adapter panels. Cross-connect cables share the same construction and are available with the same options as trunk and extension cables.

InstaPATCH 360 cross-connect/patch cables (Pinned-Pinned)

MPO-MPO cross-connect cables	End A	End B
Connects to	InstaPATCH 360 trunk cables	InstaPATCH 360 trunk cables
Connector type	Pinned MPO	Pinned MPO

ULL cross-connect/patch cables (Unpinned-Unpinned)

MPO-MPO cross-connect cables	End A	End B
Connects to	ULL trunk cables	ULL trunk cables
Connector type	Unpinned MPO	Unpinned MPO

Ruggedized fanout cables

Ruggedized fanout cables-also known as hydra cables, direct attach or breakout cables, and are used to transition MPO connectors into simplex or duplex connectors for direct connection to electronic equipment. Depending on application, fanout cables can be configured with either a pinned or unpinned MPO. Care must be taken to order the correct fanout type or an incompatible connection will result. Ruggedized fanout cables use the same cable and construction as trunks cables, but the total fiber count is limited to 144. Ruggedized cables are recommended for connecting between cabinets or in overhead pathways, for example.

InstaPATCH 360 ruggedized fanout cables

Ruggedized fanout cables	End A	End B
Connects to	InstaPATCH 360 trunk cables or modules	Active equipment
Connector type	Pinned or unpinned MPO	LC or SC

ULL ruggedized fanout cables

Ruggedized fanout cables	End A	End B
Connects to	ULL trunk cables or modules	Active equipment
Connector type	Pinned or unpinned MPO	LC

Array/equipment cables

Array cables, also known as equipment cables, are light-duty, single-subunit cables used to connect trunks or modules to electronic equipment. Array cables are recommended for use within protected patching areas – within a cabinet, for example.

InstaPATCH 360 array cables must be configured with unpinned MPO connector on one end, connecting to the equipment, and with either unpinned or pinned MPO connector on the other.

ULL array cables are constructed identical to the cross-connect cables, with unpinned MPO connectors on both ends.

InstaPATCH 360 array cables are available with either 12-fiber or 24-fiber MPO connectors. ULL array cables are available with 8-fiber, 12-fiber or 24-fiber MPO connectors. 8-fiber and 12-fiber cables are 3.0mm in diameter and 24-fiber cables are 3.6mm.

InstaPATCH 360 array/equipment cables

Array/equipment cables	End A	End B
Connects to	Active equipment	InstaPATCH 360 trunk or modules
Connector type	Unpinned MPO	Pinned or unpinned MPO

ULL array/equipment cables (identical construction as ULL cross-connect cables)

Array equipment cables	End A	End B
Connects to	Active equipment	ULL trunk cables
Connector type	Unpinned MPO	Unpinned MPO

Specialty 24-fiber Cable Assemblies

InstaPATCH 360 1X2 Bi-furcated Fanouts

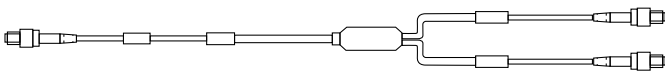
1x2 Bi-furcated fanouts uses a 24-fiber cable that has a single 24-fiber MPO connector on End A. End B is furcated out to two 12-fiber MPO connectors.

This cable allows 24-fiber transceivers to work with two 12-fiber trunks. The 24-fiber MPO connector is always unpinned (connector code 2P), but the 12-fiber MPO connectors may be either pinned or unpinned, depending on the application. Connector code CP or CX are used for InstaPATCH 360 assemblies.

ULL 1X2 Bi-furcated Fanouts

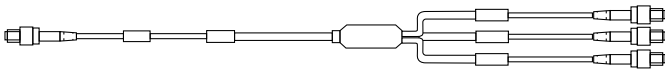
The ULL 24-fiber MPO connector is always unpinned (connector code 2C) with the 12-fiber connectors pinned or unpinned (connector codes MP and MX).

1X2 Bi-furcated fanouts with OM4 fiber are available in both InstaPATCH and ULL. OM5 versions are only available in ULL.



1X3 Tri-Furcated Fanouts

Similar to the 1X2 Bi-furcated fanout, the 1X3 Tri-furcated Fanout uses a 24-fiber cable and a 24-fiber MPO connector on End A (connector code 2P or 2X), but End B is furcated out to three 8-fiber MPO connectors which may be either pinned or unpinned, depending on the application (connector code QP or QX).



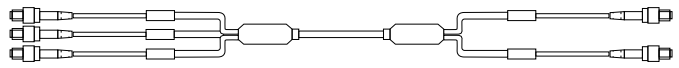
2x3 Fanouts

2X3 fanouts serve much the same purpose as CMs in that they allow three 8-fiber transceivers to be used with two 12-fiber trunks with 100% fiber utilization.

2X3 fanouts use a 24-fiber cable that is furcated out to three unpinned 8-fiber MPO connectors.

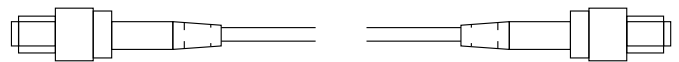
	End A MM	End B MM	End A SM	End B SM
InstaPATCH 360	QP	PP, PX	QQ	PP, PX
ULL	QP	MP, MX	QP	MP, MX

2X3 fanouts with OM4 and single-mode fiber are available in InstaPATCH. OM4, OM5 and single-mode versions are available in ULL.



24f 2C- CXP/CFP Equipment Cables

2C-CP Equipment Cables are 24-fiber cables with one 24-fiber MPO 2C connector on end "A" connecting a CXP/CFP transceiver to the back of an MPO24 CM or breakout array. "B" end connectors are 2P or 2X.



Labeling of duplex ends of rugged and array fanout cables

The duplex connector ends of InstaPATCH 360 rugged or array fanout cables are identified with both "ALPHA" and "BETA" labels to maintain correct port mapping, depending on which end of a link they are installed; see Figure 17.

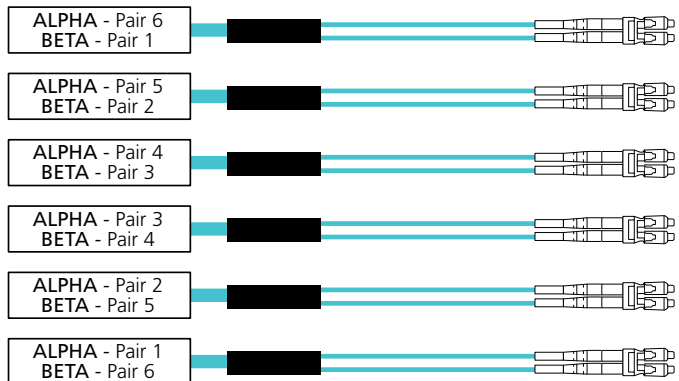


Figure 17. Labeling of duplex end of InstaPATCH 360 fanout cables

ULL fanout cables do not have ALPHA/BETA labeling; they are simply labeled as Pair 1, Pair 2, Pair 3, etc.

Polarity control

SYSTIMAX preterminated systems provide polarity control mechanisms that ensure signals are correctly routed through array fiber modules, trunks and fanout cables. Polarity refers to the basic fiber optic design premise that every fiber must connect a signal source at one end to the proper signal receiver at the other end.

InstaPATCH® 360 utilizes Method B polarity management, and ULL utilizes Enhanced Method B polarity management. Both systems use Method B trunks and aligned-key MPO adapters.

InstaPATCH 360 and ULL systems are similar but unique systems. The single-mode MPO connector angle orientations are different between InstaPATCH 360 and ULL, hence the two systems are incompatible. To achieve consistent performance, the InstaPATCH 360 and ULL systems (both multimode and single-mode) should not be mixed.

Comparison of Method B polarity to Enhanced Method B

InstaPATCH 360 modules and fanout cables require ALPHA/BETA implementation—meaning components on End B of a fiber link need to be flipped upside-down relative to components on End A. Labeling systems identify port numbers according to the alpha or beta orientation.

When an InstaPATCH 360 fanout cable is connected to an InstaPATCH 360 module that is in the “ALPHA” orientation, the duplex connector sequencing follows the “BETA” duplex labeling. Conversely, when the module is in “BETA” orientation, the duplex connectors follow the “ALPHA” labeling. Both configurations are illustrated in Figure 18.

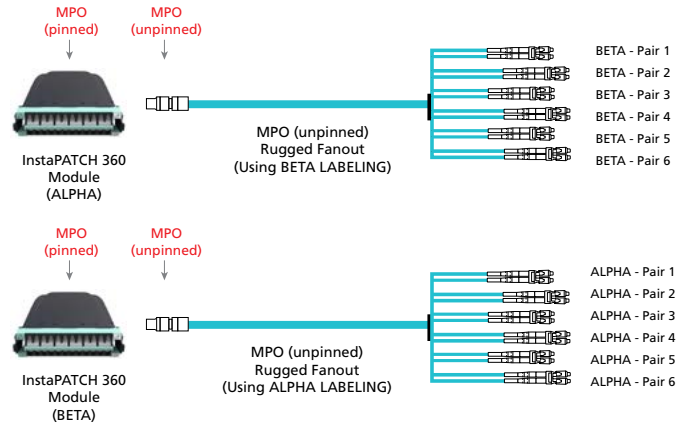


Figure 18. InstaPATCH 360 module orientation and use of ALPHA/BETA labeling in fanout cable

When installing in a link, one module must be in ALPHA orientation and the other module must be in BETA. Flipping the modules upside-down keeps like-numbered ports in the same place on both ends of a channel; see Figures 19 and 20. (Port 1 will always be bottom left on the module.)

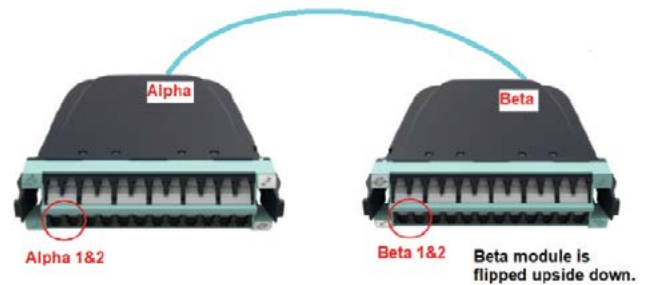


Figure 19. ALPHA/BETA modules used in InstaPATCH 360 system

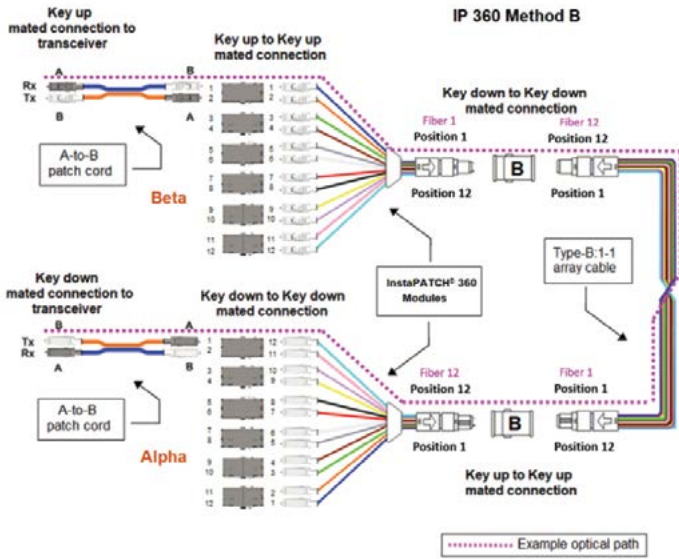


Figure 20. InstaPATCH 360 Method B



Figure 21. Modules used in ULL system

ULL uses Enhanced Method B polarity, which still uses Method B trunks and aligned key adapters, but the fiber routing within the modules is different eliminating the requirement for ALPHA/BETA labeling and flipping of modules; see Figures 21 and 22.

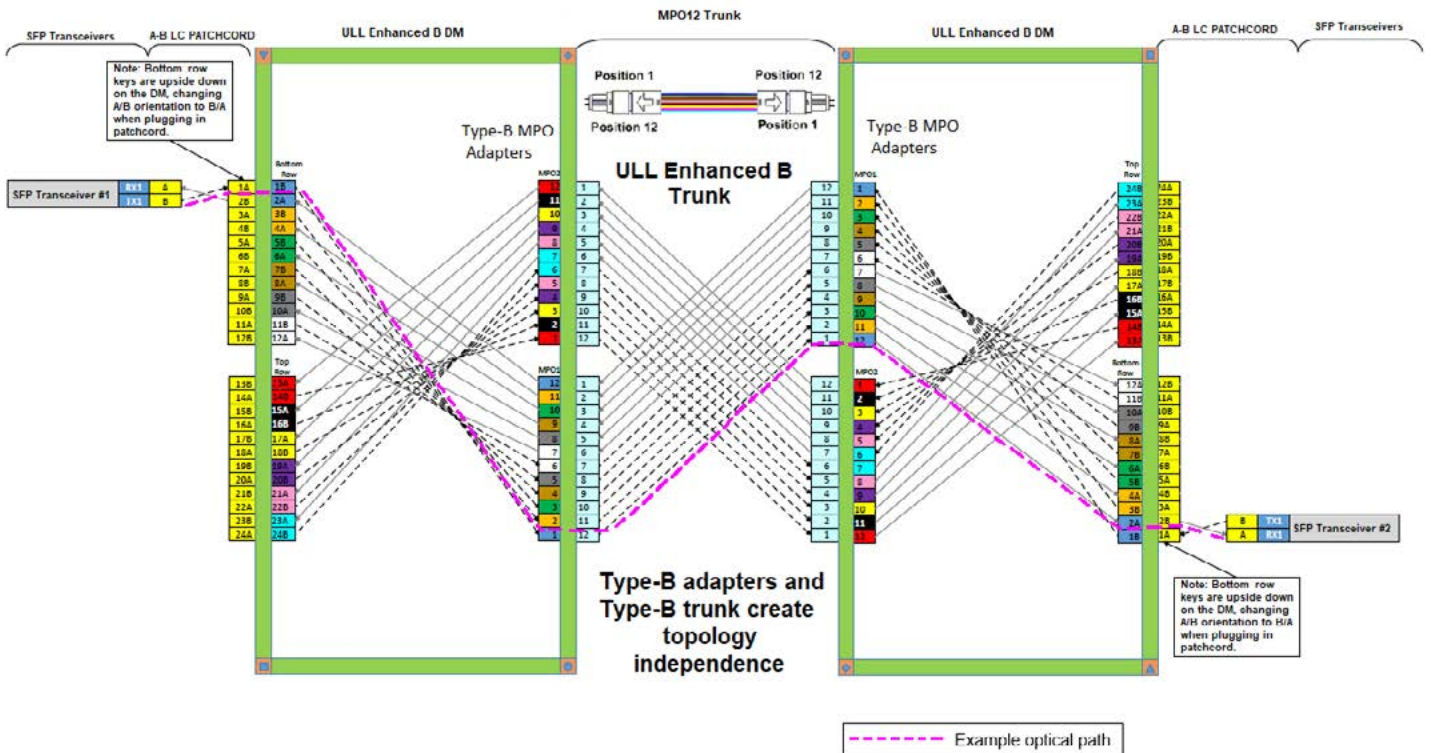


Figure 22. ULL Enhanced B System

InstaPATCH 360 configuration rules

InstaPATCH 360 Basic configuration rules

InstaPATCH 360 Rule Number 1:

In each connected pair of MPO connectors there shall be an MPO (pinned) connector, an MPO (unpinned) connector and an aligned-key MPO adapter (keying option k=2, key-up to key-up).

InstaPATCH 360 Rule Number 2:

Adding or removing MPO pins in the field is not allowed.

InstaPATCH 360 Rule Number 3:

Any direct connection to an InstaPATCH 360 shelf or Module, or to an MPO optical array transceiver shall be made with an MPO (unpinned) connector.

InstaPATCH 360 Rule Number 4:

In order to maintain simple port management and mapping, all InstaPATCH 360 links should consist of an "ALPHA" oriented module/shelf/fanout on one end of the link to a "BETA" oriented module/shelf/fanout on the other end of the link.

InstaPATCH 360 Rule Number 5:

Any InstaPATCH 360 connection to traditional InstaPATCH 360 trunks terminated in MPO adapter panels shall be made with an MPO (pinned) connector.

InstaPATCH 360 Rule Number 6:

When an InstaPATCH 360 rugged fanout is connected to a module or shelf that is in the "ALPHA" orientation, the duplex connector sequencing follows the "BETA" duplex labelling. Conversely, when an InstaPATCH 360 rugged fanout is connected to a module or shelf that is in the "BETA" orientation, the duplex connector sequencing follows the "ALPHA" duplex labelling.

InstaPATCH 360 Rule Number 7:

Only SYSTIMAX solutions factory-manufactured InstaPATCH 360 components shall be used in an InstaPATCH 360 channel or link.

ULL configuration rules

ULL basic configuration rules

ULL Rule Number 1:

In each connected pair of MPO connectors there shall be an MPO (pinned) connector, an MPO (unpinned) connector and an aligned-key MPO adapter (keying option k=2, key-up to key-up).

ULL Rule Number 2:

The ULL multimode Polarity and Gender Changeable patchcords allow adding and removing the pins and changing the polarity in the field.

ULL Rule Number 3:

Any ULL direct connection to an DM or CM or EHD Module, or to an MPO optical array transceiver shall be made with an MPO (unpinned) connector.

ULL Rule Number 4:

Any connection to ULL trunks terminated in MPO Adapter panels shall be made with an MPO (unpinned) connector.

ULL Rule Number 5:

Only SYSTIMAX solutions factory-manufactured ULL components shall be used in an ULL channel or link.

Typical MPO configurations for InstaPATCH 360 systems (multimode)

Using trunks to interconnect to modules

The simplest configuration connects two modules with a single trunk. InstaPATCH uses ALPHA/BETA modules and trunks with unpinned MPO connectors.

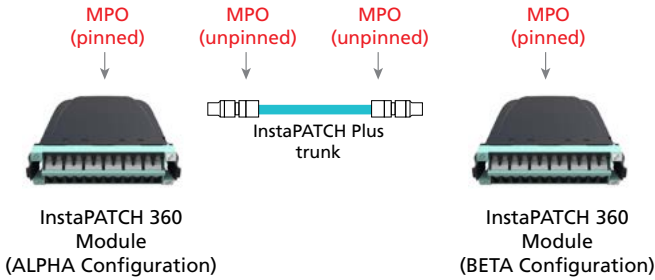


Figure 23. InstaPATCH 360 modules in ALPHA/BETA orientation

Using trunk extension cables

With use of an aligned-key MPO adapter, extension cables can be used to increase the reach of existing trunks.

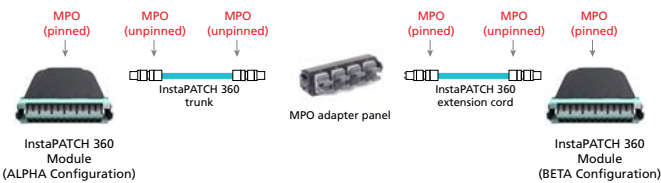


Figure 24. InstaPATCH 360 extension cables

Using MPO-MPO array/equipment cables

Array/equipment cables connect trunks to electronic equipment through MPO adapter panels.

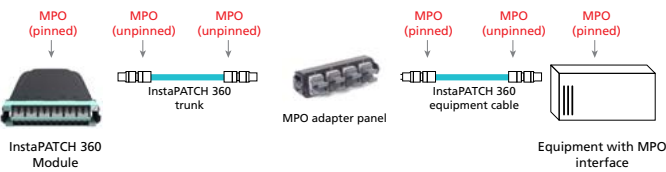


Figure 25. InstaPATCH 360 array/equipment cables

Note: For single-mode InstaPATCH applications, the MPO connector connecting to equipment must have the "MQ" connector code.

Using cross-connect cables

Cross-connect cables serve the function of an array "jumper" between two MPO trunks terminated in MPO adapter panels, as illustrated in Figure 26.

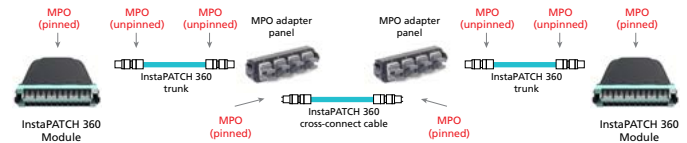


Figure 26. InstaPATCH 360 cross-connect cable

Using rugged or array fanout cables with modules

When fanout cables connect to InstaPATCH 360 modules, as illustrated in Figure 27, the fanout MPO must be unpinned.

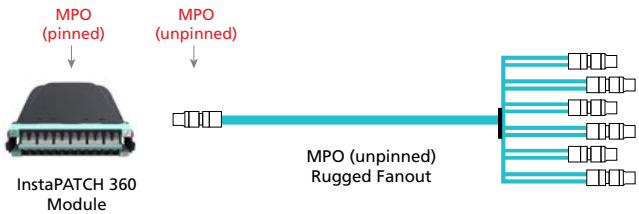


Figure 27. InstaPATCH 360 MPO (unpinned) fanout cable

Using rugged or array fanout cables with trunks

Fanout cables are available with either pinned MPO or unpinned MPO connectors for nearly unlimited network design possibilities. The network designer must correctly specify the MPO pin configuration.

When fanout cables connect to InstaPATCH 360 trunks through an MPO adapter panel, the fanout must have a pinned MPO connector; see Figure 28.

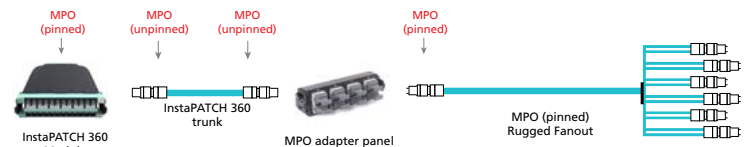


Figure 28. InstaPATCH 360 MPO (pinned) fanout cable

InstaPATCH 360 Method B single-mode ferrule angle

Single-mode MPO connectors are polished with an 8-degree angle on the connector ferrule. This angle is there to improve return loss (RL) performance, giving RL measurements of 55dB or better. Since Method B polarity requires the use of aligned-key MPO adapters, pinned and unpinned MPO connectors used in InstaPATCH 360 cable assemblies are angled in opposite directions. Pinned MPO connectors are angled down relative to the key and unpinned connectors are angled up, as illustrated in Figure 29.

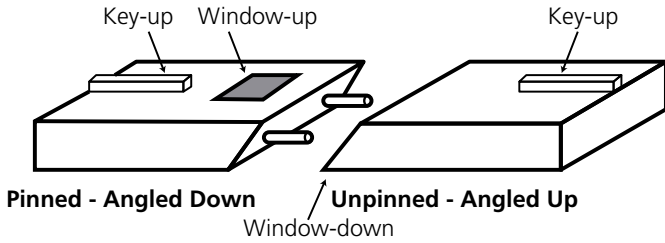


Figure 29. InstaPATCH 360 single-mode MPO angle orientation

These opposing angles ensure physical contact between fibers when the connectors are joined together; however, when an equipment connection is required, the unpinned MPO connector must match the angle of the electronic equipment. All single-mode MPO-based transceivers are designed to accept unpinned MPO connectors with down angles (See Figure 30).

As a result, a third MPO variant was introduced for InstaPATCH 360 single-mode MPO equipment cables. This down-angled unpinned MPO connector is identified in InstaPATCH 360 systems with the code "MQ." MQ connectors are identical in every respect to unpinned (MP) connectors except for the direction of the angle-making them compatible with single-mode transceivers but incompatible with pinned (MX) connectors.

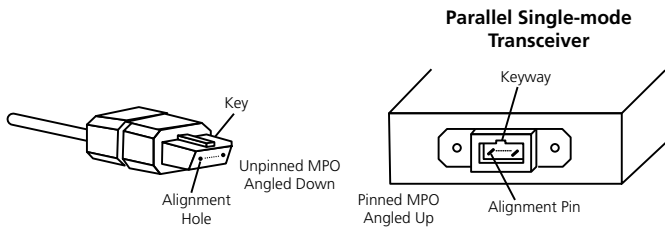


Figure 30. Parallel Single-mode Transceiver Receptacle Angle Orientation

Single-mode InstaPATCH 360 array/equipment cables must be ordered with an MQ connector on one end.

ULL Enhanced Method B single-mode ferrule angle

For Enhanced Method B, the angles on single-mode MPO connectors have been reversed. Pinned connectors are angled up relative to the key and unpinned connectors are angled down (See Figure 31). This eliminates the need for special MPO connectors to interface with the electronics. ULL single-mode MPO has a 65dB RL performance.

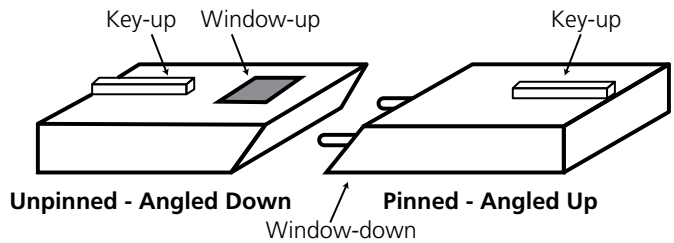


Figure 31. ULL single-mode MPO angle orientation

All the single-mode MPO connectors used in the SYSTIMAX InstaPATCH 360 and ULL systems comply with the ANSI/TIA-604-5, Revision F (published in March 2019) - FOCIS 5 Fiber Optic Connector Intermateability Standard- Type MPO.

Typical MPO configurations for ULL systems (single-mode)

Using trunks to interconnect to modules

The simplest configuration connects two modules with a single trunk. ULL modules contains unpinned MPO and aligned-key adapters on the back, and the trunk used are pinned MPO on both ends, illustrated in Figure 32.

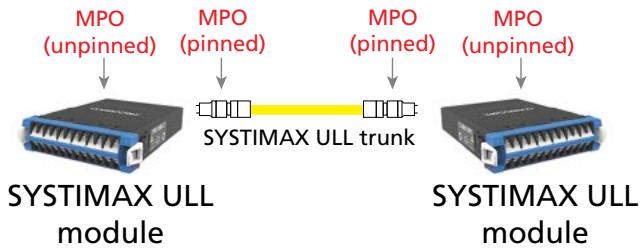


Figure 32. ULL modules

Using trunk extension cables

With use of an aligned-key MPO adapter, extension cables can be used to increase the reach of existing trunks.

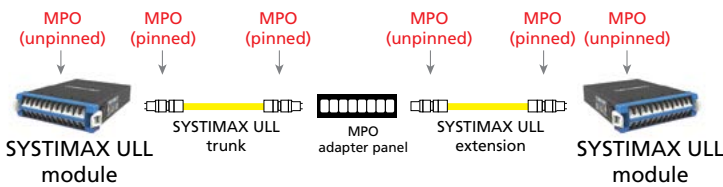


Figure 33. ULL extension cables

Using MPO-MPO array/equipment cables

Array/equipment cables connect trunks to electronic equipment through MPO adapter panels.

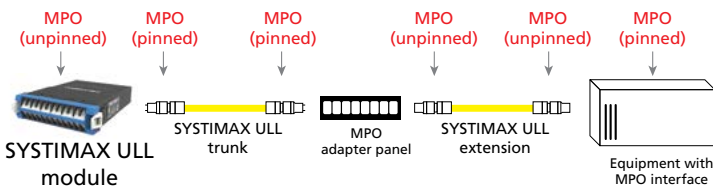


Figure 34. ULL array/equipment cables

Using cross-connect cables

Cross-connect cables serve the function of an array “jumper” between two MPO trunks terminated in MPO adapter panels, as illustrated in Figure 35.

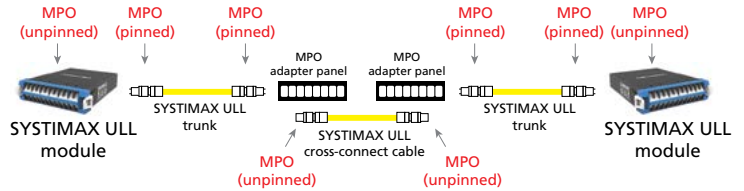


Figure 35. ULL cross-connect cables

Using ruggedized or array fanout cables with trunks

Fanout cables are available with either pinned MPO or unpinned MPO connectors for nearly unlimited network design possibilities. The network designer must correctly specify the MPO pin configuration. When fanout cables connect to ULL trunk cables, the fanout must have an unpinned MPO connector.

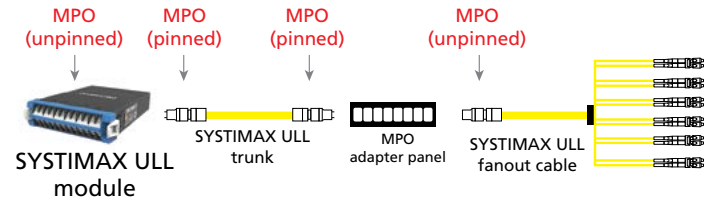


Figure 36. ULL MPO (unpinned) fanout cable

Using ruggedized or array fanout cables with modules

When fanout cables connect to ULL modules, the fanout MPO must be pinned.

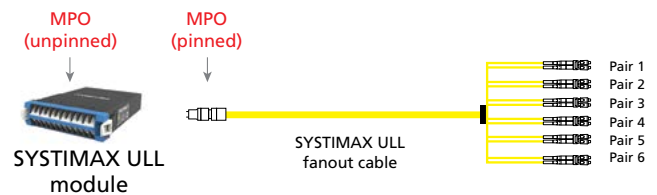
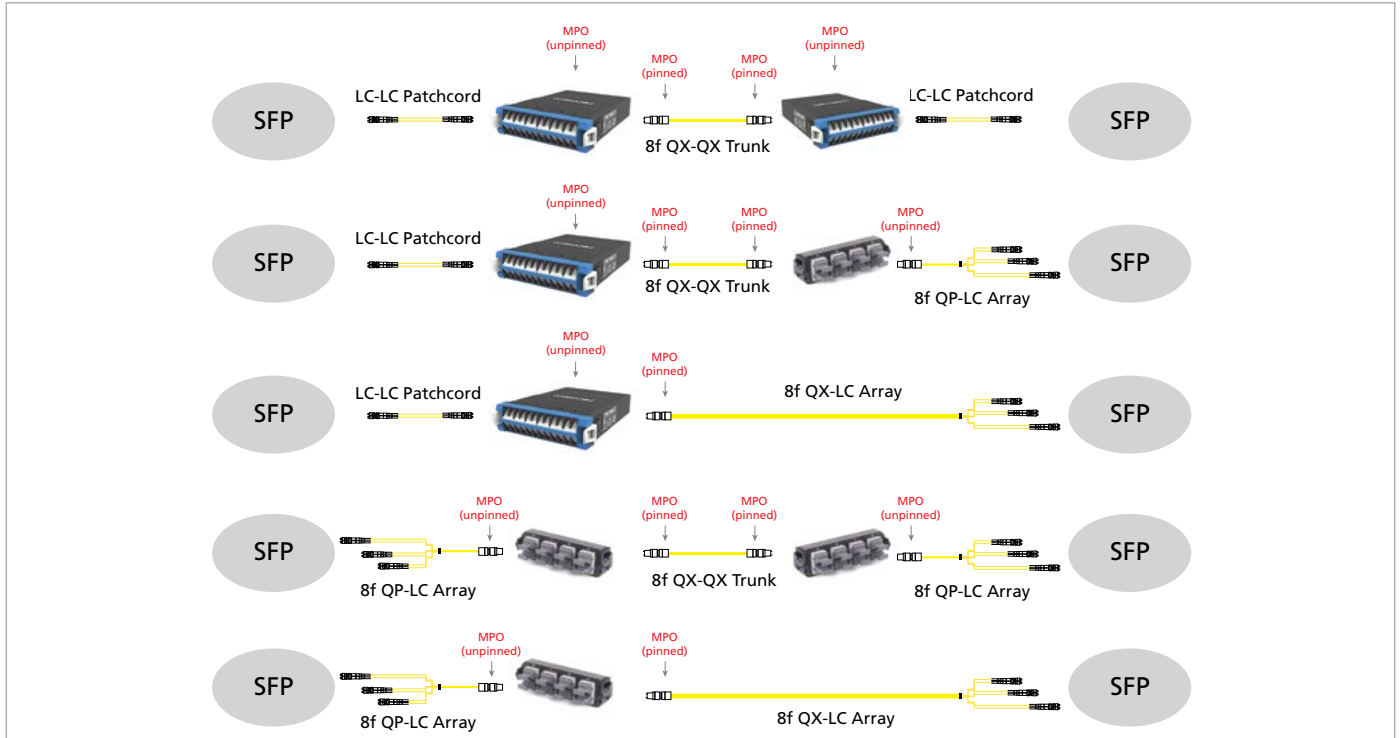


Figure 37. ULL MPO (pinned) fanout cable

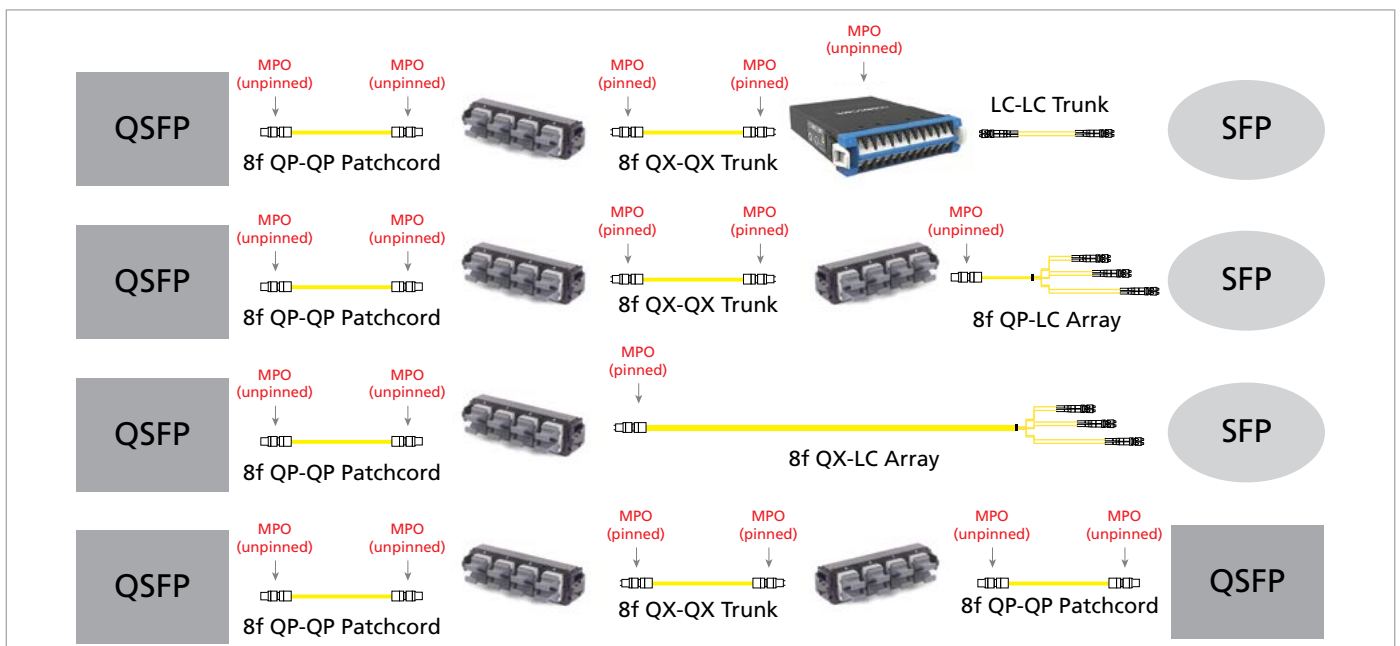
ULL Enhanced Method B MPO Configurations

ULL DMs, CMs, ruggedized array and array cables in 8f- and 12f configuration utilize Enhanced Method B. These components may be configured together in many combinations. Polarity management is designed in for all multimode and single-mode components. For demonstration purposes, the following examples show single-mode solutions. Configurations would be identical for multimode solutions.

MPO8 for duplex



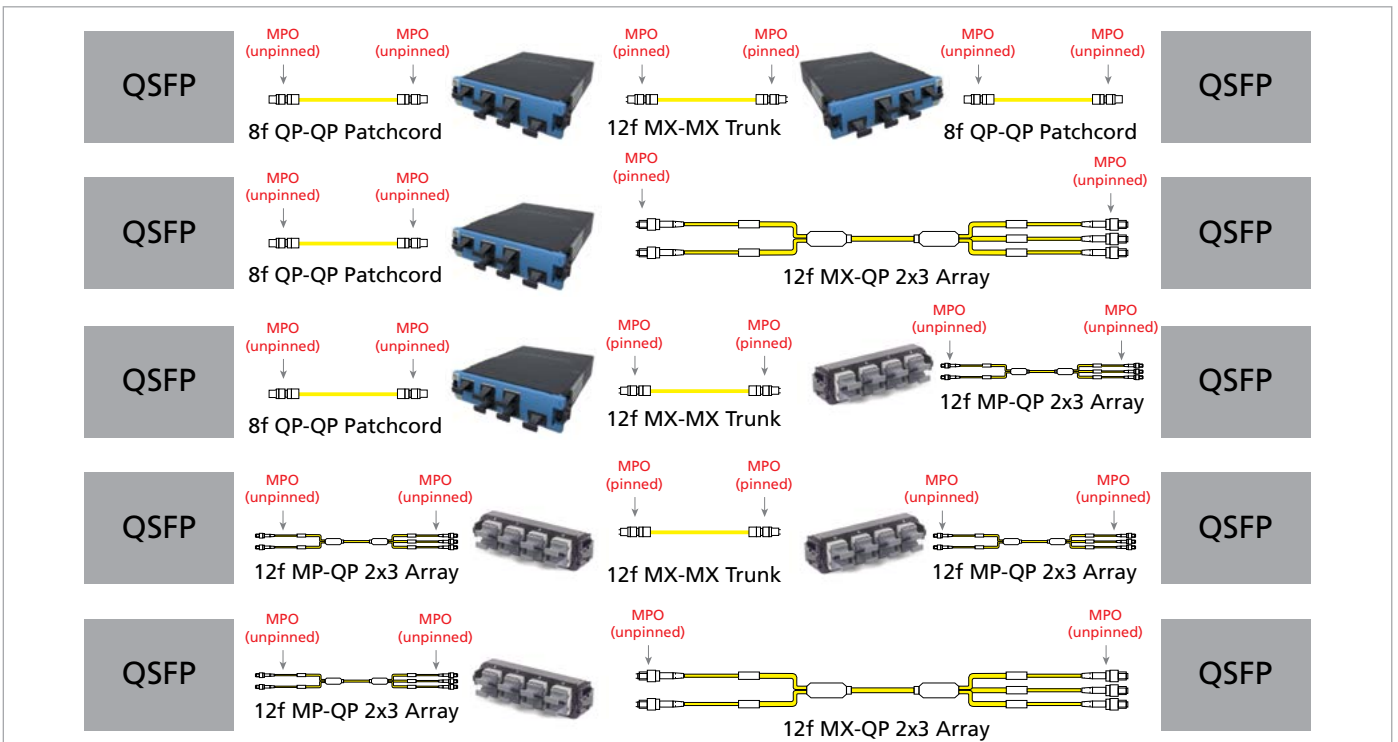
MPO8 for breakout and parallel



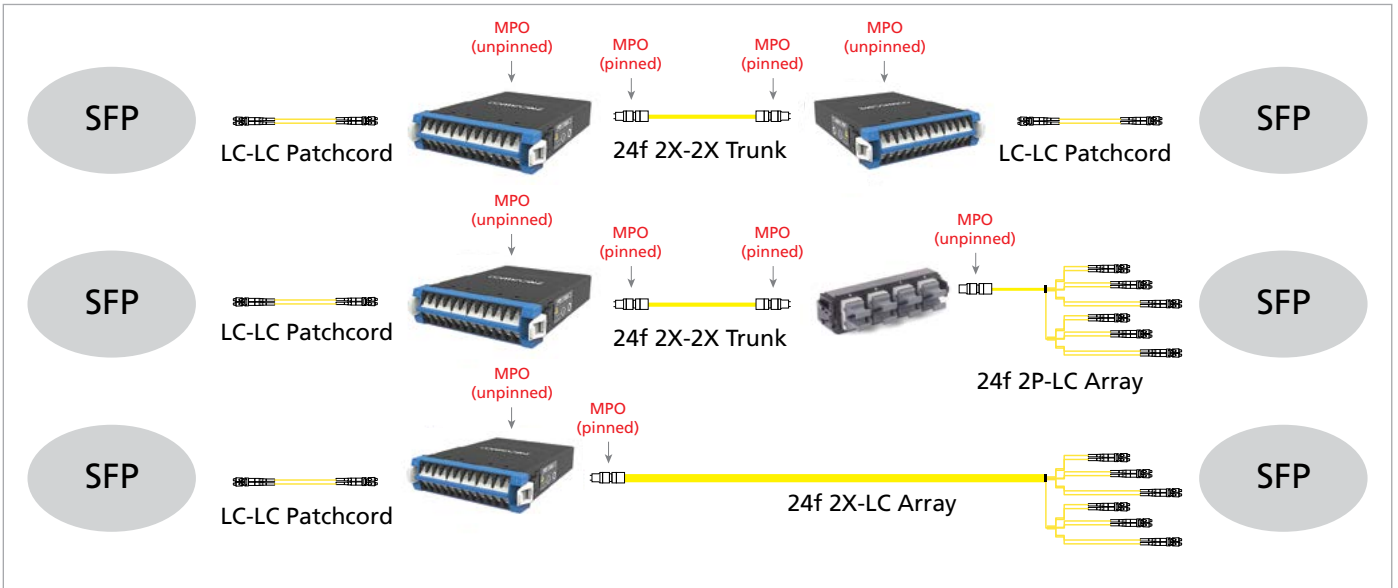
MP012 for duplex and breakout



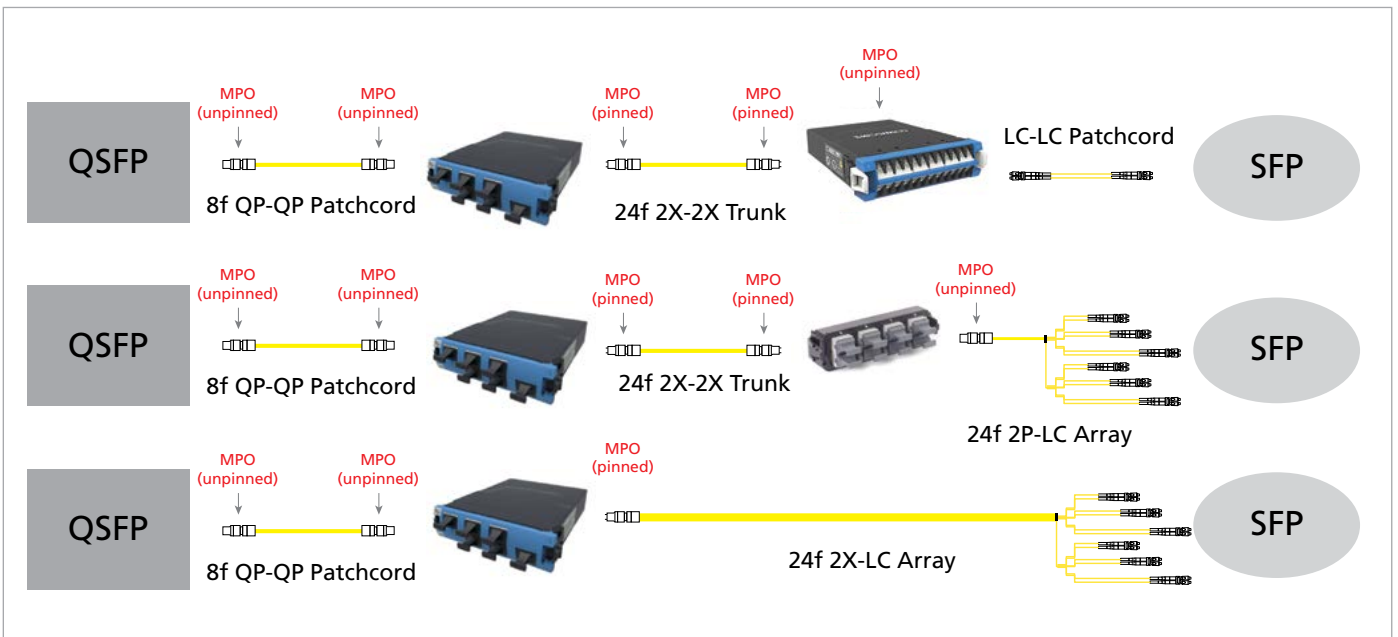
MP012 for parallel



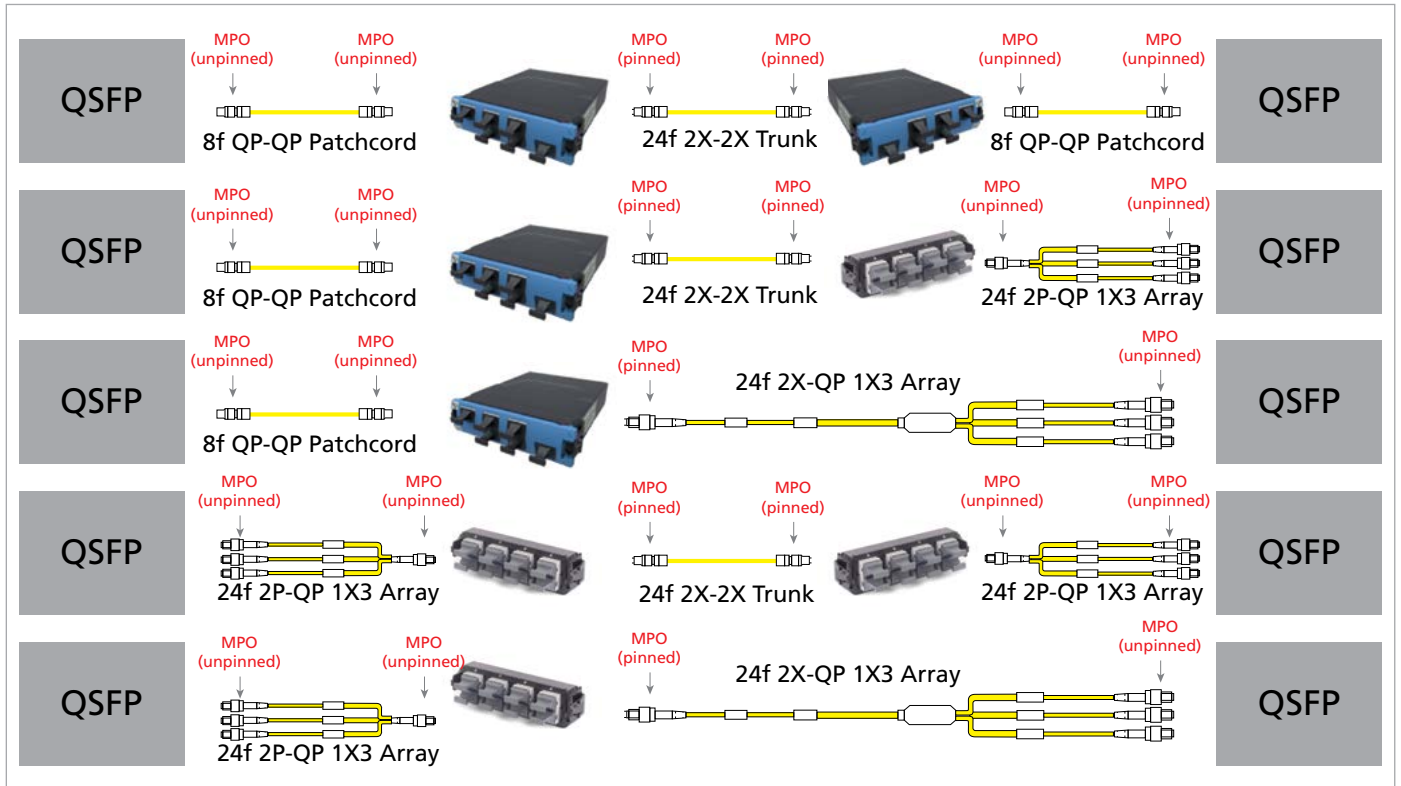
MPO24 for duplex



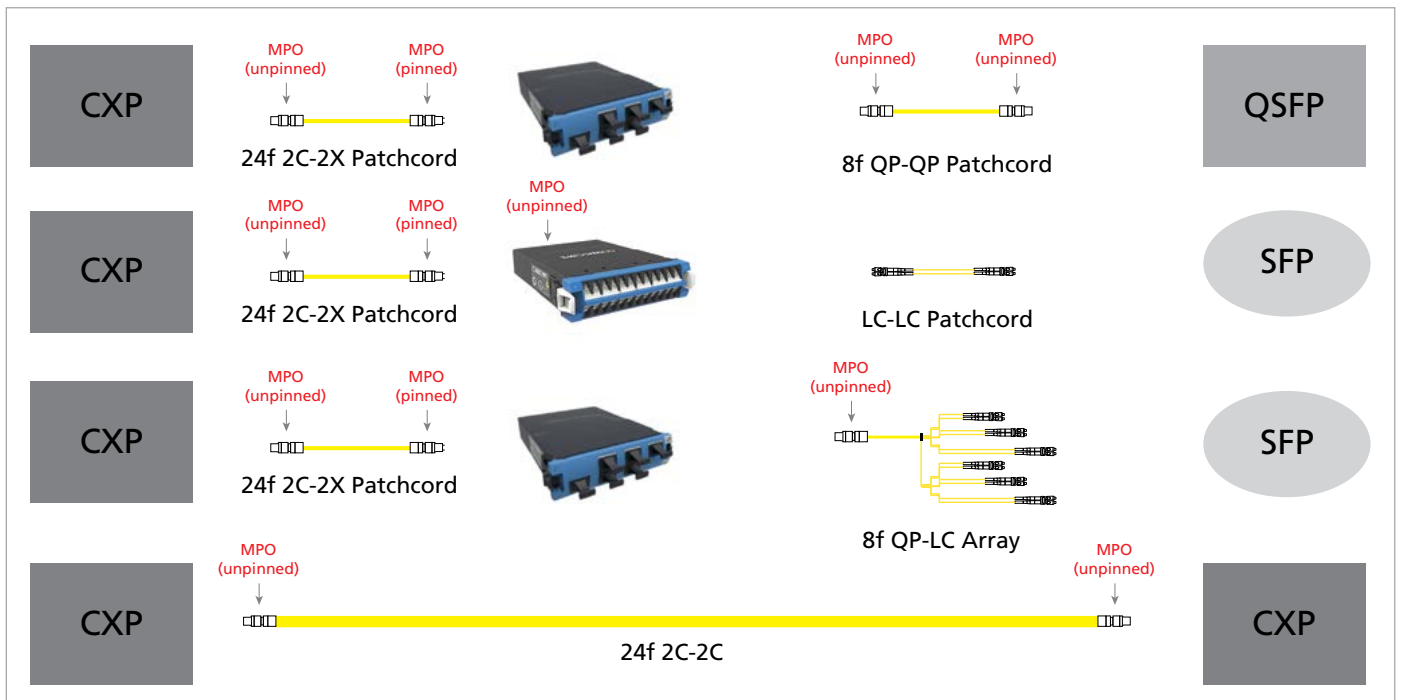
MPO24 for breakout



MPO24 for parallel



MPO24 CXP/CFP



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