760207944 | HD-1U-REAR-EXT

High density 1U Fiber Shelf Rear Extension, 6 Cable Entries

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Extension unit
Product Series	HD

General Specifications

Color	Black
Rack Units	1

Dimensions

Height	44.45 mm | 1.75 in
Width	375.92 mm | 14.8 in
Depth	43.18 mm | 1.7 in

Material Specifications

Material Type	Acrylonitrile butadiene styrene (ABS) | Polycarbonate (PC) | Steel

Environmental Specifications

Flammability Rating	UL 94 V-0

Packaging and Weights

Packaging quantity	1

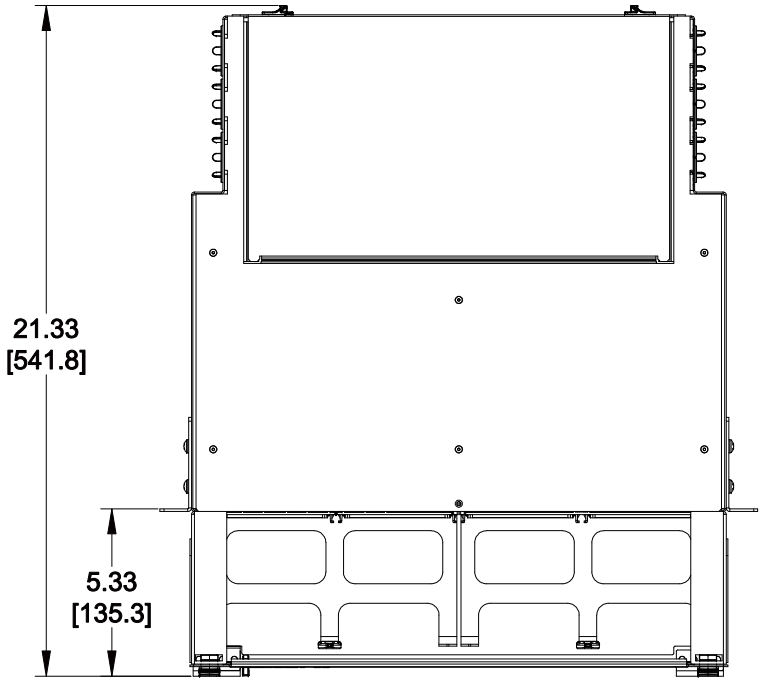
Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance

760207944 | HD-1U-REAR-EXT

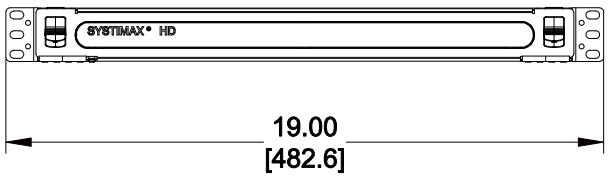
ROHS	Compliant
UK-ROHS	Compliant

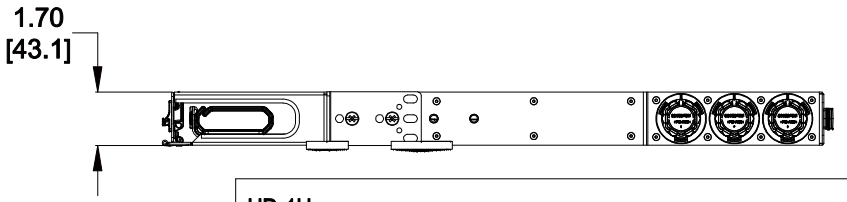
MATERIAL ID	DESCRIPTION
760209940	ASSY, 1U SLIDING SHELF + DOORS AND TROUGHS



NOTES:

1. SEE SYSTIMAX CATALOG FOR PART NUMBER SUFFIXES TO INDICATE COLOR/PKG.
2. SEE SYSTIMAX CATALOG FOR COMPLETE LIST OF PARTS RELATED TO THE USE OF THIS PRODUCT.
3. DIMENSIONS ARE IN INCHES[MM].
4. PART INCLUDES:
   (1) SUBASSY, TROUGH AND DOOR
   (1) 1U SLIDING SHELF
   (1) RETAINER KIT





HD-1U

COMMSCOPE, INC OF NORTH CAROLINA

SYSTIMAX® SOLUTIONS

REV	DATE	ECR	DESCRIPTION	APPROVED BY	DRAWN BY TZ		DWG NO 760209940
1	06/09/15		INITIAL ISSUE	NCF	DATE 06/09/2015		

760209940 | HD-1U

High Density 1U modular cassette sliding Panel, accepts (4) G2 modules or MPO panels, providing up to 48 duplex LC ports, or up to 32 MPO ports

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber patch panel
Product Series	HD

General Specifications

Application	Accepts four G2 modular cassettes
Color	Black | Gray
Intelligence Type	iPatch® ready
Interface, front	Unloaded
Rack Type	EIA 19 in
Rack Units	1
Shelf Movement	Sliding

Dimensions

Height	44.45 mm | 1.75 in
Width	482.6 mm | 19 in
Depth	541.78 mm | 21.33 in

Material Specifications

Material Type	Steel

Environmental Specifications

Flammability Rating	UL 94 V-0
Safety Standard	UL 1863

Packaging and Weights

760209940 | HD-1U

Packaging quantity	1
Weight, net	5.625 kg | 12.4 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant

COMMSCOPE® Instruction Sheet

860601012
Rev E, January 2019
www.commscope.com

High-Density Sliding Fiber Shelf

General

The CommScope high-density sliding fiber shelves come equipped with modular pair trays, fiber management trough, and steel top cover. Shelf will accommodate G2 and **InstaPATCH® 360** distribution modules. These shelves are intended for indoor use, but may be used outdoors in a suitable enclosure.

Ordering information is listed below:

Material ID	Part No.	Description
760209940	HD-1U	Modular HD 1U shelf, sliding with door and trough
760209957	HD-2U	Modular HD 2U shelf, sliding with door and trough
760209965	HD-4U	Modular HD 4U shelf, sliding with door and trough

High-Density Sliding Fiber Shelves

How to Contact Us

- To find out more about **CommScope®** products, visit us on the web at http://www.commscope.com
- For technical assistance, use our online interface to filter by problem and location: http://www.commscope.com/SupportCenter
- To report any missing/damaged parts: within the United States, contact **CommScope** Customer Claims at 1-866-539-2795 or email to claims@commscope.com; outside the United States, contact your local account representative or **PartnerPRO** Network Partner.

Tools Required

- Phillips-head screwdriver

Parts List

Verify parts against the parts list below:

Quantity	Description
1	Shelf assembly
1	Hook-and-loop strip cable retainer kit
4	#12-24 x 1/2-inch screws for 19-inch (483mm) and 23-inch (584mm) rack mounting
4	M6 x 12mm screws for ETSI rack mounting
1	Instruction sheet

Separately Orderable Components

Material ID	Part No.	Description
760039883	G2-23BRKT	Mounting bracket accessory kit for 23-inch (584mm) rack and ETSI rack

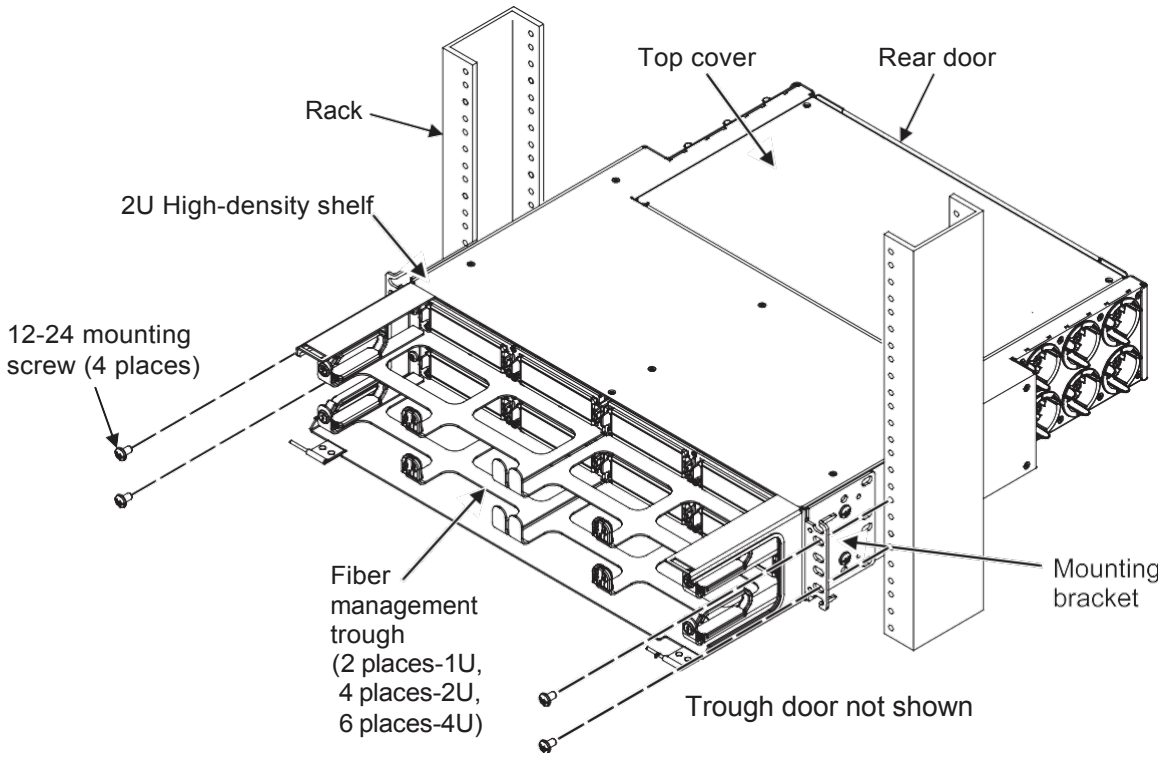
Important Safety Cautions

- To reduce the risk of fire, electric shock, and injury to persons, read, understand, and adhere to the following instructions as well as any warnings marked on the product.
- Remote risk of electric shock. Never install the product in wet locations or during lightning storms. Never touch uninsulated communication wires or terminals.
- Disconnected optical components may emit invisible optical radiation that can damage your eyes. Never look directly into an optical component that may have a laser coupled to it. Serious and permanent retinal damage is possible. If accidental exposure to laser radiation is suspected, consult a physician for an eye examination.
- Wearing safety glasses during installation of this shelf is recommended. Although standard safety glasses provide no protection from potential optical radiation, they offer protection from accidental airborne hardware and cleaning solvents.

Precautions

- Fiber optic trunk cable and jumper performance is sensitive to bending, pulling, and crushing. Minimum bend radius must be maintained during installation per the manufacturer's specification. Appropriate pulling grips must be used during installation, and pulling forces shall not exceed manufacturer's recommendations. Use caution to avoid kinking trunk cables.
- All wiring that connects to this equipment must meet applicable local and national building codes and network wiring standards for communication cable.
- **IMPORTANT**: Dust covers are installed in the ports to protect the fibers connected to the back of the ports. Do not remove a dust cover from a port until you connect a patch cord to that port. If you remove a patch cord later, replace dust cover in the port.
- Prior to installation, clean the trunk cable and jumper connectors per the manufacturer's recommendations.
- Isopropyl alcohol is flammable, and can cause eye irritation on contact. If eye contact occurs, flush with water for at least 15 minutes. In case of ingestion, consult a physician. Use only in well ventilated areas.
- Care should be taken not to compromise the stability of the rack by installation of this equipment.
- To be installed in restricted access areas only.

Step 1 – Mount Shelf to Rack



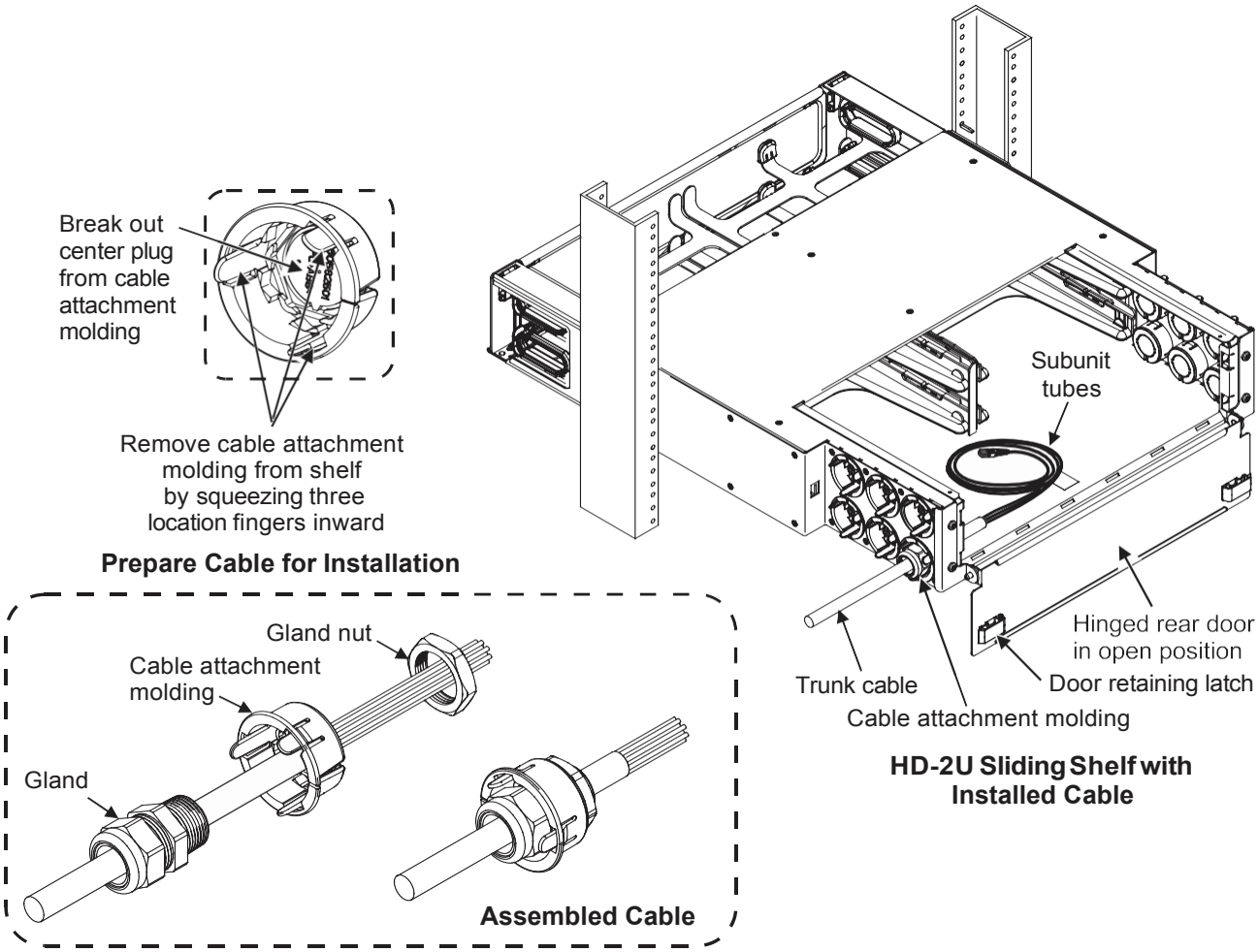
1. Determine the rack size and desired mounting location.
   - For 19-inch (483mm) rack – Mount shelf to rack using the pre-installed mounting brackets and four #12-24 x 1/2-inch screws (provided) as shown.
   - For a 23-inch (584mm) rack, use the G2-23BRKT accessory kit (ordered separately) and install conversion brackets on each side of shelf using four 10-32 screws included in the kit. Mount shelf to rack using four 12-24 screws provided.

     Note: 1 accessory kit is required for a 1U shelf, 2 accessory kits used for a 2U shelf and 4 accessory kits for a 4U shelf.
   - For an ETSI rack, use the G2-23BRKT accessory kit (ordered separately) and install one conversion bracket on one side of shelf using two of the four 10-32 screws included in the kit. Mount shelf to rack using four M6 x 12mm screws (provided). The shelf will not be centered in the rack.

     Note: 1 accessory kit can be used for two 1U shelves, 1 accessory kit to be used for a 2U shelf and 2 accessory kits for a 4U shelf.

Step 2 – Attach Fiber Trunk Cable to Shelf

Note: This shelf is designed for direct connection of fiber cables using cable glands inserted into cable attachment moldings provided. Another method for securing fiber cables is the use of optional rack mounted brackets, which is not covered here. See instruction sheet 860380781 for using rack mounted brackets.



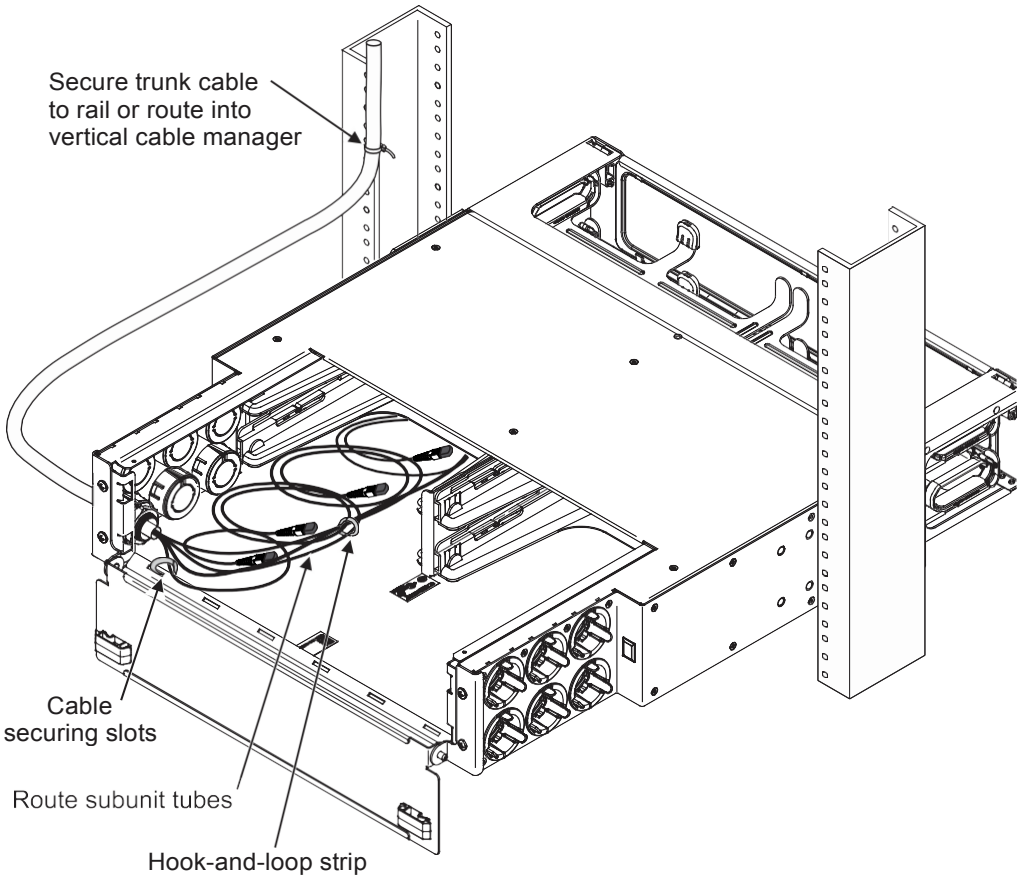
Cable Assembly

1. Open rear door.
2. Slide top cover back to remove cover for access to cable routing.

   Note: HD-1U shelf top/rear cover is a one piece unit and slides off when the retaining latches are depressed.
3. Remove cable attachment molding from shelf as shown.

   Note: Number of moldings is specific to shelf size. 1U shelf is equipped with six cable attachment moldings, 2U has twelve and 4U has twenty four cable attachment moldings.
4. Break out center plug from cable attachment molding as shown above.
5. Remove gland nut from cable gland.
6. Slide cable attachment molding onto cable and secure threaded gland nut to hold molding in place as shown.

Step 3 – Route and Secure Trunk Cable



1. Feed cable assembly through cable attachment opening on side of shelf from outside of side wall and push until the assembly is seated.

   Note: Fiber cables may enter shelf from right side and left side of shelf.

2. Loosely secure trunk cable to equipment rack upright approximately 3 inches (76mm) above or below shelf using cable ties. Leave approximately 48 inches (2.1m) length of cable/subunit tubes to route into shelf.

3. Loop subunit tubes inside shelf as shown or according to local practices. Secure loose fibers together using the provided hook-and-loop strips.

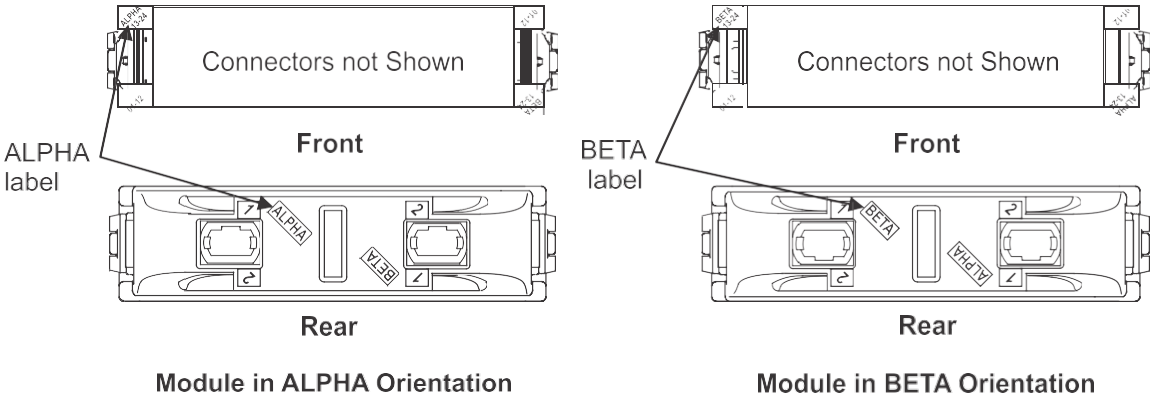
   Caution: Do not exceed minimum bend radius of fiber.

4. Fiber cable may be loosely secured to rear of shelf in slots provided using the additional hook-and-loop strips. Do not attach fiber bundles to floor of chassis.

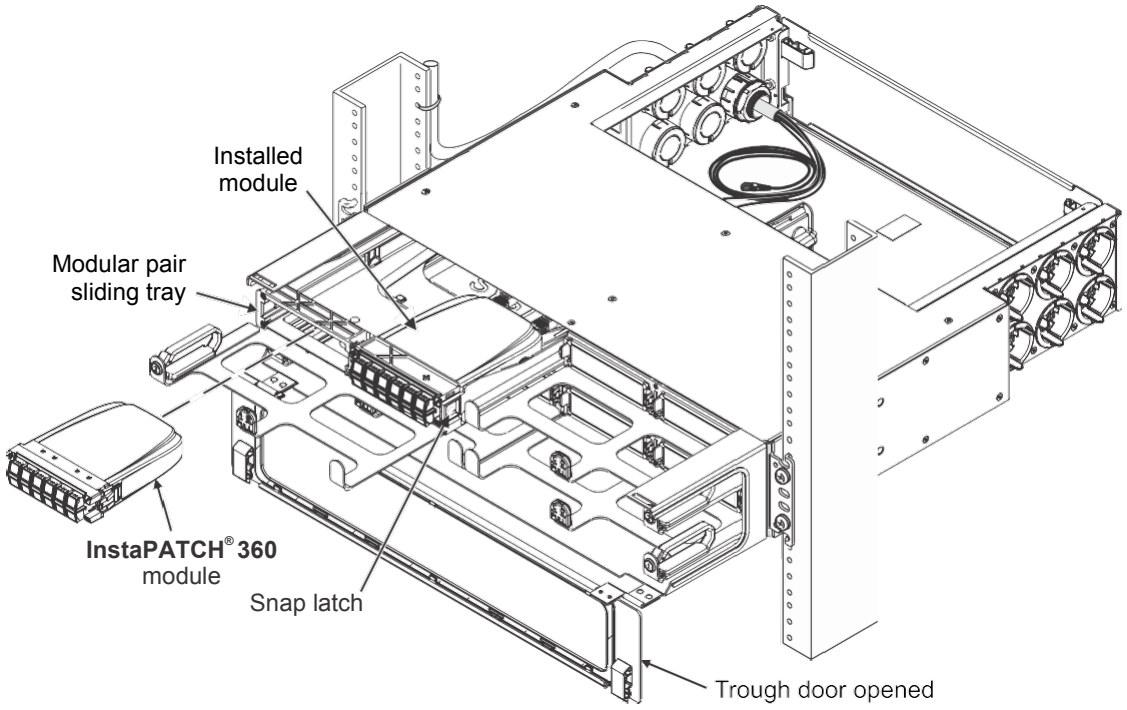
5. Temporarily store slack subunit tubes on floor of chassis.

Step 4 – Orient the InstaPATCH 360 Modules

Note: If the fiber shelf is shipped populated with **InstaPATCH 360** modules, they will all be installed in the ALPHA orientation. The **InstaPATCH 360** modules must be oriented for the proper polarity. Identical modules are used at each end of a trunk cable, but one module must be in the ALPHA orientation and the other module must be in the BETA orientation.



Step 5 – Terminate Fiber Cable Inside Shelf – InstaPATCH 360

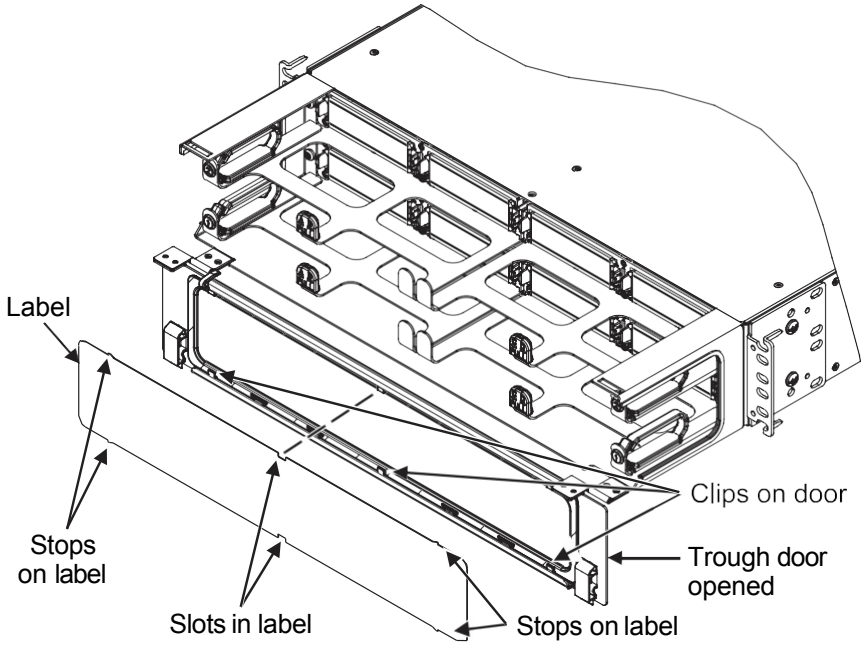


1. CommScope HD fiber shelves have two modular pair trays per row. Modular pair trays slide to the front of the shelf separately as shown.

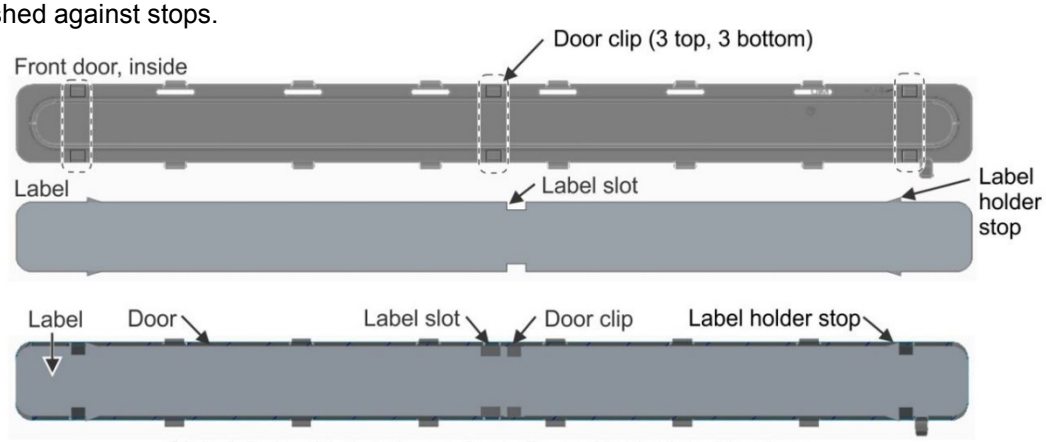
   Note: Trays slide until reaching stop to prevent them from sliding out. Do not continue to pull tray past stop.
2. Install **InstaPATCH 360** modules in modular pair trays. Verify that latches on either side of module snap into tray opening with an audible click.

   Note: Remove a module by using a small flat blade screwdriver to depress inner-most latch for release from modular pair tray position.
3. Pull subunit tubes with connectors through openings in front of shelf and plug MPO connectors into module.

Step 6 – Install Label on Trough Door



1. The door may be fitted with labels visible through the door window when closed or may be visible when the door is opened.
2. Open door to 180°.
3. Align slots in label with center clips on door. Slide label to drop beneath center clips.
4. Slide label to one side to settle end under clips on end of door. Small stops on either end resist label sliding past door edge.
5. Bend label to slide end under clips on other end of door. Label locks into place when positioned under clips and pushed against stops.



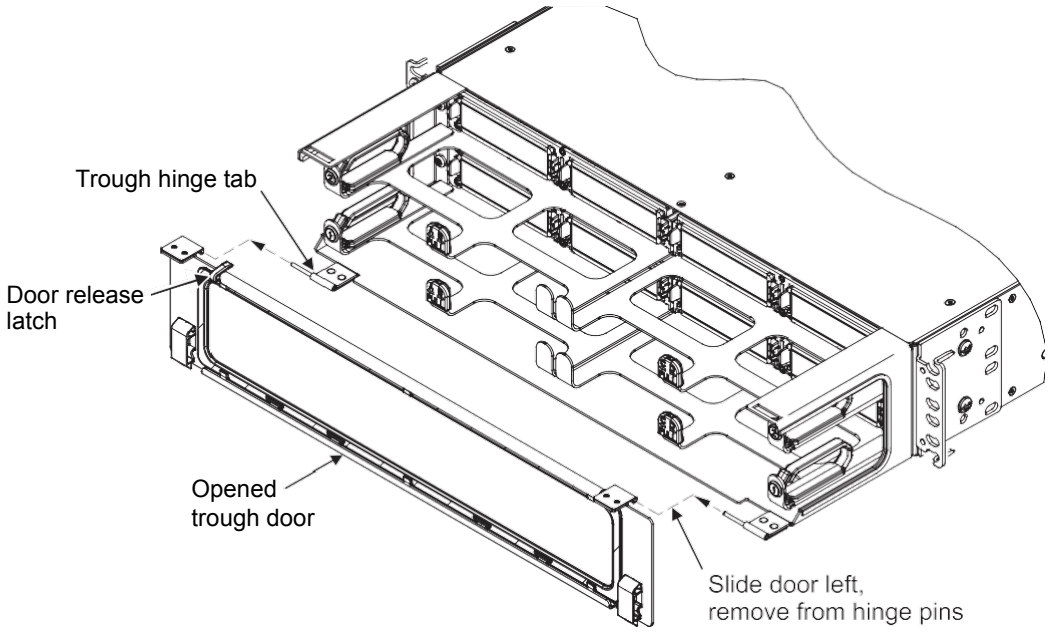
Slide label until slot clears door clip and locks label in place.

Install Label on 1U Trough Door

6. Printable label templates are available on the **CommScope®** website, which can be used along with available label stock to create finished port numbering labels.

   Note: To print a designation label, go to http://www.commscope.com/Resources/Labeling-Templates, scroll down to the High-Density Fiber Shelf and select the appropriate label template.

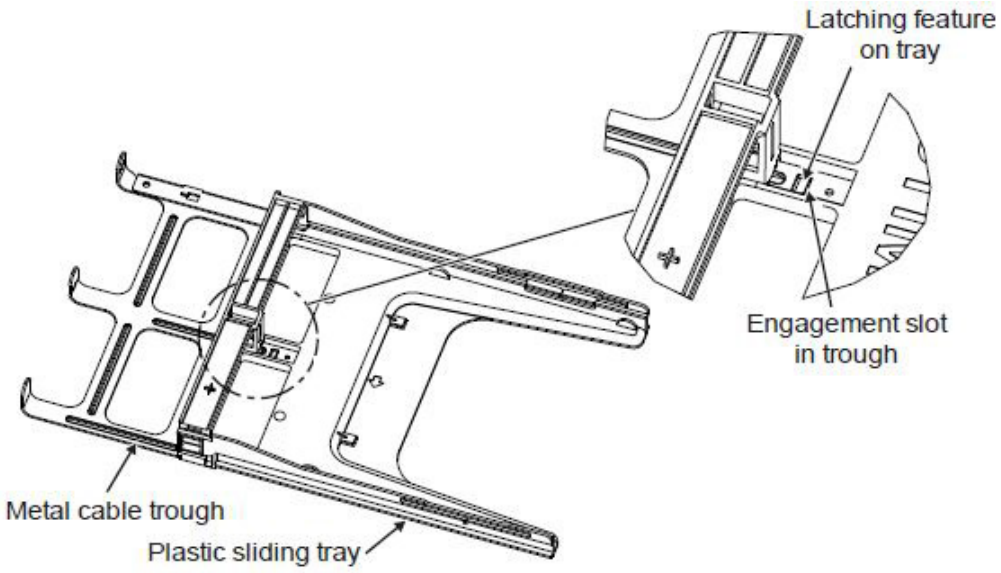
Step 7 – Remove Front Door (Optional)



1. Pull down on both door retaining latches and pull door forward to open.
2. Open door 180° as shown.
3. Pull up on door release latch and while holding it up to clear hinge, slide door to the left as shown to remove from hinge pins.
4. To re-install door, orient door open at 180°, place door release latch over trough hinge tab while sliding both door hinge tabs back over trough hinge pins.

Step 8 – Fiber Management Trough Removal (Optional)

1. Using a screwdriver or similar tool, depress latching feature located on center support behind sliding tray module openings as shown.
2. Hold tray still while pulling the trough forward until it releases from sliding tray.



CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
https://www.dekra.us/en/audits/

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17021-1 MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	**Site Activities**
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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Managing Director

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Certificate Number: 111045.000
ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

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Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
Site Address	**Site Activities**
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou,Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing &First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

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Certified Since: January 10, 2001

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Certificate Number: 111045.000
ADDENDUM Page Four of Seven

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CommScope, Inc.

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ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
Commscope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karanataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou,Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:
Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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IAF

证 书 附 录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技（苏州）有限公司

中国江苏省苏州工业园区启明路77 号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料（网络跳线、配线装置等）的生产。

认证结构: **多场所**

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10

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ISO/IEC 17021-1
MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No: **EMS 648387**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

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Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Euless Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

LIMITED WARRANTY

1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A,** (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization**. Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver**. If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15^{th}) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

(a) improper installation or misapplication of parts;
(b) chain or system failures induced by other products or components;
(c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
(d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
(e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
(f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
(g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
(h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
(i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
(j) use of the Product for purposes other than that for which it was designed; or
(k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.	Hardware One (1) Year Software Ninety (90) Days
Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
Category C Products Intentionally left blank.	
Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
Category E Products Intentionally left blank	
Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
Category F1 Products All CHP Headend Optical (HEO) Elements	Hardware Three (3) Years Software Ninety (90) Days
Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.	Hardware Five (5) Years Software Ninety (90) Days
Category G2 Products All CH3 Headend (HEO) Elements	One (1) year
Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories	Hardware Three (3) Years Software Ninety (90) Days

Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.	Hardware One (1) Year Software Ninety (90) Days
Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™® Workforce Management, Mobile TV, SecureMedia and Titanium	Hardware One (1) Year Software Ninety (90) Days
Category J Products Intentionally left blank	
Category K Products Intentionally left blank.	
Category L Products Intentionally left blank	
Category M Products Intentionally left blank.	
Category N Products Intentionally left blank.	
Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS	DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days
Category P Products Intentionally left blank.	
Category P1 Products Intentionally left blank	
Category Q Products Intentionally left blank	
Category R Products Intentionally left blank	
Category R1 Products Intentionally left blank	
Category S Products Intentionally left blank	
Category S1 Products Intentionally left blank	

LIMITED WARRANTY

Category T Products RUCKUS Wi-Fi	Hardware: - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an "e" suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** Software Ninety (90) Days
Category T1 Products RUCKUS ICX Switches	- ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product
Category T2 Products Intentionally left blank	
Category U Products Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC) NovuX Products Prodigy Products FDH Products Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable Assemblies OSP "Box" Products Mini-RDTs and RDTs FOSC™, FIST™ and Tenio™ OSP Copper Connect and Closure Products HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes Fiber Optic Panels, including Accessories, Mounting Hardware, Modules Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables, Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks Passive Optical Components and Value Added Modules (VAMs) FiberGuide® : Fiber cable Management System Optical Distribution Frames, including Modules, Blocks, Accessories and Hardware Cabinets Cable and Apparatus Products Alifabs™ Cabinets & Ancillary Products Alifabs™ Telecommunications Towers and Accessories Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets	One (1) year

LIMITED WARRANTY

Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products Electronic Enclosure Products (Cabinets) Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines) PowerShift™ & Power Products	Two (2) years
Category W Products ValuSite® Products I-Line Accessory Products Microwave Antennas Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)	Three (3) years
Category X Products Broadband RF Connectivity Products Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products	Five (5) years
Category Y Products QR® Coaxial Cable	Five (5) years
Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products * RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller's connectors in accordance with the installation instructions.	One (1) year
Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products * CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller's connectors by Seller or its certified distributor	Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.
Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products * HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller's connectors by Seller or its certified distributor.	Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.
Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment. Software Ninety (90) Days
Category DD Products In- Building and Fixed Subscriber Antennas	The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment

LIMITED WARRANTY

Category EE Products OneCell® Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days
Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software	Ninety (90) days
Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products	Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year
Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems	Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.
Category II Products SiteRise™ Solutions	One (1) year on workmanship for the Solution.
Category JJ Products Copper Structured Cabling Products Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)	One (1) year from the date of Installation
Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)	One (1) year from the date of completion of the work.
Category LL Products imVision Overlays and Controllers	Three (3) years

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.

RoHS Certificate of Compliance

COMMSCOPE®

Product Name: HD-1U Sliding Fiber Shelf

Product Number: 760209940

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by:

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

TC-96283-IP • Rev A • November 2019

Installation Instructions

HD Cable Management Tray

DESCRIPTION

The HD Cable Management Tray (shown below shaded in gray) is an accessory that extends the HD Sliding Shelf for organizing longer cable breakout lengths. It allows using hook-and-loop straps (or other means) to fasten cable slack loops on the rear of the sliding shelf.

INSTALLATION PROCEDURE

Use the following procedure to install the HD Cable Management Tray in the HD Sliding Shelf.

1. Lay the tray flat down on the sliding shelf and slide in the tray, making sure that the rear tabs of the tray are positioned below the shelf to hold the tray in place.
2. Slide in the tray until the front retainers on the tray are secured below the front tabs on the sliding shelf.

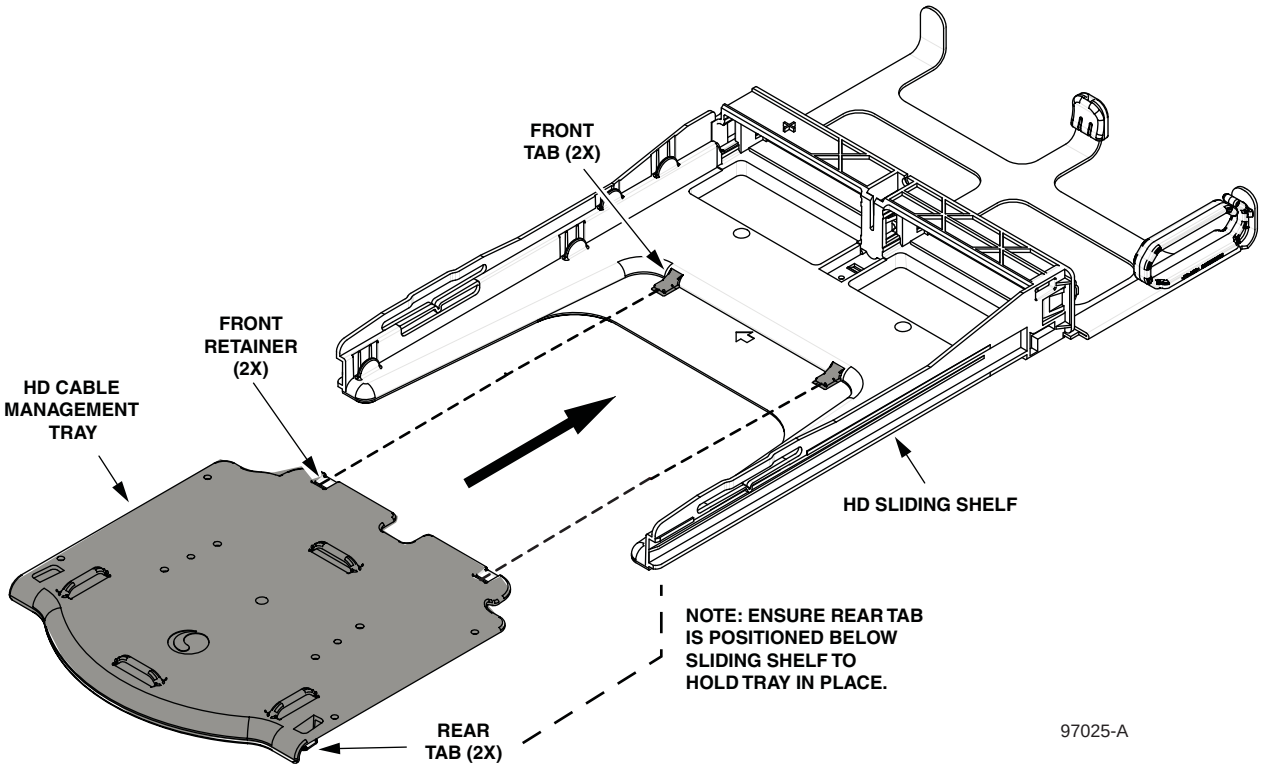
CUSTOMER SUPPORT

For general information on CommScope products, visit us online using the following URL:
http://www.commscope.com

For technical assistance on this or any product, go to the following URL:
https://www.commscope.com/Support Center

PATENTS

For information on current or pending CommScope patents, go to:
http://www.cs-pat.com



HD Cable Management Tray & HD Sliding Shelf

COMMSCOPE®

TECP-96-194 Rev C May 2019

LC and MPO Connectors

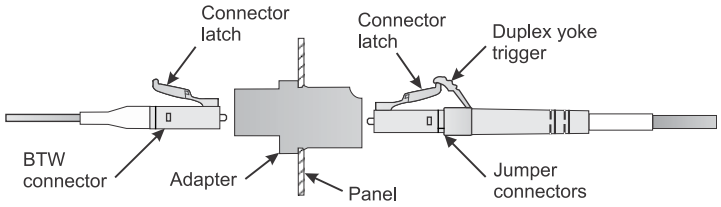
Instructions for Use

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

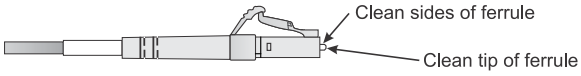
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

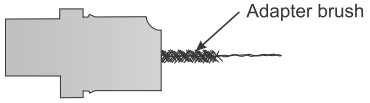
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



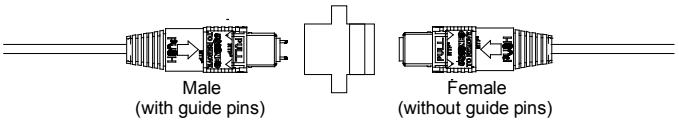
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



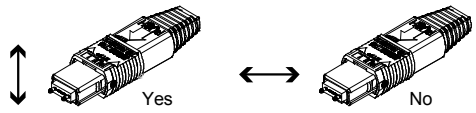
3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

   Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.

Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

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How to Contact Us

- For product information and support, visit us on the web at http://www.commscope.com/SupportCenter
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

Instructions for Use

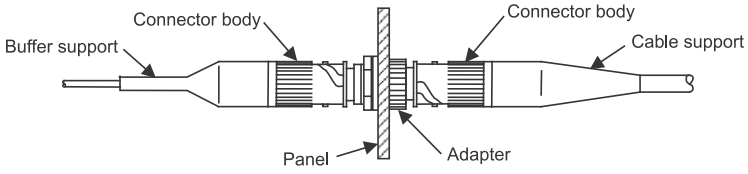
ST® and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST® Connectors into Adapter

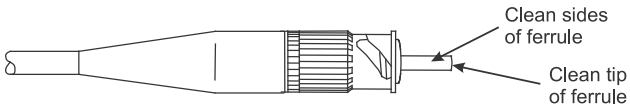
1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the **ST** cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of **ST** connectors, use the **ST** cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



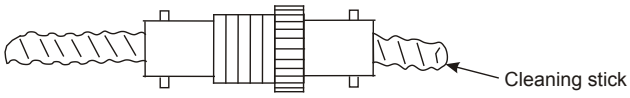
Clean *ST* Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.

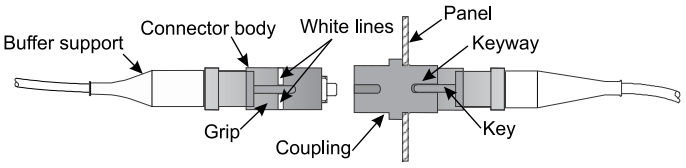


Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

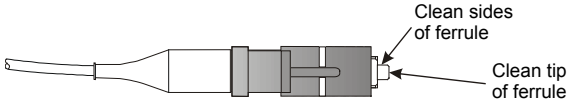


Clean SC Connector and Adapter

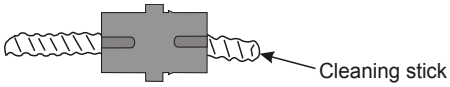
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.

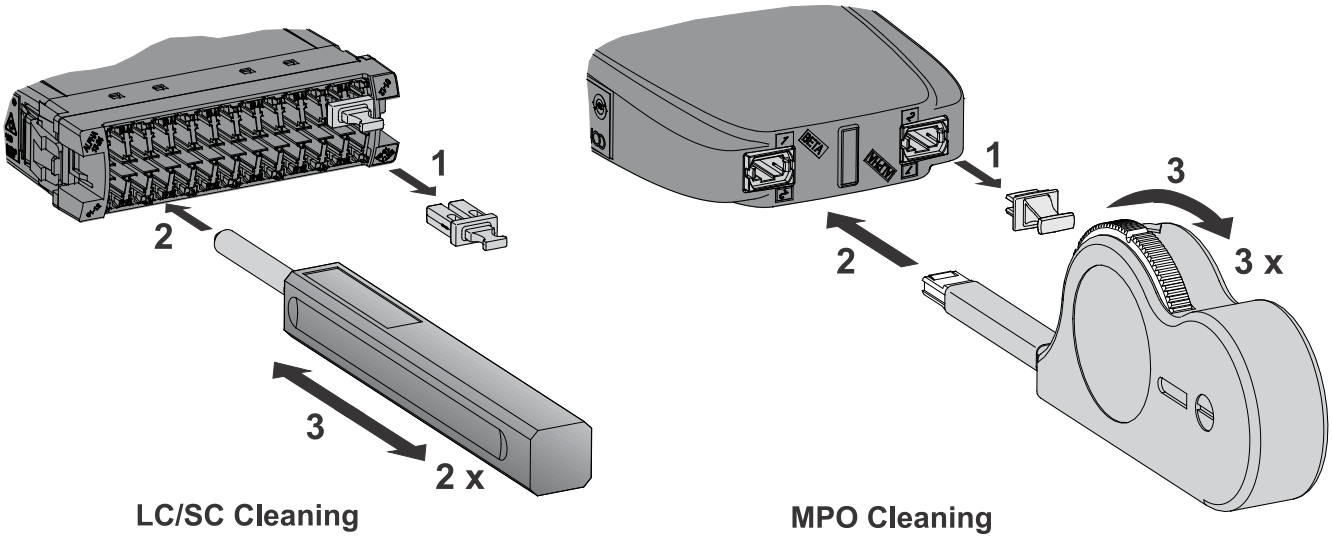


LC/SC and MPO Module Port Cleaning Instructions

The Fiber Optic Connector Cleaning and Inspection Kit (MID 760053199) contains all the tools and materials required to properly clean module ports.

Replacement consumables (MID 760053207) are available for the Cleaning and Inspection Kit.

For more information refer to http://docs.commscope.com/Public/CommEnt_Cleaning_Procedures.pdf



Clean each module port prior to installing a mating connector.

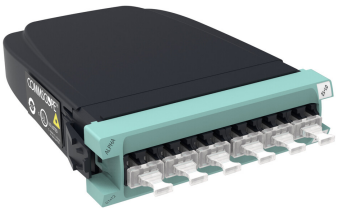
Tools Required

- LC/SC **IBC**™ cleaner
- MPO **IBC** cleaner

How to Contact Us

- To find out more about **CommScope**® products, visit us on the web at http://www.commscope.com/
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

760242967 | 360DMiP-12LC-LS



InstaPATCH® 360 LazrSPEED® Standard Module, 12 LC fibers (6 duplex ports), Aqua, iPatch Ready

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber module

General Specifications

Functionality	Breakout
Adapters, quantity, front	6
Adapters, quantity, rear	1
Color, front	Aqua
Color, rear	Gray
Data Module Type	Standard
Intelligence Type	iPatch® ready
Interface, front	LC/UPC
Interface, rear	MPO
Interface Feature, rear	Pinned | Reduced footprint
Shuttered	Yes
Total Fibers, quantity	12
Total Ports, quantity, front	12

Dimensions

Height	30.48 mm | 1.2 in
Width	91.44 mm | 3.6 in
Depth	116.84 mm | 4.6 in

Optical Specifications

Fiber Mode	Multimode
Fiber Type	OM4, LazrSPEED® 550

Insertion Loss Change, mating	0.3 dB
Insertion Loss Change, temperature	0.3 dB
Insertion Loss, maximum	0.47 dB

Environmental Specifications

Safety Standard	UL

Packaging and Weights

Packaging quantity	1

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant/Exempted
UK-ROHS	Compliant

* Footnotes

Insertion Loss Change, mating	Maximum insertion loss change after 500 matings
Insertion Loss Change, temperature	Maximum insertion loss change from -10 °C to +60 °C (+14 °F to +140 °F)

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Application guide

High speed migration SYSTIMAX® InstaPATCH® 360 and SYSTIMAX Ultra-Low-Loss configuration guideline

Contents

SYSTIMAX® preterminated fiber-optic cabling systems configuration guide

Introduction

SYSTIMAX® InstaPATCH® 360 and SYSTIMAX 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 InstaPATCH 360 and SYSTIMAX ULL. Detailed instructions outline the design and deployment of SYSTIMAX preterminated fiber infrastructure systems.

Polarity control

SYSTIMAX preterminated systems provide polarity control mechanisms that ensure signals are correctly routed through array fiber modules, trunks and fanout cables. Both SYSTIMAX ULL and SYSTIMAX InstaPATCH 360 use Method B trunks and aligned-key adapters.

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.

The new SYSTIMAX ULL system uses the Enhanced Method B fiber routing within the modules and fanout cables, eliminating the ALPHA/BETA orientation and port labeling.

The MPO connector, MPO pins, keys and polarity

The MPO connector was developed by NTT-AT in the mid-1980s and is internationally standardized in IEC 61754-7 as well as TIA/EIA 604-5. Both InstaPATCH 360 and SYSTIMAX ULL connectors are factory terminated in pinned and unpinned versions, as shown in Figure 1.

Male MPO (pinned) “MX” Female MPO (unpinned)

Figure 1. Pinned and unpinned MPO connectors

The pinned MPO is commonly referred to as male, or MPO(m), while the MPO without pins is referred to as female, or MPO(f). With the exception of the pins, the MPO connectors are identical. A pair of MPO connectors are mated by aligning the precision guide pins on the MPO(m) connector with the pin holes in the MPO(f) connector.

Depending on the application, MPO connectors are available in 8-fiber, 12-fiber or 24-fiber configurations. InstaPATCH 360 trunks and modules are available with 12-fiber MPO connectors (black boot). SYSTIMAX ULL MMF trunks and modules are available in 12-fiber as well as 8t-fiber (gray boot) and 24-fiber MPO connectors (red boot) SMF are available in 8- and 12-fiber; see Figure 2.

Figure 2. MPO connector fiber counts

MPO connectors with aqua colored grips denote OM2, OM3 or OM4 fiber type, lime green denotes OM5, green denote SM for InstaPATCH 360 and SYSTIMAX ULL.

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).

Note that two female 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 male MPO connectors will not insert and latch in an adapter without inflicting permanent damage to one or both of the connectors.

MPO connectors and adapters have interlocking lugs and notches (commonly referred to as “keys”) that ensure proper orientation of the mating connectors. MPO keys are critical components of both polarity management and singlemode angle management.

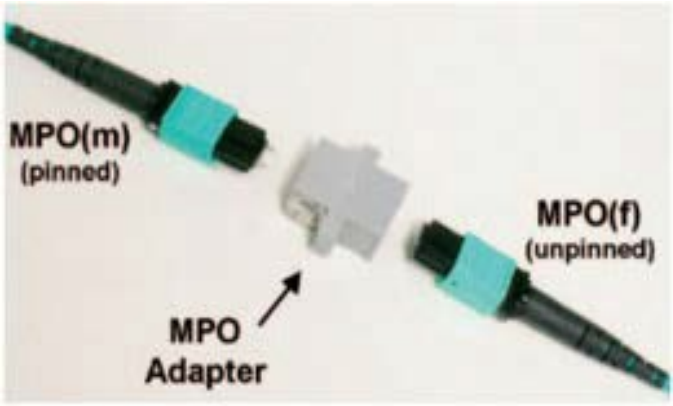


Figure 3. MPO connectors and MPO adapter

InstaPATCH® 360 and SYSTIMAX ULL systems assure correct system polarity regardless of the network design topology. 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. Both systems utilize Method B polarity control, which uses “aligned key” MPO adapters. Key orientation on MPO connectors is established in the factory to implement specific polarity design criteria. Both InstaPATCH 360 and SYSTIMAX ULL take advantage of the TIA/EIA 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 mated pair of MPO connectors in an InstaPATCH 360 or SYSTIMAX ULL link.

Aligned-key adapters are easily recognized by their light gray color; opposed-key adapters are black in color, as shown in Figure 4.

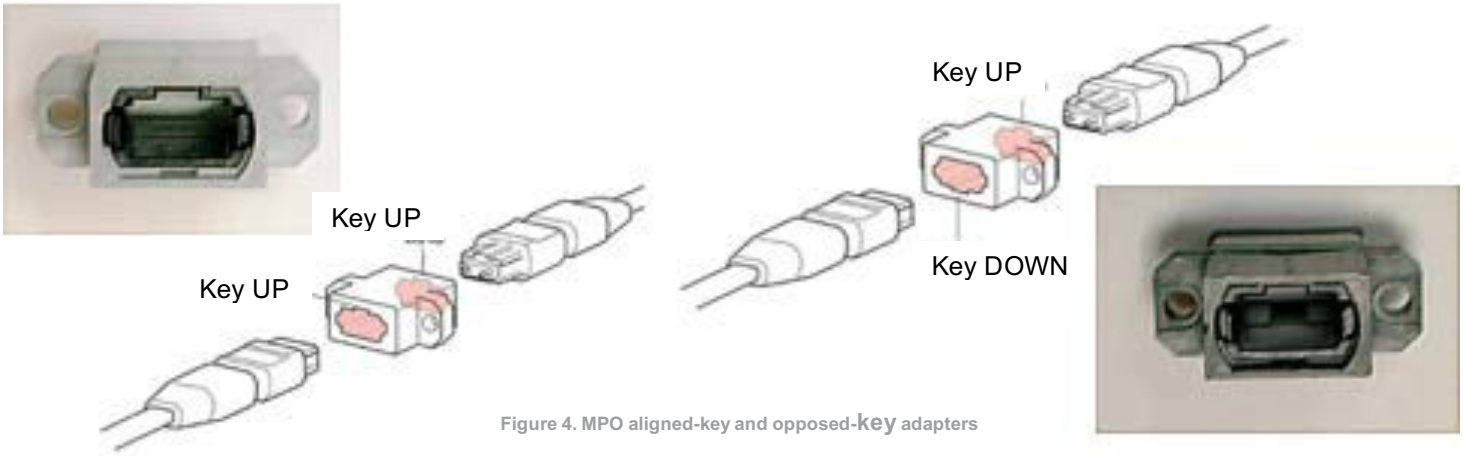


Figure 4. MPO aligned-key and opposed-key adapters

CommScope fiber-optic cable

InstaPATCH 360 products are available with CommScope LazrSPEED® 300 (OM3), LazrSPEED 550 (OM4), LazrSPEED 550 wideband (OM5), or TeraSPEED SM fiber. SYSTIMAX ULL products are available with LazrSPEED 550 (OM4) LazrSPEED 550 wideband (OM5) or TeraSPEED SM fiber.

LazrSPEED 300 and 550 products are identified with an aqua-color jacket and LazrSPEED 550 wideband jackets are lime green. InstaPATCH 360 and SYSTIMAX ULL SM products are identified with a yellow jacket.

InstaPATCH 360 cable assemblies are available in 12-fiber round (IPD) cordage types up to a total fiber count of 144 fibers.

SYSTIMAX ULL cable assemblies are available in 8-fiber, 12-fiber or 24-fiber round (IPD) cordage types up to a total of 144 fibers.

Product Descriptions

Data modules (DM)

Modules 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 modules contain male MPO connectors and are intended to be used with InstaPATCH 360 trunk cables. SYSTIMAX ULL modules contain female MPO connectors and are intended to be used with SYSTIMAX ULL trunk cables.

InstaPATCH 360 modules 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 16).

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

Visual identification of DM modules

InstaPATCH 360 DM modules have a rounded housing with a small color icon on the back, which denotes fiber type. ALPHA/BETA labeling and may have either one or two MPO adapters on the back; see Figure 5. The aqua color denotes OM4 LazrSPEED 550 fiber, lime green color denotes OM5 WB fiber and blue denotes SM.

Figure 5. InstaPATCH 360 DM module

SYSTIMAX ULL DM modules have a squared-off housing with a large, colored bulkhead on the back that denotes fiber type and may have 1, 2 or 3 MPO adapters on the back.
SYSTIMAX ULL DM modules may also be identified by gray-colored latch assists on the front; see Figure 6.

Figure 6. SYSTIMAX ULL DM module

SYSTIMAX ULL module variations

In addition to multiple fiber types, SYSTIMAX ULL modules are also available with one 24-fiber(MMF), two 12-fiber, or three 8-fiber MPOs on the back—and all SYSTIMAX ULL DM modules have 24 LCs on the front, arranged in 12 duplex LC ports differently based on MPO type.

SYSTIMAX ULL modules with two 12-fiber MPOs are similar to InstaPATCH 360 modules with two 12-fiber MPO adapters on the back, but due to internal fiber routing changes that eliminate the need for ALPHA/BETA, port labeling has changed on the front and the rear. The MPO ports are simply numbered 1 and 2 and the duplex LC ports are numbered 1-12 starting in the lower 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 7.

DM12-24LC-LS-UL

Figure 7. SYSTIMAX ULL 12-fiber MPO module

SYSTIMAX MMF ULL modules are also available with a single 24-fiber MPO on the back. The duplex LC ports are numbered 1-12 starting in the lower left corner (same as 12-fiber MPO version); see Figure 8.

DM24-24LC-WB-ULL

Figure 8. SYSTIMAX ULL 24-fiber MPO module

SYSTIMAX ULL modules are also available with three 8-fiber MPOs on the back. In this version, the duplex LC ports are arranged differently. They are arranged in three groups of four, identified by the color of the LC 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 9.

DM08-24LC-WB-ULL

Figure 9. SYSTIMAX ULL eight-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 eight aligned-key MPO adapters. These are used to connect trunk cables to equipment cords, fanout cables and trunk extensions. InstaPATCH 360 and SYSTIMAX ULL use the same MPO adapter panels; see Figure 10.

360DP-8MPO

Figure 10. MPO adapter panel

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 one 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 SYSTIMAX ULL trunks are available in multiples of 8, 12 or 24 fibers, up to a total of 144 fibers.

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

InstaPATCH 360 trunks have *female unpinned* MPO connectors on both ends for connection to InstaPATCH 360 modules or MPO adapter pass-through panels.

SYSTIMAX ULL trunks have *male pinned* MPO connectors on both ends for connection to SYSTIMAX ULL modules or MPO adapter pass-through panels.

MPO(f)-MPO(m) trunk extension cables

Extension cables are used to extend the reach of a 24-fiber MMF trunk cable. Extension cables share the same construction as MPO-to-MPO trunk cables; however, trunk extensions must have female MPOs on one end and male MPOs on the other to mate with the trunk that is being extended. One end will be mated to a trunk and the other end will be mated to a module, fanout or equipment cord.

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 11.

Figure 11. 24-fiber trunk extension fiber polarity

EHD Modules

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

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

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

Figure 14. SYSTIMAX EHD 24-DM-24LC-WB-B_ULL

EHD TeraSPEED modules are available in 2X12f to 24LC and 3X8f to 24LC. EHD LazrSPEED 550 and 550 WB are available in 1X24f to 24LC, 2X12f to 24LC and 3X8f to 24LC.

Figure 15. SYSTIMAX Splice module

EHD Splice modules are available in LazrSPEED OM4 and TeraSPEED SM with stranded and ribbon fiber options.

MPO-MPO cross-connect 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-connects have male pinned MPO connectors on both ends for patching between InstaPATCH 360 trunks.

SYSTIMAX ULL trunks have female unpinned MPO connectors on both ends for connection to SYSTIMAX ULL modules' trunks.

Ruggedized fanout cables

Ruggedized fanout cables—also known as hydra cables, direct attach or breakout cables—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 male or female MPO. Care must be taken to order the correct fanout type or an incompatible mating will result. Ruggedized fanout cables use the same cable and construction as trunks' cables, but the total fiber count is limited to 96. These cables are typically used when cable routing exits the cabinet or rack.

InstaPATCH 360 ruggedized fanout cables are available with LC, SC or ST connectors; SYSTIMAX ULL ruggedized fanouts are available only with LC connectors.

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 can be configured with MPO connectors on both ends—or on just one end with simplex or duplex connectors on the other.

SYSTIMAX InstaPATCH array cables are available with either 12-fiber or 24-fiber MPO connectors. SYSTIMAX ULL array cords are available with 8-fiber (gray), 12-fiber (black) or 24-fiber (red) MPO connectors. 8-fiber and 12-fiber cords are 3.0 millimeters in diameter and 24-fiber cords are 3.6 millimeters. These cables are used typically when cable routing remains within the rack or cabinet.

InstaPATCH 360 array fanout cables are available with LC, SC or ST connectors, SYSTIMAX ULL array fanout cables are available only with LC connectors.

SYSTIMAX ULL MPO-MPO array cables have female MPO connectors on each end, thus eliminating the possibility of plugging a male MPO into and damaging electronic equipment.

Comparison of Method B polarity to enhanced Method B

Due to its topology independence and ease of implementation, CommScope has long been an advocate of Method B polarity for MPO-based systems. InstaPATCH 360 requires the use of ALPHA/BETA modules. ALPHA/BETA is describing the flippable orientation of the modules when they are installed in a shelf or panel. One module is in ALPHA orientation and the other module is in BETA. Flipping modules keeps like-numbered ports in the same place on both ends of a channel; see Figures 16 and 17. (Port 1 will always be bottom left on the module.)

Figure 16. ALPHA/BETA modules used in InstaPATCH 360

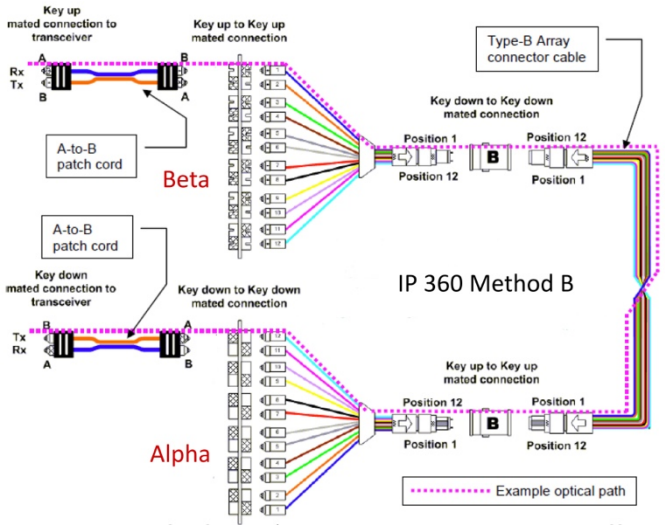


Figure 17. InstaPATCH 360 Method B

SYSTIMAX 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 18 and 19.

Figure 18. Modules used in SYSTIMAX ULL

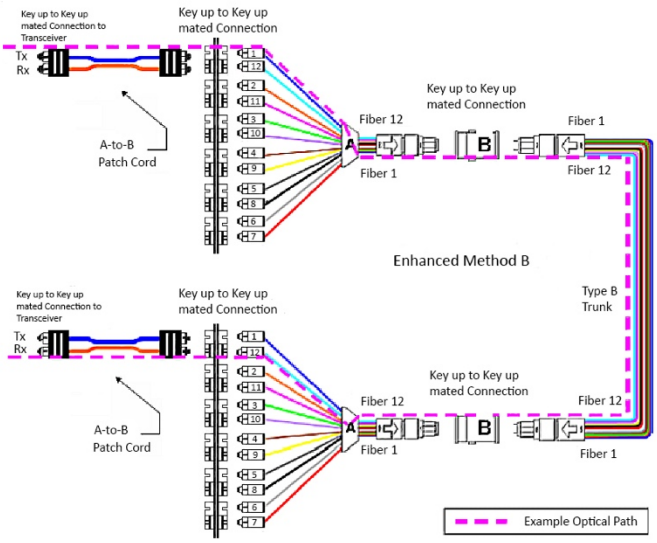


Figure 19. SYSTIMAX ULL enhanced Method B

SM ferrule angle and InstaPATCH 360 Method B

SM 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 -55 decibels or better. Since Method B polarity requires the use of aligned-key MPO adapters, male and female MPO connectors used in InstaPATCH 360 cable assemblies are angled in opposite directions. Male MPO connectors (MX) are angled down relative to the key and female connectors (MP) are angled up, as illustrated in Figure 20.

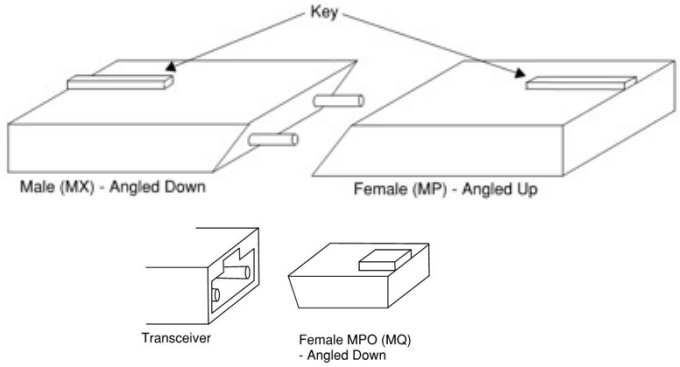


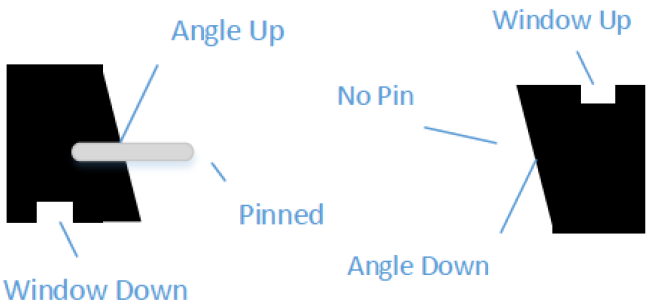
Figure 20. InstaPATCH 360 SM MPO angle orientation

These opposing angles ensure physical contact between fibers when the connectors are mated together; however, when an equipment connection is required, the female MPO connector must match the angle of the electronic equipment. All SM MPO-based transceivers are designed to accept female MPO connectors with down angles. As a result, a third MPO variant was introduced for InstaPATCH 360 SM MPO equipment cables. This down-angled female MPO connector is identified in InstaPATCH 360 systems with the code “MQ.” MQ connectors are identical in every respect to MP connectors except for the direction of the angle—making them compatible with SM transceivers but incompatible with MX connectors.

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

SM ferrule angle and SYSTIMAX ULL Enhanced Method B

For Enhanced Method B the angles on SM MPO connectors have been reversed. Male connectors are angle up relative to the key and female connectors are angled down. This eliminates the need for special MPO connectors to interface with electronics.

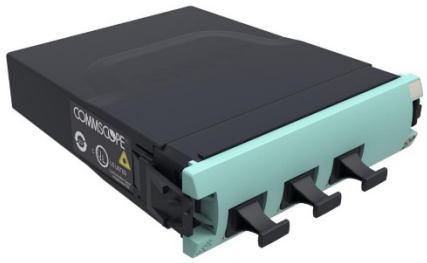


Conversion Modules (CM)

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 module allows for three 8-fiber transceivers to use two 12 fiber trunks without any dark fiber.

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

InstaPATCH 360 CM modules come in both SM and OM4 MM. They are both available in a 2x3 or double density 4x6 configurations.



360CM12-2x3-LS Front View

360CM-2x3-LS Rear View

360CM12-4X6-TS Front View

360CM12-4X6-TS Rear View

SYSTIMAX ULL CM modules use the same square back housing as the InstaPATCH CM modules. The SYSTIMAX ULL version can be visually identified by gray-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.

SYSTIMAX ULL CM modules are available in OM4 (Aqua), OM5 (Lime Green in color) and SM (Blue in color)
SYSTIMAX ULL CM Modules are available with either two 12-fiber MPOs or a single 24-fiber MPO on the back.

CM12-2x3-LSOM4 ULL Front View

CM12-4X6-SM ULL Front View

CM12-4X6-SM ULL Rear View

SYSTIMAX ULL CM module variations

Specialty 24-fiber Cable Assemblies

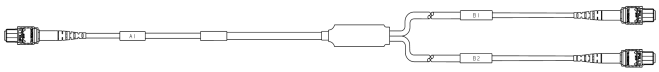
IP360 1X2 Bi-furcated Fanouts

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 female (connector code 2P), but the 12-fiber MPO connectors may be either male or female, depending on the application. Connector code CP or CX are used for IP360 assemblies.

SYSTIMAX ULL 1X2 Bi-Furcated Fanouts
The ULL 24-fiber MPO connector is always female (connector code 2C) with the 12-fiber connectors male or female (connector codes MP and MX).

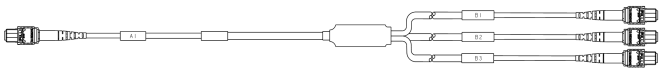
1X2 Bi-furcated fanouts with OM4 fiber are available in both InstaPATCH and SYSTIMAX ULL. OM5 versions are only available in SYSTIMAX ULL.



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 male or female, depending on the application (connector code QP or QX).

1X3 Tri-furcated fanouts with OM4 and SM fiber are available in both InstaPATCH. OM5 is only available in SYSTIMAX ULL.



2x3 Fanouts

2X3 Fanouts serve much the same purpose as CM Modules 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 female 8-fiber MPO connectors.

	End A MM	End B MM	End A SM	End B SM
IP360	QP	PP, PX	QQ	PP, PX
ULL	QP	MP, MX	QP	MP, MX

2X3Fanouts with OM4 and SM fiber are available in InstaPATCH. OM4, OM5 and SM versions are available in SYSTIMAX 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 module 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 21.

Figure 21. Labeling of duplex end of InstaPATCH 360 fanout cables

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

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 22.

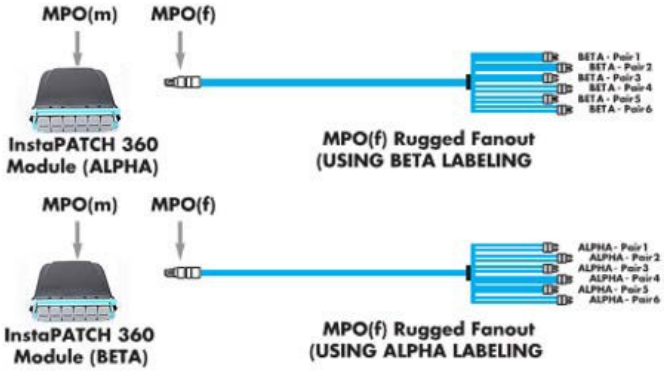


Figure 22. InstaPATCH 360 module orientation and use of ALPHA/BETA labeling in fanout cables.

Typical MPO configurations for InstaPATCH 360 systems

Using trunks to interconnect to modules

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

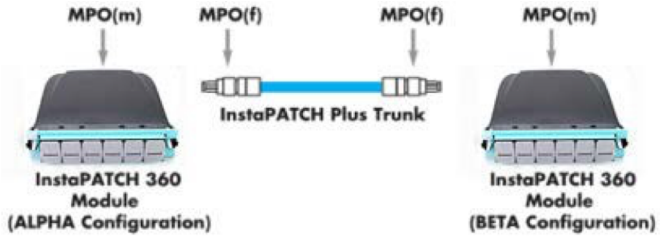


Figure 23. InstaPATCH 360 modules in ALPHA/BETA orientation

Using trunk extension cables

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

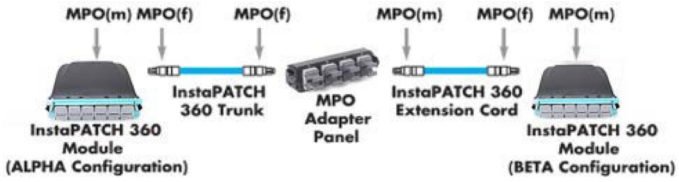


Figure 24. InstaPATCH 360 extension cables

Using MPO-MPO array/equipment cables

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

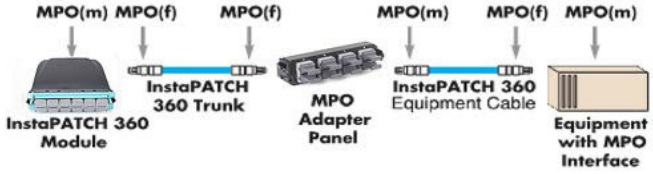


Figure 25. InstaPATCH 360 array/equipment cables

Note—for SM InstaPATCH applications, the MPO connector mating 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 20.

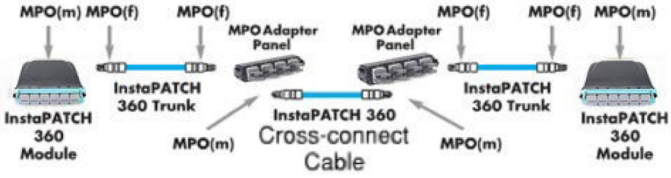


Figure 20. InstaPATCH 360 cross-connect cable

Using rugged or array fanout cables with modules

When fanout cables mate to InstaPATCH 360 modules, as illustrated in Figure 26, the fanout MPO must be female.

Figure 26. InstaPATCH 360 MPO(f) fanout cable

Using rugged or array fanout cables with trunks

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

When fanout cables mate to InstaPATCH 360 trunks through an MPO adapter panel, the fanout must have a male MPO connector; see Figure 27.

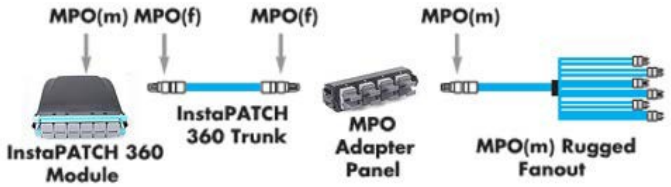
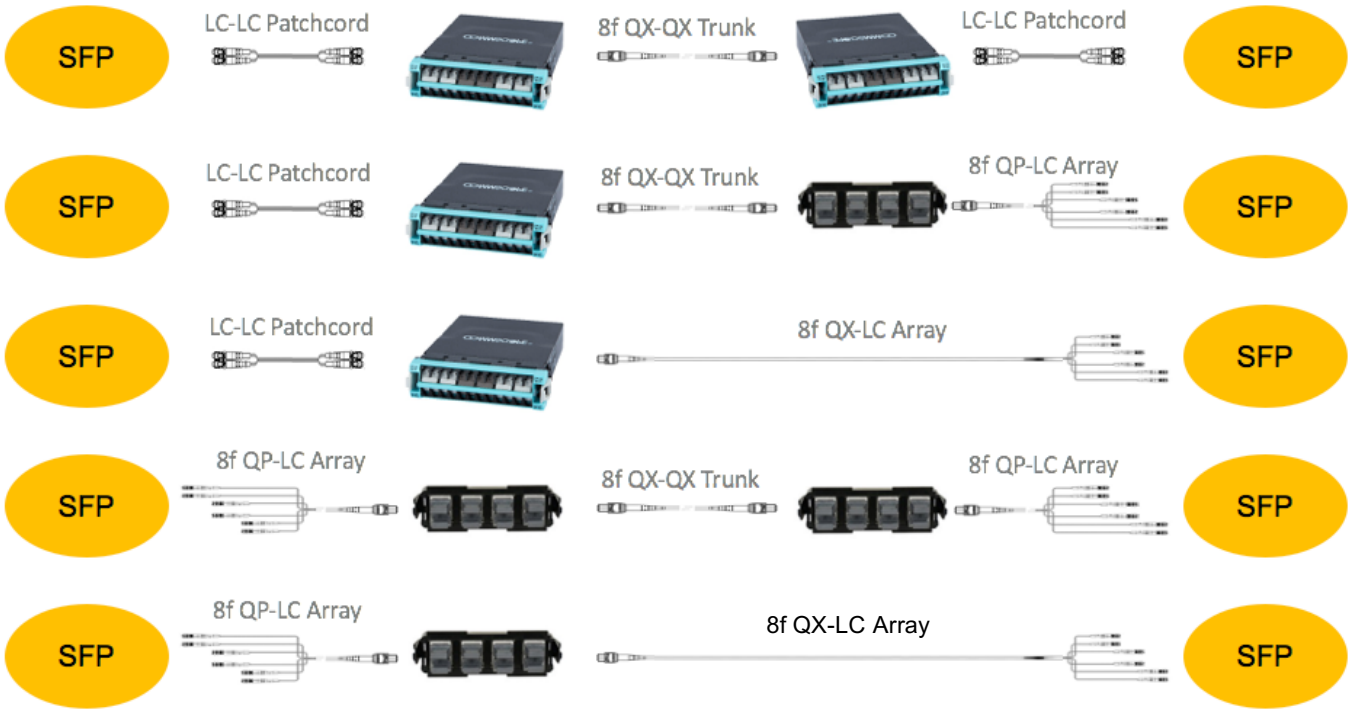


Figure 27. InstaPATCH 360 MPO(m) fanout cable

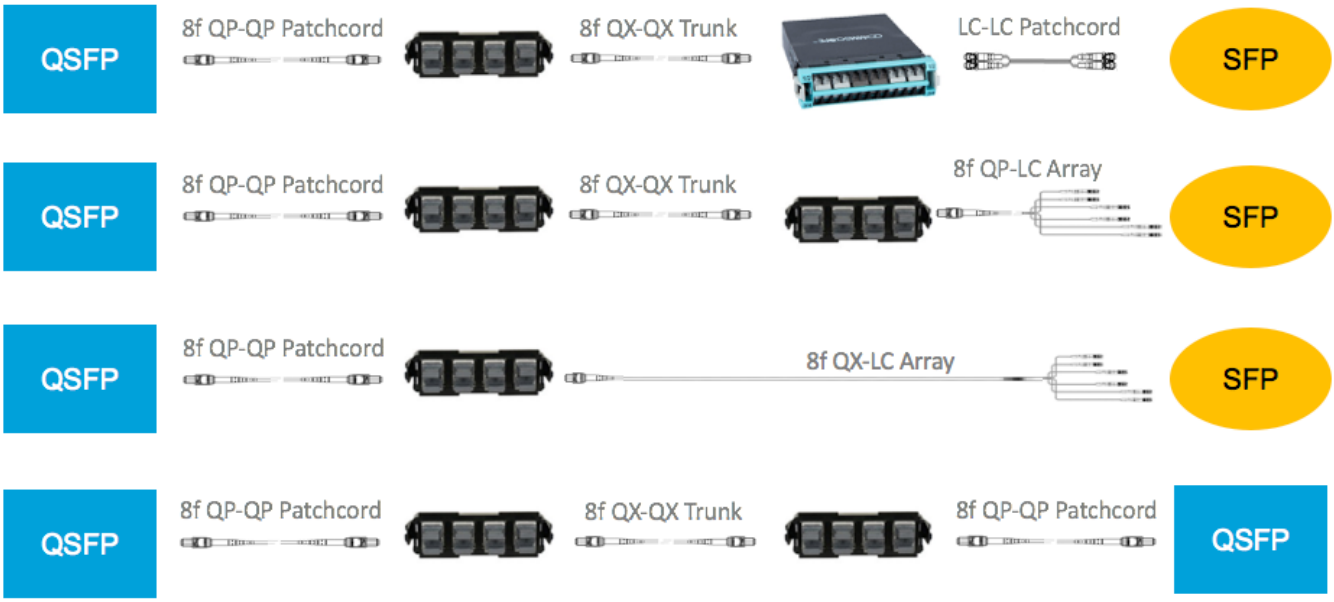
SYSTIMAX ULL Enhanced Method B MPO Configurations

SYSTIMAX ULL Distribution Modules (DM), Conversion Modules (CM), 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 singlemode components.

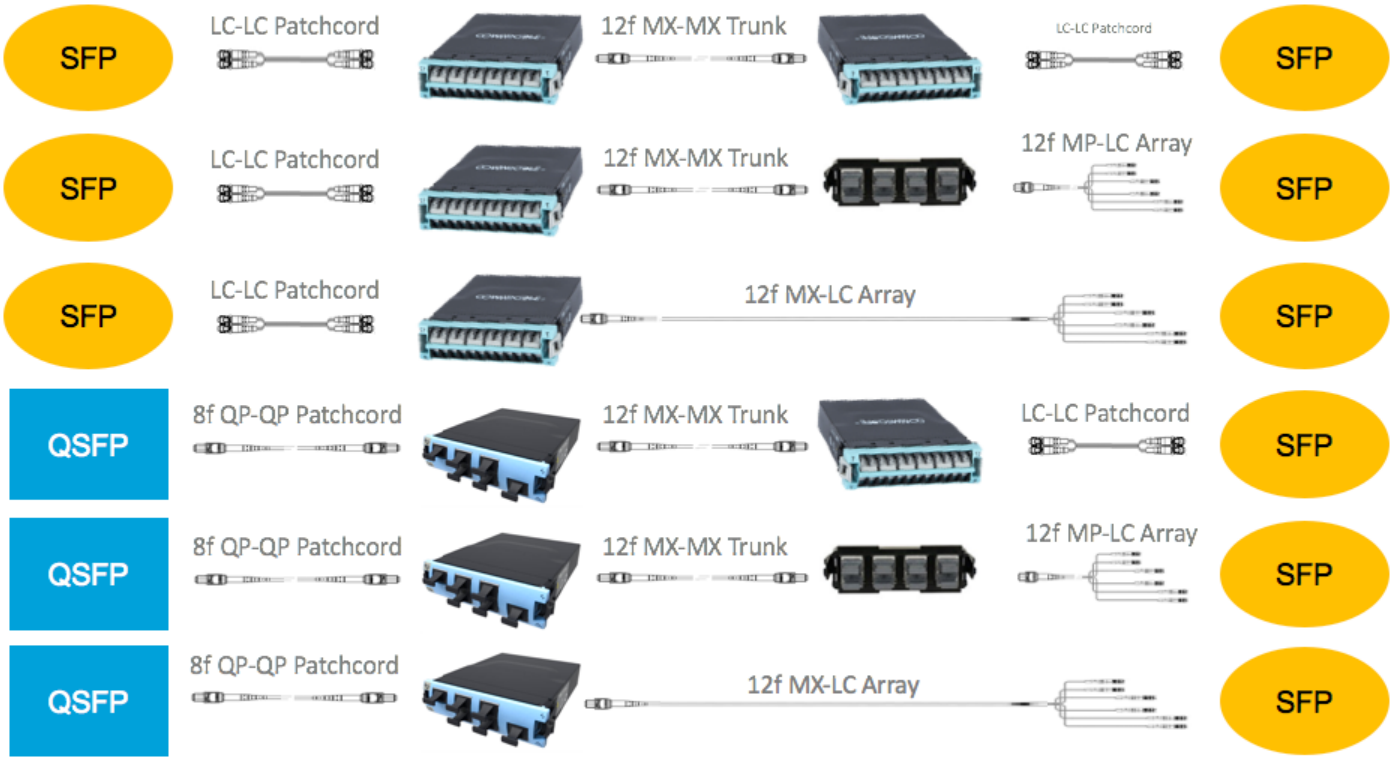
MPO8 Duplex configurations



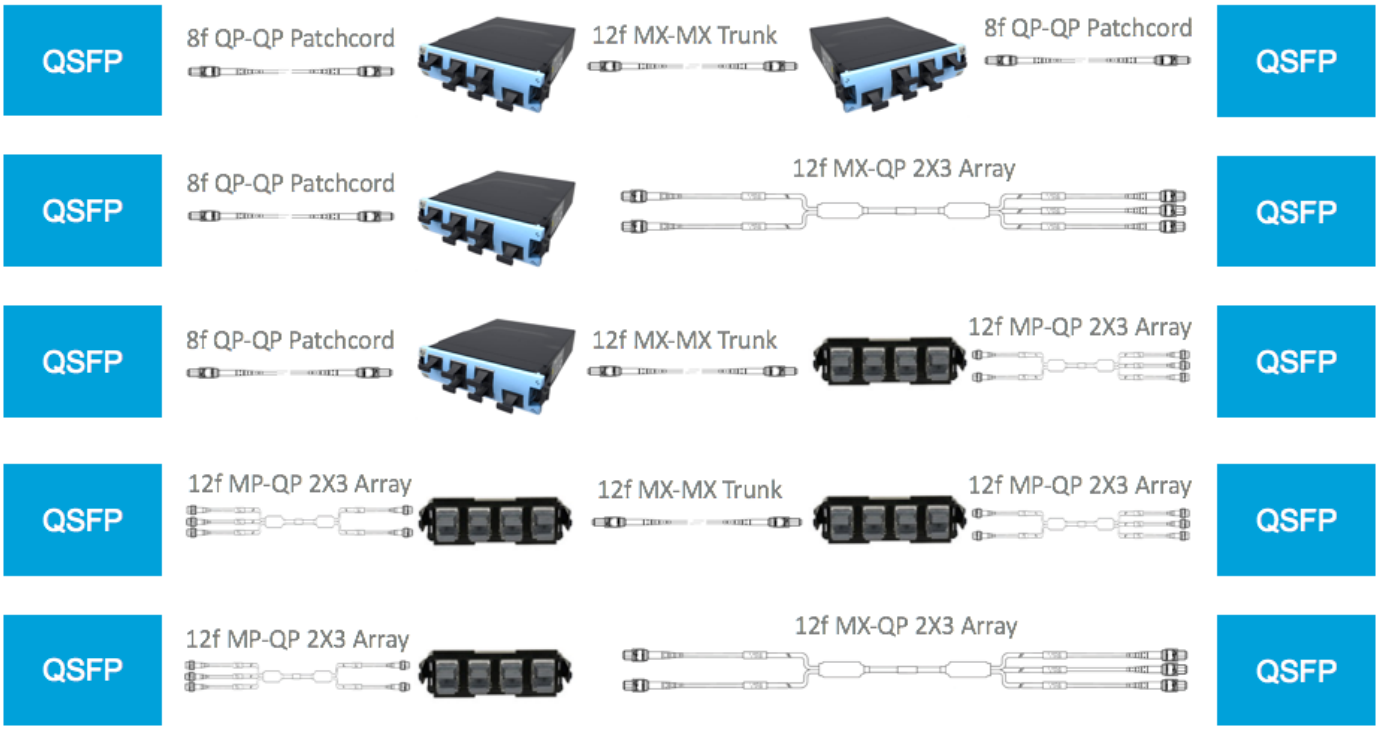
MPO8 QSFP Configurations



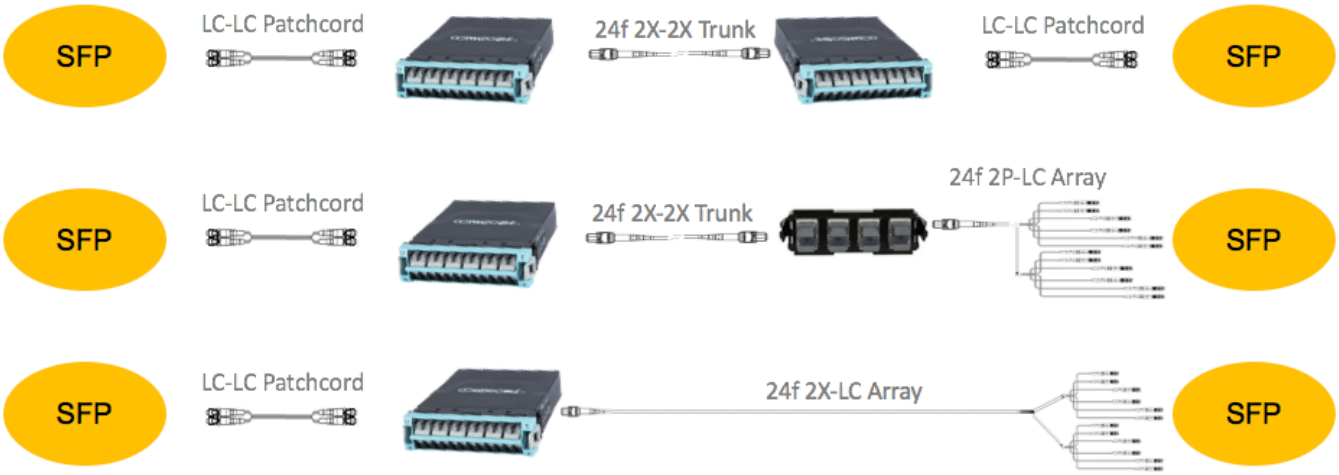
MPO12 Duplex Configurations



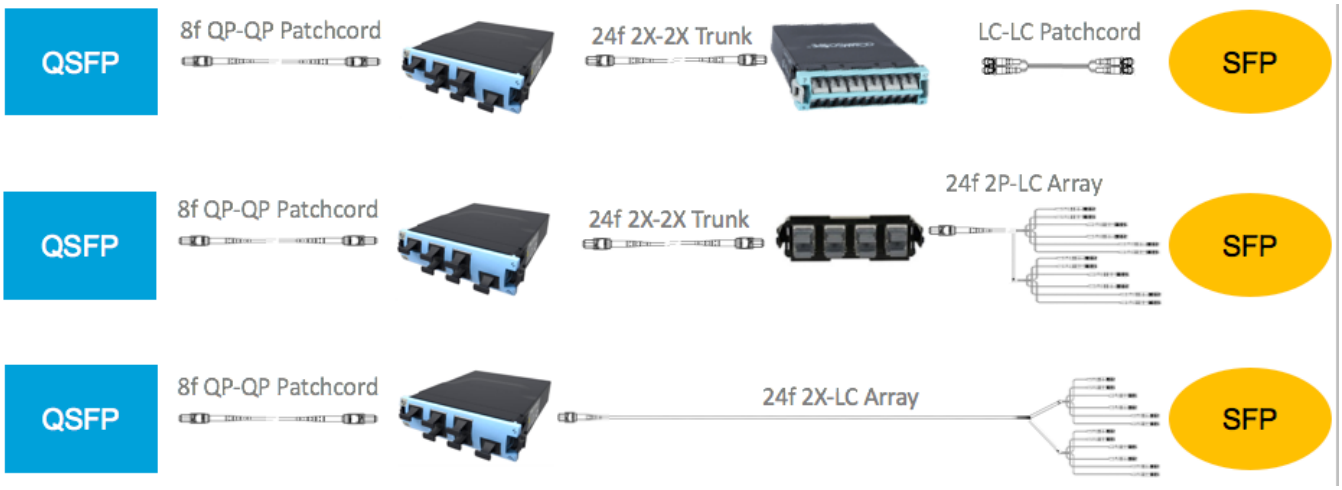
MPO12 QSFP



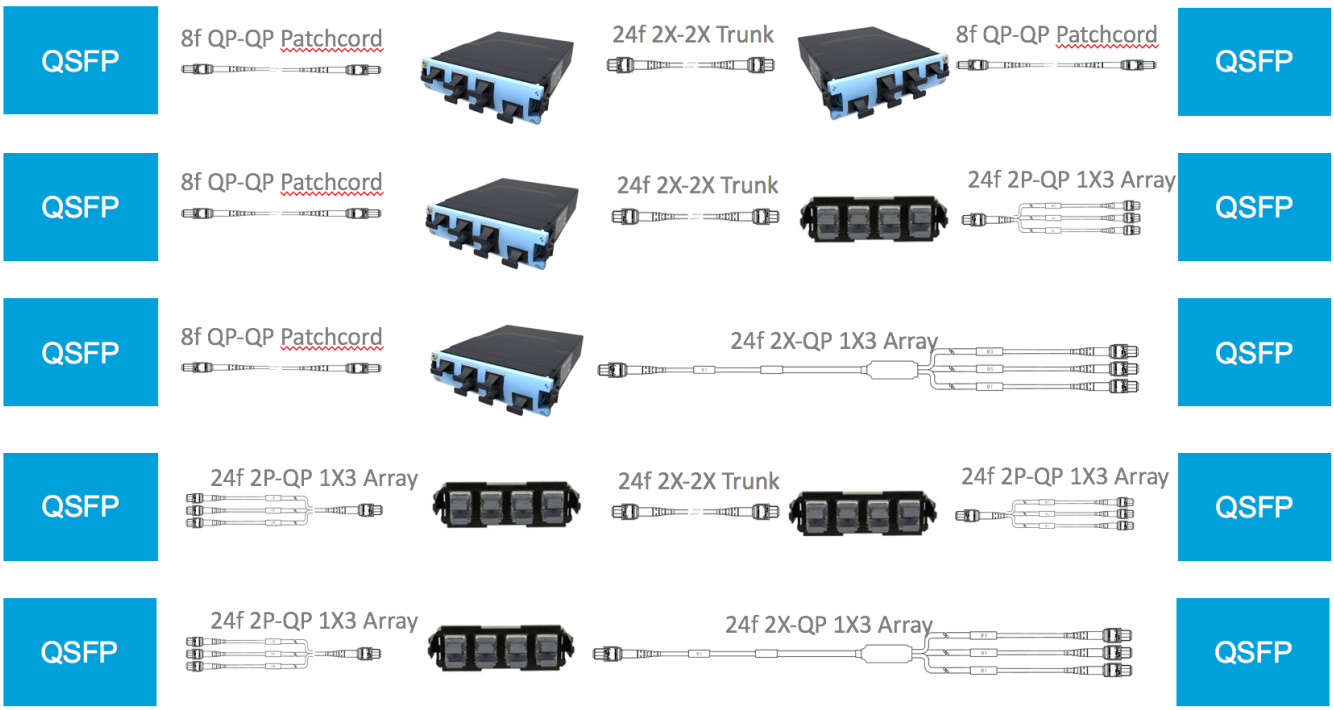
MPO24 Duplex



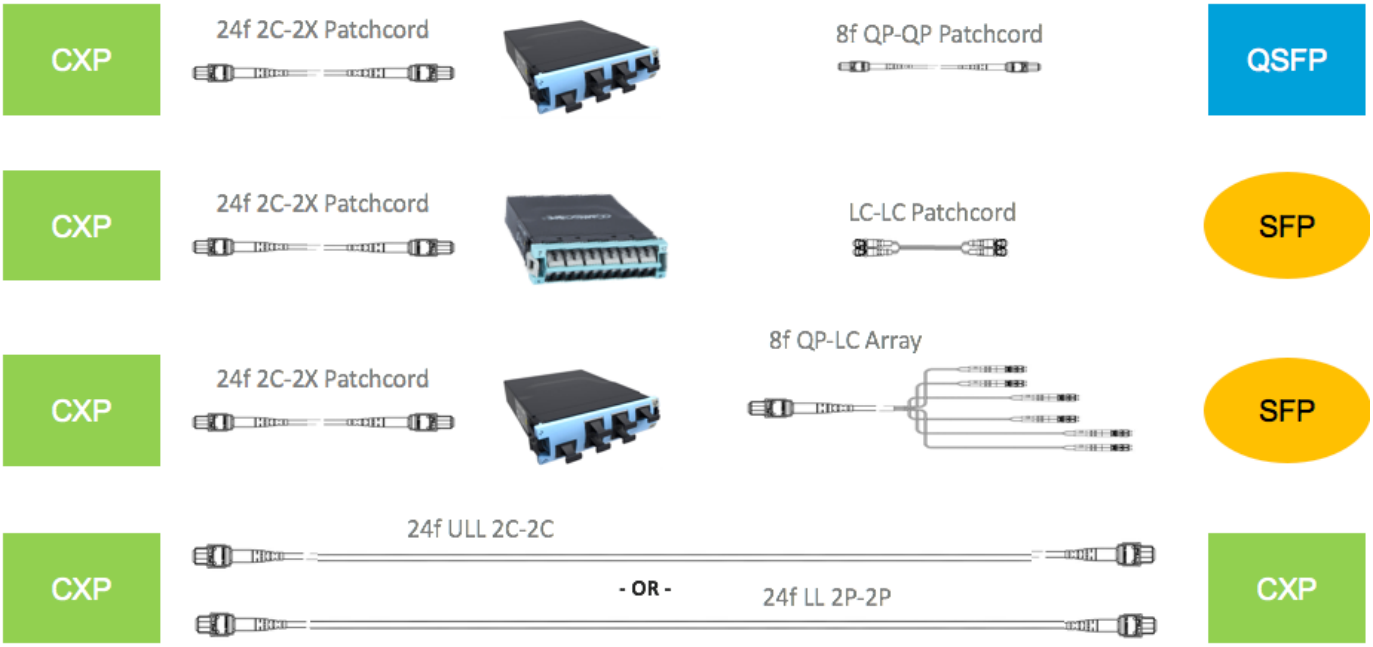
MPO24 QSFP/Duplex



MPO24 QSFP



MPO24 CXP/CFP



SYSTIMAX IP360 and ULL configuration rules

Instapatch 360 Basic configuration rules

InstaPATCH® 360 Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) 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(f) 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(m) 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.

SYSTIMAX ULL basic configuration rules

SYSTIMAX ULL Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) connector and an aligned-key MPO adapter (keying option k=2, key-up to key-up).

SYSTIMAX ULL Rule Number 2:
Adding or removing MPO pins in the field is not allowed.

SYSTIMAX ULL Rule Number 3:
Any SYSTIMAX ULL direct connection to an DM or CM or EHD Module, or to an MPO optical array transceiver shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 4:
Any connection to SYSTIMAX ULL trunks terminated in MPO Adapter panels shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 5:
Only SYSTIMAX solutions® factory-manufactured components shall be used in an SYSTIMAX ULL channel or link.

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TP-108195.3-EN (10/17)

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United States

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Scope:

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Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None

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	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

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CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

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ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

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CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou,Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
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CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
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Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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ANSI National Accreditation Board
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ISO/IEC 17021-1
MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
Commscope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karanataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
https://www.dekra.us/en/audits/

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17021-1 MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou,Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:
Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001

Dr. Cem O. Onus
Managing Director

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IAF

证 书 附 录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技（苏州）有限公司

中国江苏省苏州工业园区启明路77 号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料（网络跳线、配线装置等）的生产。

认证结构: **多场所**

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10

Dr. Cem O. Onus
Managing Director

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MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No: **EMS 648387**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Euless Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

LIMITED WARRANTY

1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A,** (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization**. Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver**. If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15^{th}) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

(a) improper installation or misapplication of parts;
(b) chain or system failures induced by other products or components;
(c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
(d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
(e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
(f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
(g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
(h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
(i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
(j) use of the Product for purposes other than that for which it was designed; or
(k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.	Hardware One (1) Year Software Ninety (90) Days
Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
Category C Products Intentionally left blank.	
Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
Category E Products Intentionally left blank	
Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
Category F1 Products All CHP Headend Optical (HEO) Elements	Hardware Three (3) Years Software Ninety (90) Days
Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.	Hardware Five (5) Years Software Ninety (90) Days
Category G2 Products All CH3 Headend (HEO) Elements	One (1) year
Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories	Hardware Three (3) Years Software Ninety (90) Days

Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.	Hardware One (1) Year Software Ninety (90) Days
Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™® Workforce Management, Mobile TV, SecureMedia and Titanium	Hardware One (1) Year Software Ninety (90) Days
Category J Products Intentionally left blank	
Category K Products Intentionally left blank.	
Category L Products Intentionally left blank	
Category M Products Intentionally left blank.	
Category N Products Intentionally left blank.	
Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS	DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days
Category P Products Intentionally left blank.	
Category P1 Products Intentionally left blank	
Category Q Products Intentionally left blank	
Category R Products Intentionally left blank	
Category R1 Products Intentionally left blank	
Category S Products Intentionally left blank	
Category S1 Products Intentionally left blank	

LIMITED WARRANTY

Category T Products RUCKUS Wi-Fi	Hardware: - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an "e" suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** Software Ninety (90) Days
Category T1 Products RUCKUS ICX Switches	- ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product
Category T2 Products Intentionally left blank	
Category U Products Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC) NovuX Products Prodigy Products FDH Products Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable Assemblies OSP "Box" Products Mini-RDTs and RDTs FOSC™, FIST™ and Tenio™ OSP Copper Connect and Closure Products HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes Fiber Optic Panels, including Accessories, Mounting Hardware, Modules Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables, Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks Passive Optical Components and Value Added Modules (VAMs) FiberGuide® : Fiber cable Management System Optical Distribution Frames, including Modules, Blocks, Accessories and Hardware Cabinets Cable and Apparatus Products Alifabs™ Cabinets & Ancillary Products Alifabs™ Telecommunications Towers and Accessories Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets	One (1) year

LIMITED WARRANTY

Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products Electronic Enclosure Products (Cabinets) Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines) PowerShift™ & Power Products	Two (2) years
Category W Products ValuSite® Products I-Line Accessory Products Microwave Antennas Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)	Three (3) years
Category X Products Broadband RF Connectivity Products Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products	Five (5) years
Category Y Products QR® Coaxial Cable	Five (5) years
Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products * RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller's connectors in accordance with the installation instructions.	One (1) year
Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products * CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller's connectors by Seller or its certified distributor	Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.
Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products * HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller's connectors by Seller or its certified distributor.	Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.
Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment. Software Ninety (90) Days
Category DD Products In- Building and Fixed Subscriber Antennas	The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment

LIMITED WARRANTY

Category EE Products OneCell® Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days
Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software	Ninety (90) days
Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products	Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year
Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems	Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.
Category II Products SiteRise™ Solutions	One (1) year on workmanship for the Solution.
Category JJ Products Copper Structured Cabling Products Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)	One (1) year from the date of Installation
Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)	One (1) year from the date of completion of the work.
Category LL Products imVision Overlays and Controllers	Three (3) years

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.

COMMSCOPE®

TECP-96-194 Rev C May 2019

LC and MPO Connectors

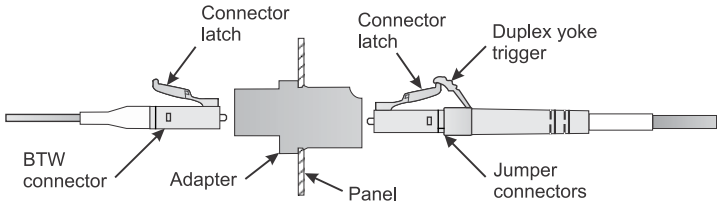
Instructions for Use

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

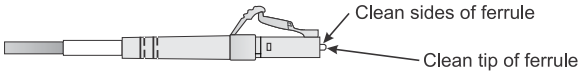
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

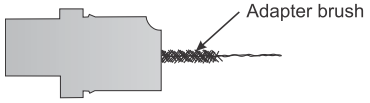
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



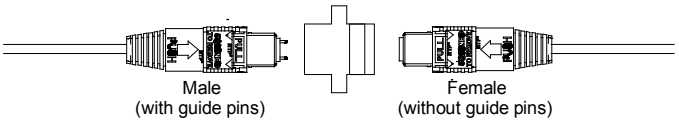
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



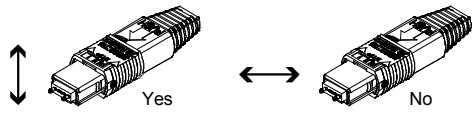
3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

   Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.

Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

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How to Contact Us

- For product information and support, visit us on the web at http://www.commscope.com/SupportCenter
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

Instructions for Use

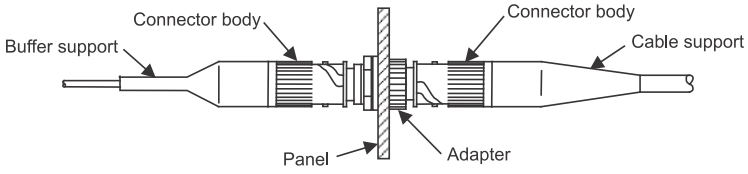
ST® and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST® Connectors into Adapter

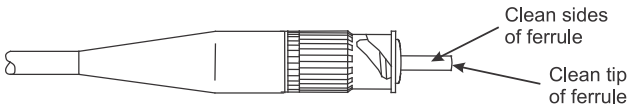
1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the **ST** cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of **ST** connectors, use the **ST** cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



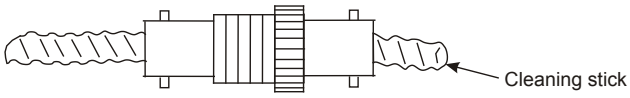
Clean *ST* Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.

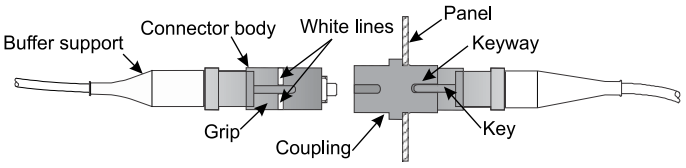


Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

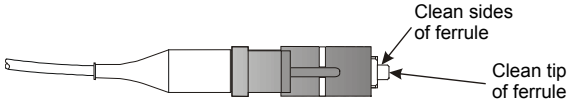


Clean SC Connector and Adapter

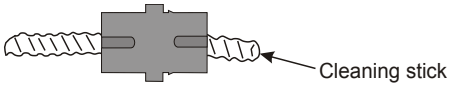
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.

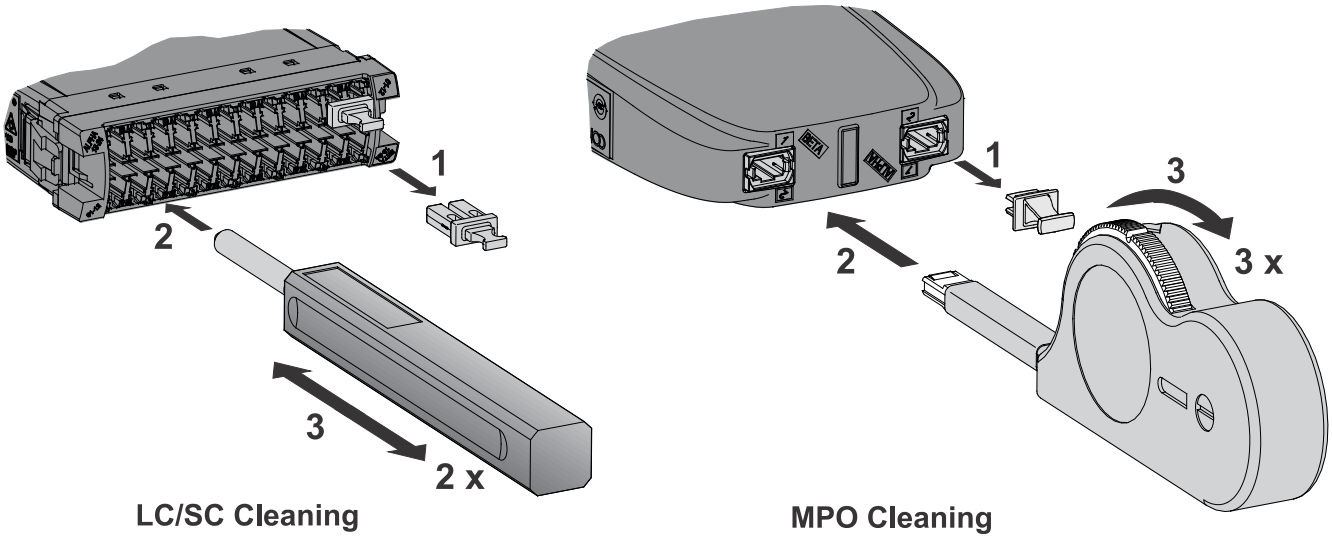


LC/SC and MPO Module Port Cleaning Instructions

The Fiber Optic Connector Cleaning and Inspection Kit (MID 760053199) contains all the tools and materials required to properly clean module ports.

Replacement consumables (MID 760053207) are available for the Cleaning and Inspection Kit.

For more information refer to http://docs.commscope.com/Public/CommEnt_Cleaning_Procedures.pdf



Clean each module port prior to installing a mating connector.

Tools Required

- LC/SC **IBC**™ cleaner
- MPO **IBC** cleaner

How to Contact Us

- To find out more about **CommScope**® products, visit us on the web at http://www.commscope.com/
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

760242971 | 360DMiP-24LC-LS

InstaPATCH® 360 LazrSPEED® Standard Module, 24 LC fibers (12 duplex ports), Aqua, iPatch Ready

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber module

General Specifications

Functionality	Breakout
Adapters, quantity, front	12
Adapters, quantity, rear	2
Color, front	Aqua
Color, rear	Gray
Data Module Type	Standard
Intelligence Type	iPatch® ready
Interface, front	LC/UPC
Interface, rear	MPO
Interface Feature, rear	Pinned | Reduced footprint
Shuttered	Yes
Total Fibers, quantity	24
Total Ports, quantity, front	24

Dimensions

Height	30.48 mm | 1.2 in
Width	91.44 mm | 3.6 in
Depth	116.84 mm | 4.6 in

760242971 | 360DMiP-24LC-LS

Optical Specifications

Fiber Mode	Multimode
Fiber Type	OM4, LazrSPEED® 550
Insertion Loss Change, mating	0.3 dB
Insertion Loss Change, temperature	0.3 dB
Insertion Loss, maximum	0.47 dB

Environmental Specifications

Safety Standard	UL

Packaging and Weights

Packaging quantity	1

Regulatory Compliance/Certifications

Agency	**Classification**
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant/Exempted
UK-ROHS	Compliant/Exempted

* Footnotes

Insertion Loss Change, mating	Maximum insertion loss change after 500 matings
Insertion Loss Change, temperature	Maximum insertion loss change from -10 °C to +60 °C (+14 °F to +140 °F)

COMMSCOPE®

Application guide

High speed migration SYSTIMAX® InstaPATCH® 360 and SYSTIMAX Ultra-Low-Loss configuration guideline

Contents

SYSTIMAX® preterminated fiber-optic cabling systems configuration guide

Introduction

SYSTIMAX® InstaPATCH® 360 and SYSTIMAX 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 InstaPATCH 360 and SYSTIMAX ULL. Detailed instructions outline the design and deployment of SYSTIMAX preterminated fiber infrastructure systems.

Polarity control

SYSTIMAX preterminated systems provide polarity control mechanisms that ensure signals are correctly routed through array fiber modules, trunks and fanout cables. Both SYSTIMAX ULL and SYSTIMAX InstaPATCH 360 use Method B trunks and aligned-key adapters.

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.

The new SYSTIMAX ULL system uses the Enhanced Method B fiber routing within the modules and fanout cables, eliminating the ALPHA/BETA orientation and port labeling.

The MPO connector, MPO pins, keys and polarity

The MPO connector was developed by NTT-AT in the mid-1980s and is internationally standardized in IEC 61754-7 as well as TIA/EIA 604-5. Both InstaPATCH 360 and SYSTIMAX ULL connectors are factory terminated in pinned and unpinned versions, as shown in Figure 1.

Male MPO (pinned) “MX” Female MPO (unpinned)

Figure 1. Pinned and unpinned MPO connectors

The pinned MPO is commonly referred to as male, or MPO(m), while the MPO without pins is referred to as female, or MPO(f). With the exception of the pins, the MPO connectors are identical. A pair of MPO connectors are mated by aligning the precision guide pins on the MPO(m) connector with the pin holes in the MPO(f) connector.

Depending on the application, MPO connectors are available in 8-fiber, 12-fiber or 24-fiber configurations. InstaPATCH 360 trunks and modules are available with 12-fiber MPO connectors (black boot). SYSTIMAX ULL MMF trunks and modules are available in 12-fiber as well as 8t-fiber (gray boot) and 24-fiber MPO connectors (red boot) SMF are available in 8- and 12-fiber; see Figure 2.

Figure 2. MPO connector fiber counts

MPO connectors with aqua colored grips denote OM2, OM3 or OM4 fiber type, lime green denotes OM5, green denote SM for InstaPATCH 360 and SYSTIMAX ULL.

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).

Note that two female 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 male MPO connectors will not insert and latch in an adapter without inflicting permanent damage to one or both of the connectors.

MPO connectors and adapters have interlocking lugs and notches (commonly referred to as “keys”) that ensure proper orientation of the mating connectors. MPO keys are critical components of both polarity management and singlemode angle management.

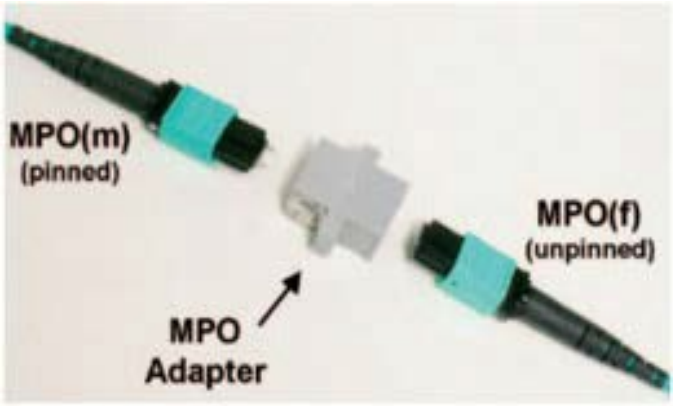


Figure 3. MPO connectors and MPO adapter

InstaPATCH® 360 and SYSTIMAX ULL systems assure correct system polarity regardless of the network design topology. 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. Both systems utilize Method B polarity control, which uses “aligned key” MPO adapters. Key orientation on MPO connectors is established in the factory to implement specific polarity design criteria. Both InstaPATCH 360 and SYSTIMAX ULL take advantage of the TIA/EIA 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 mated pair of MPO connectors in an InstaPATCH 360 or SYSTIMAX ULL link.

Aligned-key adapters are easily recognized by their light gray color; opposed-key adapters are black in color, as shown in Figure 4.

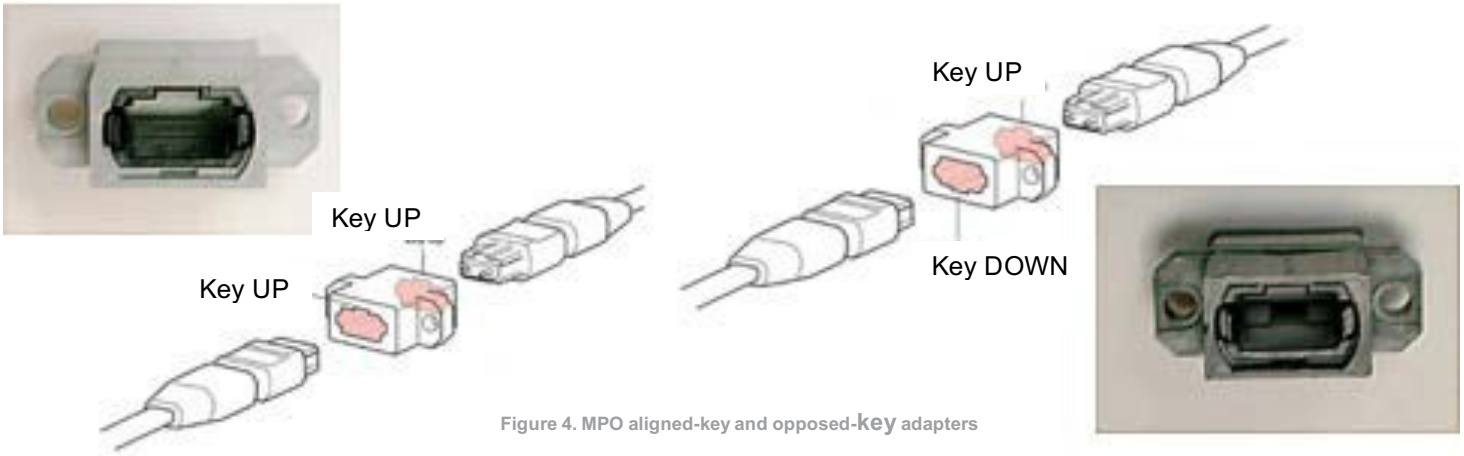


Figure 4. MPO aligned-key and opposed-key adapters

CommScope fiber-optic cable

InstaPATCH 360 products are available with CommScope LazrSPEED® 300 (OM3), LazrSPEED 550 (OM4), LazrSPEED 550 wideband (OM5), or TeraSPEED SM fiber. SYSTIMAX ULL products are available with LazrSPEED 550 (OM4) LazrSPEED 550 wideband (OM5) or TeraSPEED SM fiber.

LazrSPEED 300 and 550 products are identified with an aqua-color jacket and LazrSPEED 550 wideband jackets are lime green. InstaPATCH 360 and SYSTIMAX ULL SM products are identified with a yellow jacket.

InstaPATCH 360 cable assemblies are available in 12-fiber round (IPD) cordage types up to a total fiber count of 144 fibers.

SYSTIMAX ULL cable assemblies are available in 8-fiber, 12-fiber or 24-fiber round (IPD) cordage types up to a total of 144 fibers.

Product Descriptions

Data modules (DM)

Modules 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 modules contain male MPO connectors and are intended to be used with InstaPATCH 360 trunk cables. SYSTIMAX ULL modules contain female MPO connectors and are intended to be used with SYSTIMAX ULL trunk cables.

InstaPATCH 360 modules 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 16).

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

Visual identification of DM modules

InstaPATCH 360 DM modules have a rounded housing with a small color icon on the back, which denotes fiber type. ALPHA/BETA labeling and may have either one or two MPO adapters on the back; see Figure 5. The aqua color denotes OM4 LazrSPEED 550 fiber, lime green color denotes OM5 WB fiber and blue denotes SM.

Figure 5. InstaPATCH 360 DM module

SYSTIMAX ULL DM modules have a squared-off housing with a large, colored bulkhead on the back that denotes fiber type and may have 1, 2 or 3 MPO adapters on the back.
SYSTIMAX ULL DM modules may also be identified by gray-colored latch assists on the front; see Figure 6.

Figure 6. SYSTIMAX ULL DM module

SYSTIMAX ULL module variations

In addition to multiple fiber types, SYSTIMAX ULL modules are also available with one 24-fiber(MMF), two 12-fiber, or three 8-fiber MPOs on the back—and all SYSTIMAX ULL DM modules have 24 LCs on the front, arranged in 12 duplex LC ports differently based on MPO type.

SYSTIMAX ULL modules with two 12-fiber MPOs are similar to InstaPATCH 360 modules with two 12-fiber MPO adapters on the back, but due to internal fiber routing changes that eliminate the need for ALPHA/BETA, port labeling has changed on the front and the rear. The MPO ports are simply numbered 1 and 2 and the duplex LC ports are numbered 1-12 starting in the lower 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 7.

DM12-24LC-LS-UL

Figure 7. SYSTIMAX ULL 12-fiber MPO module

SYSTIMAX MMF ULL modules are also available with a single 24-fiber MPO on the back. The duplex LC ports are numbered 1-12 starting in the lower left corner (same as 12-fiber MPO version); see Figure 8.

DM24-24LC-WB-ULL

Figure 8. SYSTIMAX ULL 24-fiber MPO module

SYSTIMAX ULL modules are also available with three 8-fiber MPOs on the back. In this version, the duplex LC ports are arranged differently. They are arranged in three groups of four, identified by the color of the LC 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 9.

DM08-24LC-WB-ULL

Figure 9. SYSTIMAX ULL eight-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 eight aligned-key MPO adapters. These are used to connect trunk cables to equipment cords, fanout cables and trunk extensions. InstaPATCH 360 and SYSTIMAX ULL use the same MPO adapter panels; see Figure 10.

360DP-8MPO

Figure 10. MPO adapter panel

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 one 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 SYSTIMAX ULL trunks are available in multiples of 8, 12 or 24 fibers, up to a total of 144 fibers.

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

InstaPATCH 360 trunks have *female unpinned* MPO connectors on both ends for connection to InstaPATCH 360 modules or MPO adapter pass-through panels.

SYSTIMAX ULL trunks have *male pinned* MPO connectors on both ends for connection to SYSTIMAX ULL modules or MPO adapter pass-through panels.

MPO(f)-MPO(m) trunk extension cables

Extension cables are used to extend the reach of a 24-fiber MMF trunk cable. Extension cables share the same construction as MPO-to-MPO trunk cables; however, trunk extensions must have female MPOs on one end and male MPOs on the other to mate with the trunk that is being extended. One end will be mated to a trunk and the other end will be mated to a module, fanout or equipment cord.

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 11.

Figure 11. 24-fiber trunk extension fiber polarity

EHD Modules

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

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

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

Figure 14. SYSTIMAX EHD 24-DM-24LC-WB-B_ULL

EHD TeraSPEED modules are available in 2X12f to 24LC and 3X8f to 24LC. EHD LazrSPEED 550 and 550 WB are available in 1X24f to 24LC, 2X12f to 24LC and 3X8f to 24LC.

Figure 15. SYSTIMAX Splice module

EHD Splice modules are available in LazrSPEED OM4 and TeraSPEED SM with stranded and ribbon fiber options.

MPO-MPO cross-connect 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-connects have male pinned MPO connectors on both ends for patching between InstaPATCH 360 trunks.

SYSTIMAX ULL trunks have female unpinned MPO connectors on both ends for connection to SYSTIMAX ULL modules' trunks.

Ruggedized fanout cables

Ruggedized fanout cables—also known as hydra cables, direct attach or breakout cables—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 male or female MPO. Care must be taken to order the correct fanout type or an incompatible mating will result. Ruggedized fanout cables use the same cable and construction as trunks' cables, but the total fiber count is limited to 96. These cables are typically used when cable routing exits the cabinet or rack.

InstaPATCH 360 ruggedized fanout cables are available with LC, SC or ST connectors; SYSTIMAX ULL ruggedized fanouts are available only with LC connectors.

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 can be configured with MPO connectors on both ends—or on just one end with simplex or duplex connectors on the other.

SYSTIMAX InstaPATCH array cables are available with either 12-fiber or 24-fiber MPO connectors. SYSTIMAX ULL array cords are available with 8-fiber (gray), 12-fiber (black) or 24-fiber (red) MPO connectors. 8-fiber and 12-fiber cords are 3.0 millimeters in diameter and 24-fiber cords are 3.6 millimeters. These cables are used typically when cable routing remains within the rack or cabinet.

InstaPATCH 360 array fanout cables are available with LC, SC or ST connectors, SYSTIMAX ULL array fanout cables are available only with LC connectors.

SYSTIMAX ULL MPO-MPO array cables have female MPO connectors on each end, thus eliminating the possibility of plugging a male MPO into and damaging electronic equipment.

Comparison of Method B polarity to enhanced Method B

Due to its topology independence and ease of implementation, CommScope has long been an advocate of Method B polarity for MPO-based systems. InstaPATCH 360 requires the use of ALPHA/BETA modules. ALPHA/BETA is describing the flippable orientation of the modules when they are installed in a shelf or panel. One module is in ALPHA orientation and the other module is in BETA. Flipping modules keeps like-numbered ports in the same place on both ends of a channel; see Figures 16 and 17. (Port 1 will always be bottom left on the module.)

Figure 16. ALPHA/BETA modules used in InstaPATCH 360

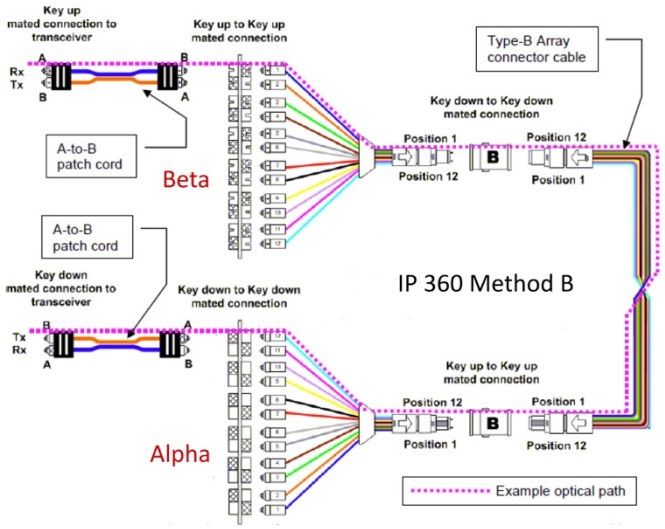


Figure 17. InstaPATCH 360 Method B

SYSTIMAX 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 18 and 19.

Figure 18. Modules used in SYSTIMAX ULL

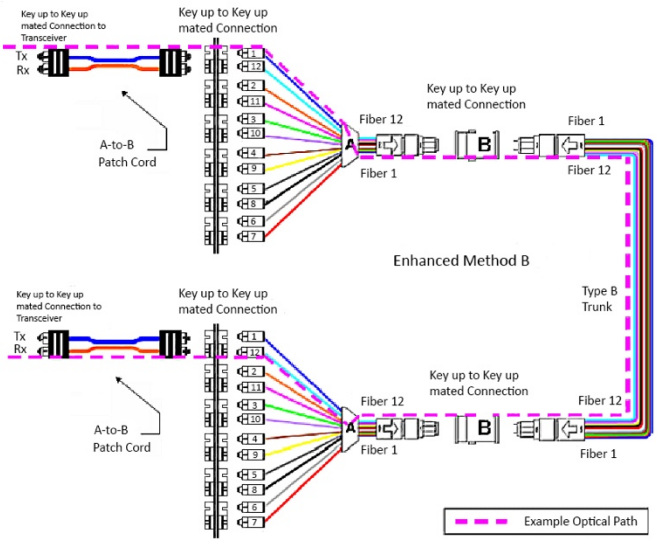


Figure 19. SYSTIMAX ULL enhanced Method B

SM ferrule angle and InstaPATCH 360 Method B

SM 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 -55 decibels or better. Since Method B polarity requires the use of aligned-key MPO adapters, male and female MPO connectors used in InstaPATCH 360 cable assemblies are angled in opposite directions. Male MPO connectors (MX) are angled down relative to the key and female connectors (MP) are angled up, as illustrated in Figure 20.

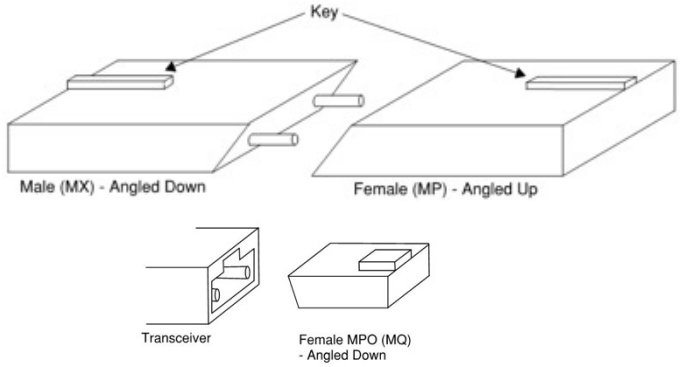


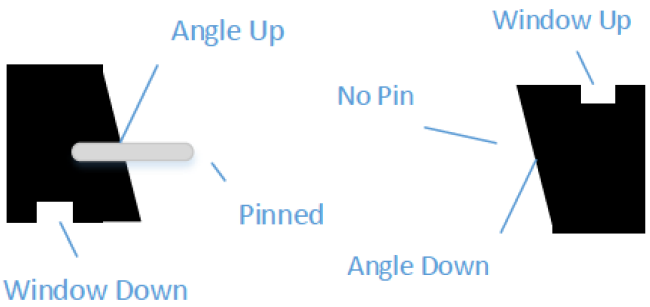
Figure 20. InstaPATCH 360 SM MPO angle orientation

These opposing angles ensure physical contact between fibers when the connectors are mated together; however, when an equipment connection is required, the female MPO connector must match the angle of the electronic equipment. All SM MPO-based transceivers are designed to accept female MPO connectors with down angles. As a result, a third MPO variant was introduced for InstaPATCH 360 SM MPO equipment cables. This down-angled female MPO connector is identified in InstaPATCH 360 systems with the code “MQ.” MQ connectors are identical in every respect to MP connectors except for the direction of the angle—making them compatible with SM transceivers but incompatible with MX connectors.

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

SM ferrule angle and SYSTIMAX ULL Enhanced Method B

For Enhanced Method B the angles on SM MPO connectors have been reversed. Male connectors are angle up relative to the key and female connectors are angled down. This eliminates the need for special MPO connectors to interface with electronics.

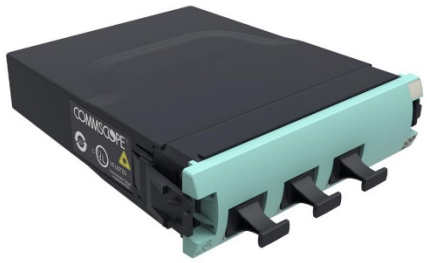


Conversion Modules (CM)

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 module allows for three 8-fiber transceivers to use two 12 fiber trunks without any dark fiber.

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

InstaPATCH 360 CM modules come in both SM and OM4 MM. They are both available in a 2x3 or double density 4x6 configurations.



360CM12-2x3-LS Front View

360CM-2x3-LS Rear View

360CM12-4X6-TS Front View

360CM12-4X6-TS Rear View

SYSTIMAX ULL CM modules use the same square back housing as the InstaPATCH CM modules. The SYSTIMAX ULL version can be visually identified by gray-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.

SYSTIMAX ULL CM modules are available in OM4 (Aqua), OM5 (Lime Green in color) and SM (Blue in color)
SYSTIMAX ULL CM Modules are available with either two 12-fiber MPOs or a single 24-fiber MPO on the back.

CM12-2x3-LSOM4 ULL Front View

CM12-4X6-SM ULL Front View

CM12-4X6-SM ULL Rear View

SYSTIMAX ULL CM module variations

Specialty 24-fiber Cable Assemblies

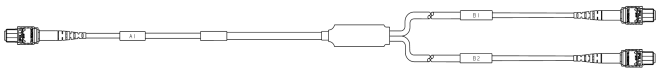
IP360 1X2 Bi-furcated Fanouts

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 female (connector code 2P), but the 12-fiber MPO connectors may be either male or female, depending on the application. Connector code CP or CX are used for IP360 assemblies.

SYSTIMAX ULL 1X2 Bi-Furcated Fanouts
The ULL 24-fiber MPO connector is always female (connector code 2C) with the 12-fiber connectors male or female (connector codes MP and MX).

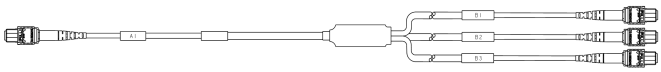
1X2 Bi-furcated fanouts with OM4 fiber are available in both InstaPATCH and SYSTIMAX ULL. OM5 versions are only available in SYSTIMAX ULL.



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 male or female, depending on the application (connector code QP or QX).

1X3 Tri-furcated fanouts with OM4 and SM fiber are available in both InstaPATCH. OM5 is only available in SYSTIMAX ULL.



2x3 Fanouts

2X3 Fanouts serve much the same purpose as CM Modules 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 female 8-fiber MPO connectors.

	End A MM	End B MM	End A SM	End B SM
IP360	QP	PP, PX	QQ	PP, PX
ULL	QP	MP, MX	QP	MP, MX

2X3Fanouts with OM4 and SM fiber are available in InstaPATCH. OM4, OM5 and SM versions are available in SYSTIMAX 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 module 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 21.

Figure 21. Labeling of duplex end of InstaPATCH 360 fanout cables

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

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 22.

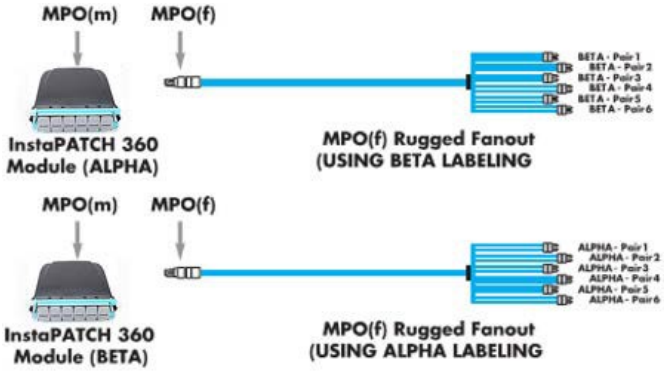


Figure 22. InstaPATCH 360 module orientation and use of ALPHA/BETA labeling in fanout cables.

Typical MPO configurations for InstaPATCH 360 systems

Using trunks to interconnect to modules

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

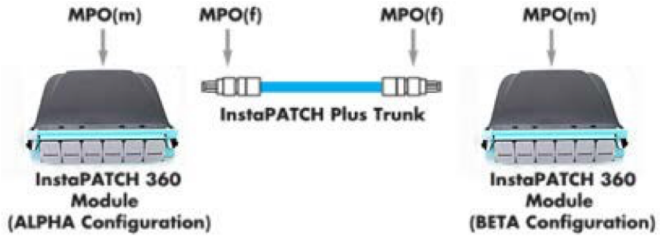


Figure 23. InstaPATCH 360 modules in ALPHA/BETA orientation

Using trunk extension cables

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

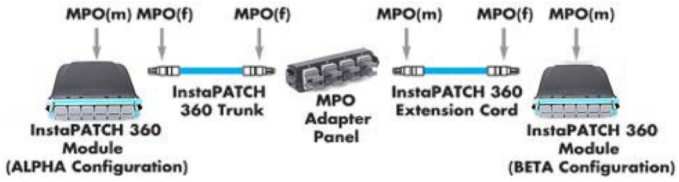


Figure 24. InstaPATCH 360 extension cables

Using MPO-MPO array/equipment cables

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

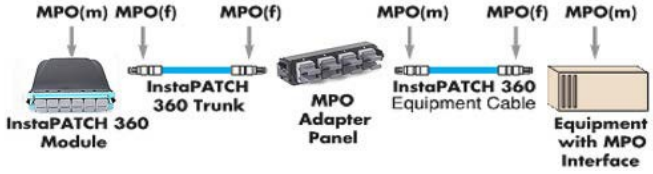


Figure 25. InstaPATCH 360 array/equipment cables

Note—for SM InstaPATCH applications, the MPO connector mating 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 20.

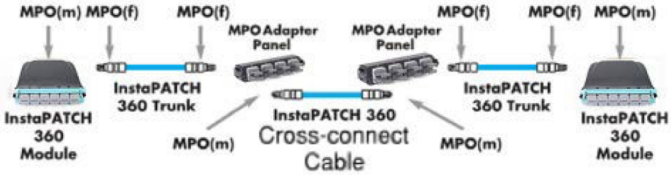


Figure 20. InstaPATCH 360 cross-connect cable

Using rugged or array fanout cables with modules

When fanout cables mate to InstaPATCH 360 modules, as illustrated in Figure 26, the fanout MPO must be female.

Figure 26. InstaPATCH 360 MPO(f) fanout cable

Using rugged or array fanout cables with trunks

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

When fanout cables mate to InstaPATCH 360 trunks through an MPO adapter panel, the fanout must have a male MPO connector; see Figure 27.

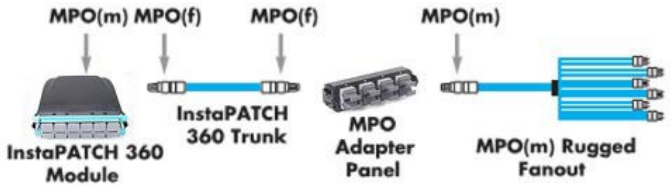
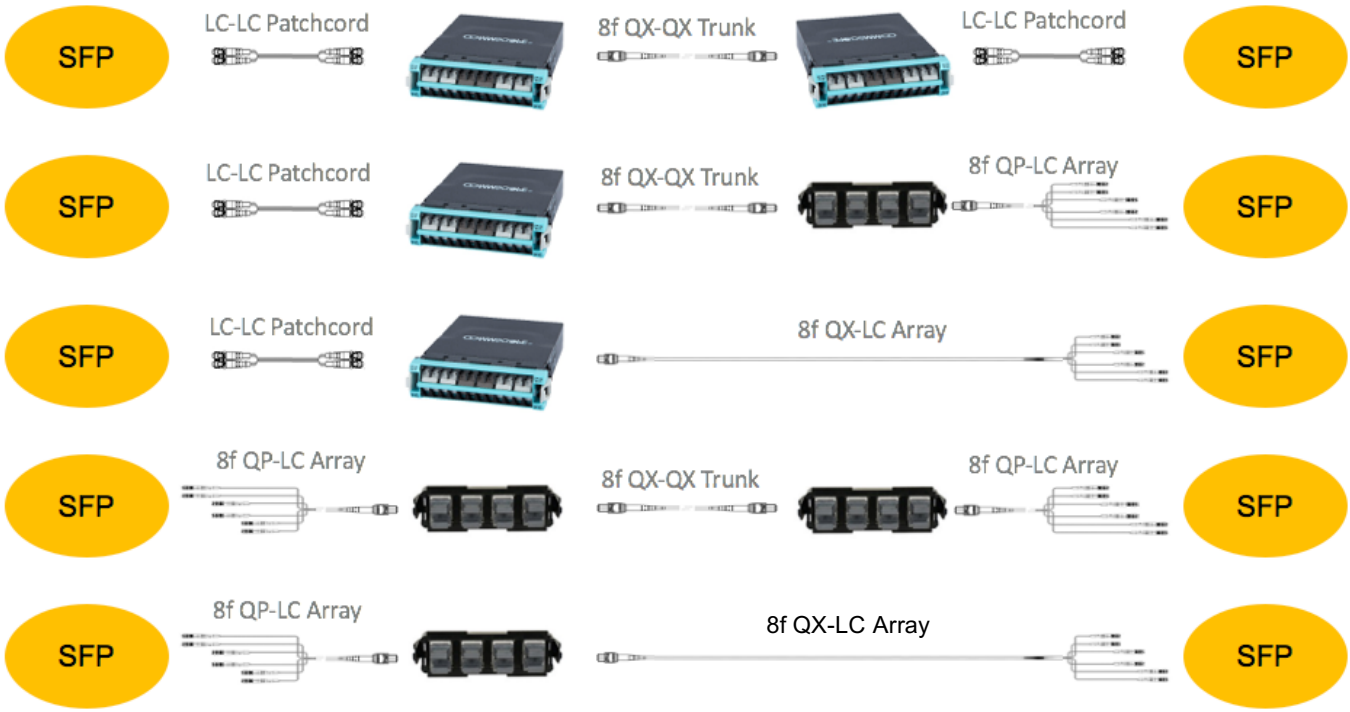


Figure 27. InstaPATCH 360 MPO(m) fanout cable

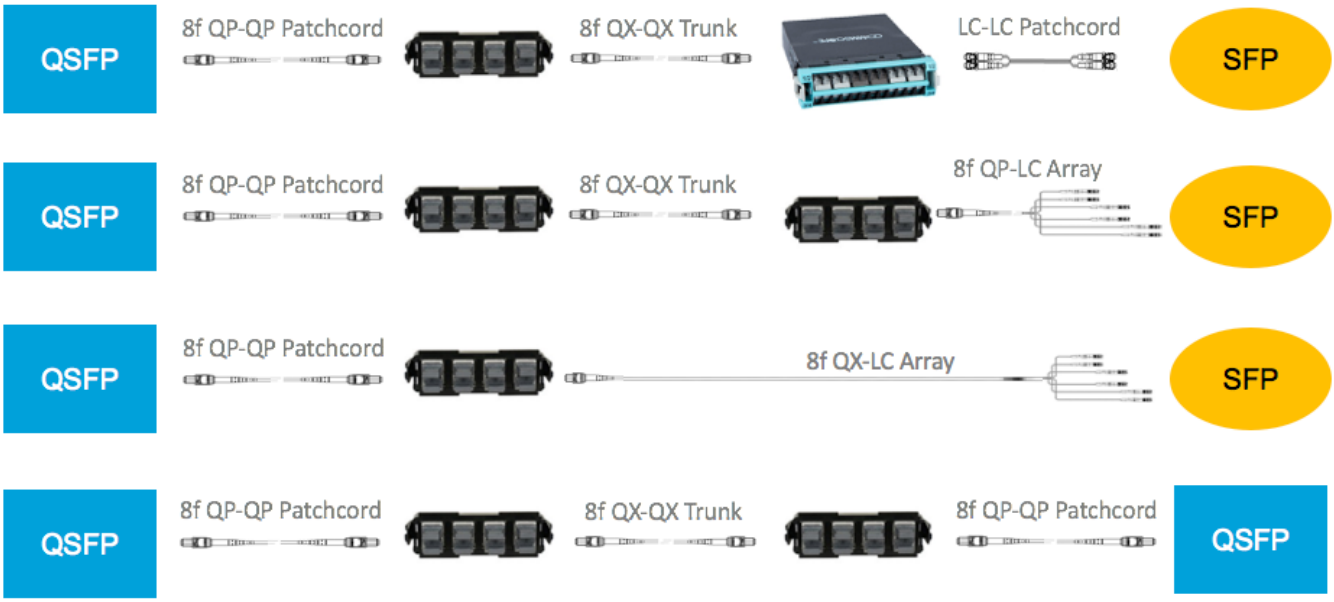
SYSTIMAX ULL Enhanced Method B MPO Configurations

SYSTIMAX ULL Distribution Modules (DM), Conversion Modules (CM), 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 singlemode components.

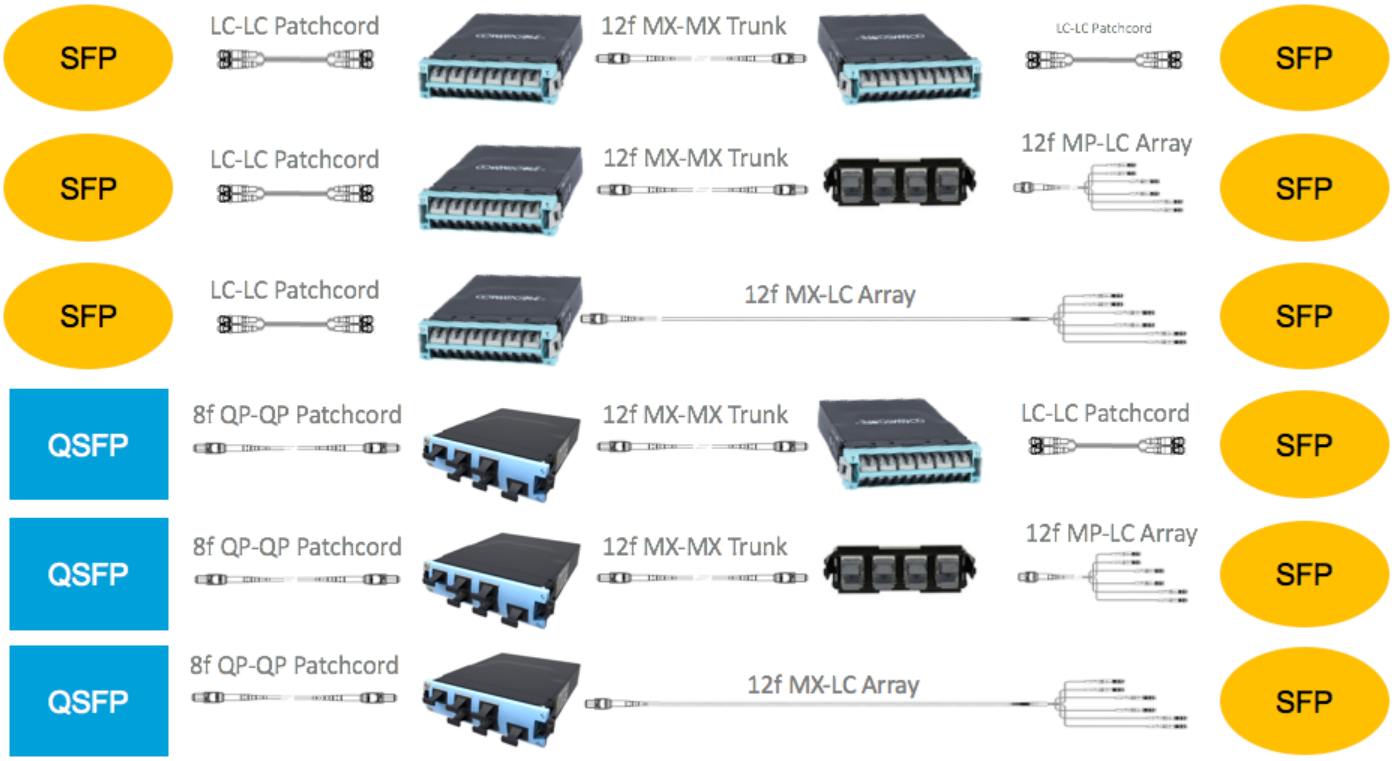
MPO8 Duplex configurations



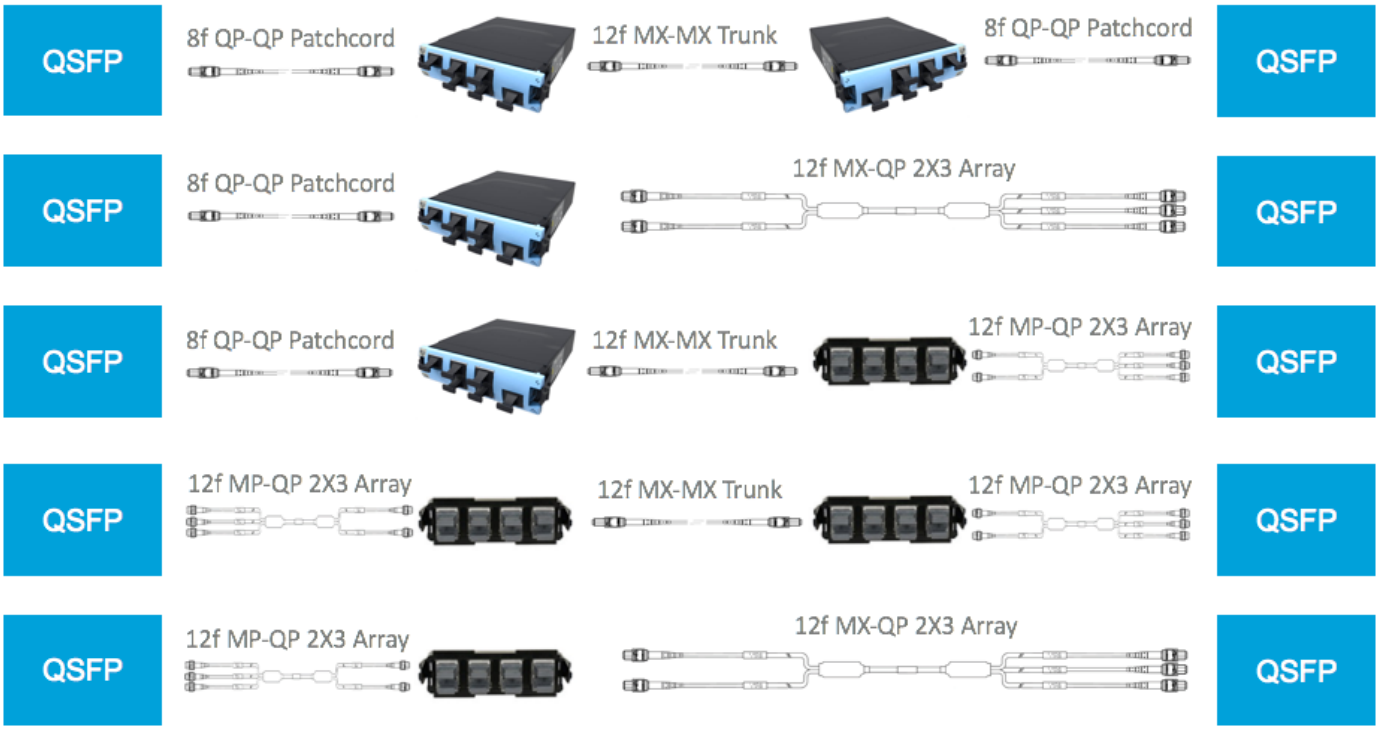
MPO8 QSFP Configurations



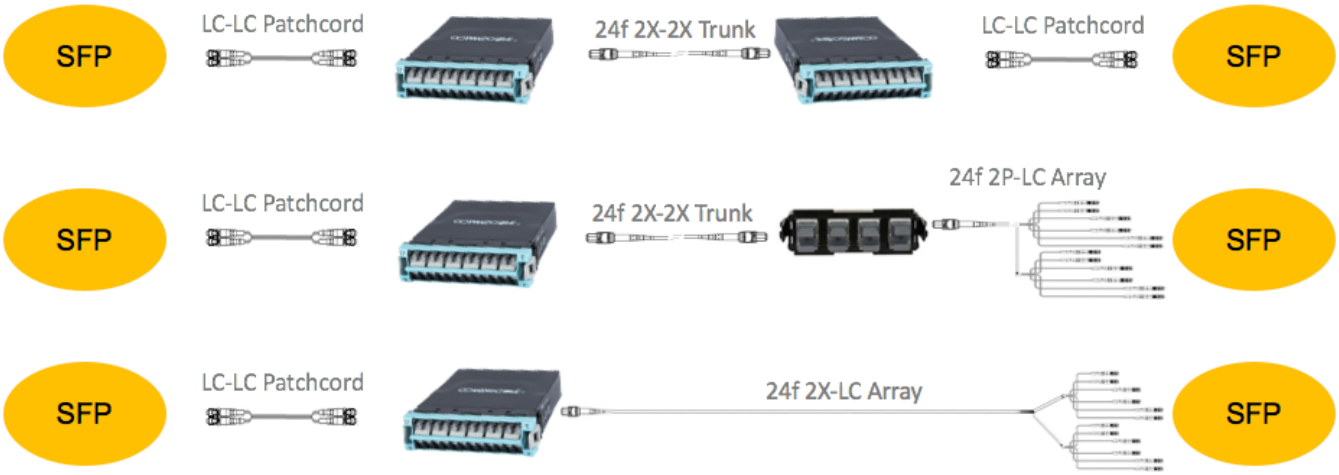
MPO12 Duplex Configurations



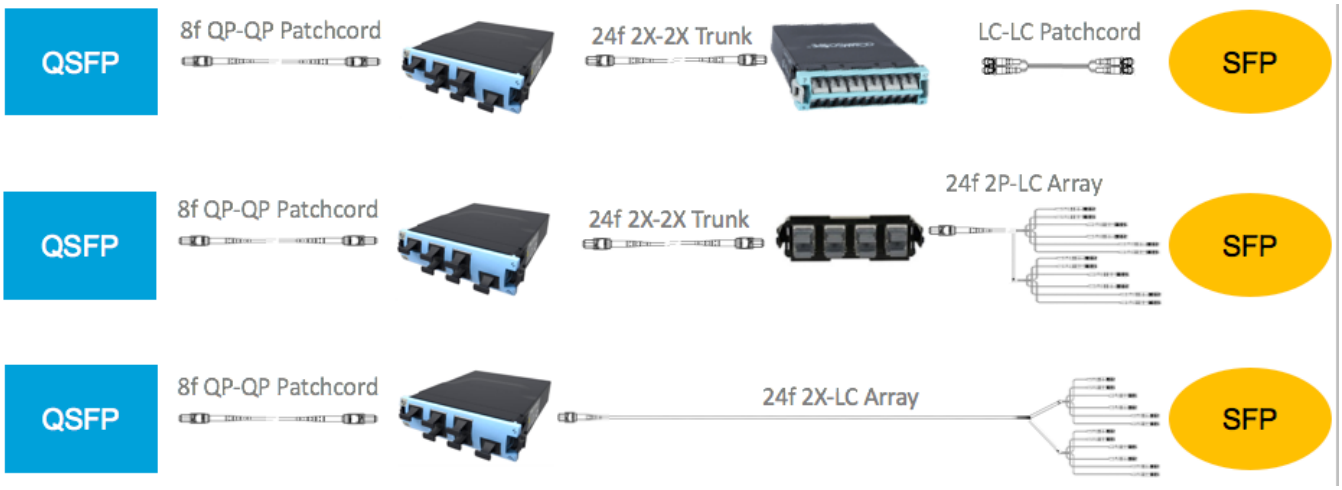
MPO12 QSFP



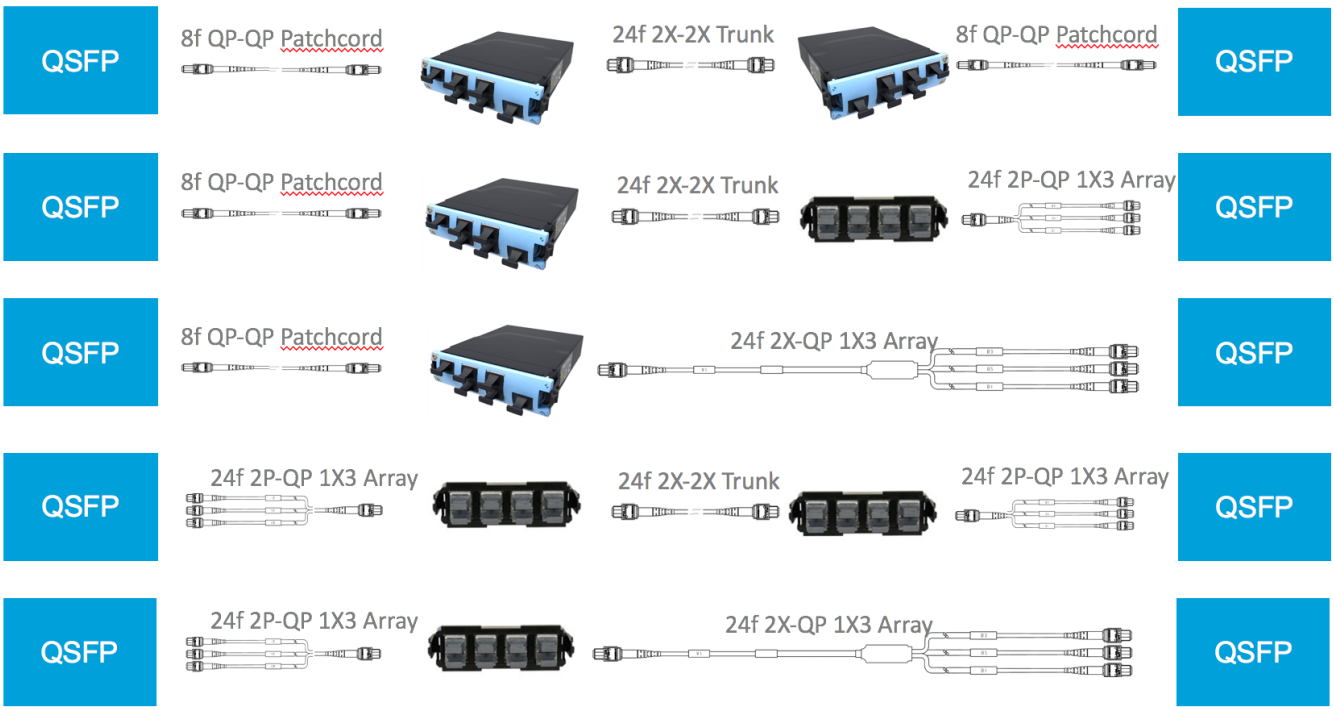
MPO24 Duplex



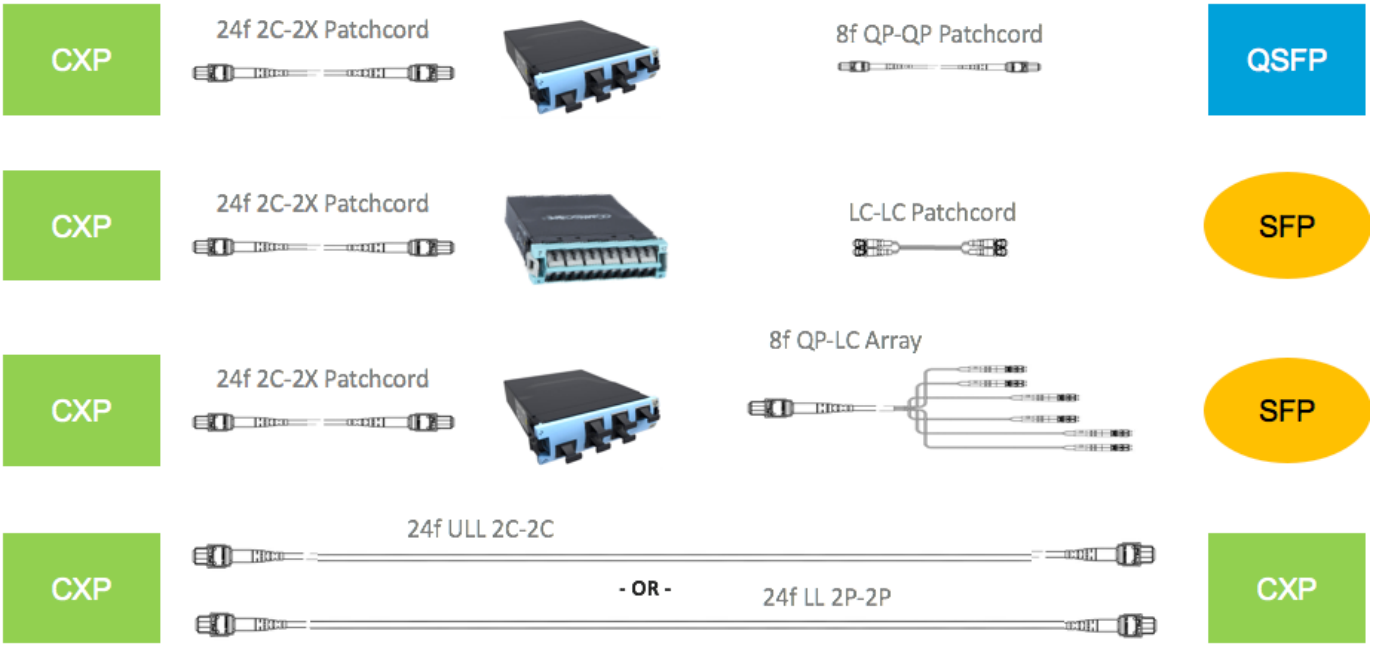
MPO24 QSFP/Duplex



MPO24 QSFP



MPO24 CXP/CFP



SYSTIMAX IP360 and ULL configuration rules

Instapatch 360 Basic configuration rules

InstaPATCH® 360 Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) 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(f) 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(m) 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.

SYSTIMAX ULL basic configuration rules

SYSTIMAX ULL Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) connector and an aligned-key MPO adapter (keying option k=2, key-up to key-up).

SYSTIMAX ULL Rule Number 2:
Adding or removing MPO pins in the field is not allowed.

SYSTIMAX ULL Rule Number 3:
Any SYSTIMAX ULL direct connection to an DM or CM or EHD Module, or to an MPO optical array transceiver shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 4:
Any connection to SYSTIMAX ULL trunks terminated in MPO Adapter panels shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 5:
Only SYSTIMAX solutions® factory-manufactured components shall be used in an SYSTIMAX ULL channel or link.

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TP-108195.3-EN (10/17)

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Hickory, NC 28602
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meets the requirements of the standard:

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Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None

Dr. Cem O. Onus
Managing Director

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ADDENDUM Page One of Seven

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	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

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CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

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ADDENDUM Page Two of Seven

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ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

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ADDENDUM Page Three of Seven

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Site Address	**Site Activities**
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou,Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
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ACCREDITED
ISO/IEC 17021-1
MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
https://www.dekra.us/en/audits/

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
Commscope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karanataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou,Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:
Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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Atlanta, GA 30339 USA
(215) 997-4519
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IAF

证 书 附 录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技（苏州）有限公司

中国江苏省苏州工业园区启明路77 号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料（网络跳线、配线装置等）的生产。

认证结构: **多场所**

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
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CERTIFICATION BODY

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IAF

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No: **EMS 648387**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Euless Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

RoHS Certificate of Compliance

COMMSCOPE®

Product Name: 360DMiP-24LC-LS

Product Number: 760242971

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by:

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

COMMSCOPE®

TECP-96-194 Rev C May 2019

LC and MPO Connectors

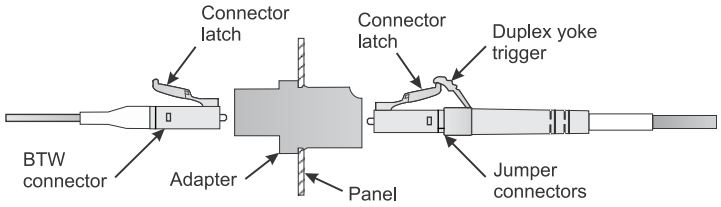
Instructions for Use

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

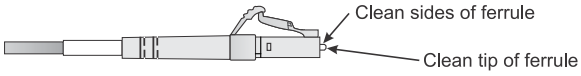
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

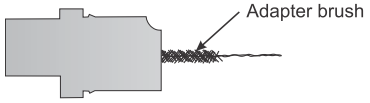
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



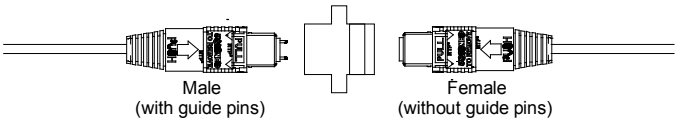
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



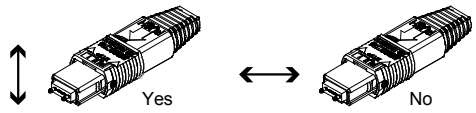
3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

   Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.

Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

COMMSCOPE®

How to Contact Us

- For product information and support, visit us on the web at http://www.commscope.com/SupportCenter
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

Instructions for Use

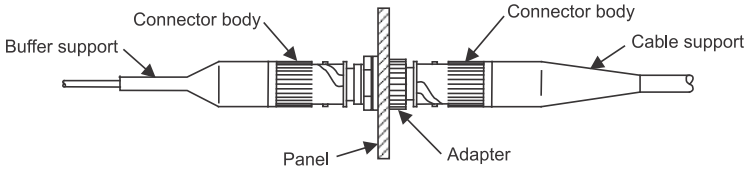
ST® and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST® Connectors into Adapter

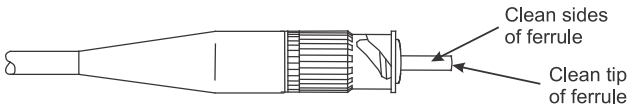
1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the **ST** cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of **ST** connectors, use the **ST** cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



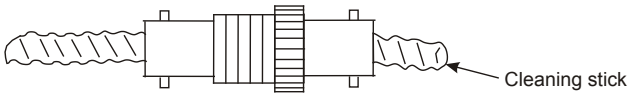
Clean *ST* Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.

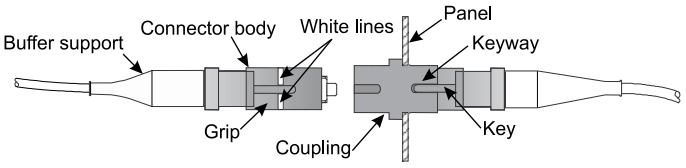


Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

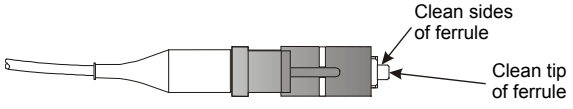


Clean SC Connector and Adapter

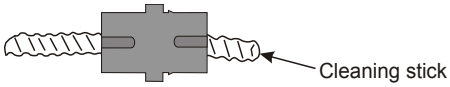
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.

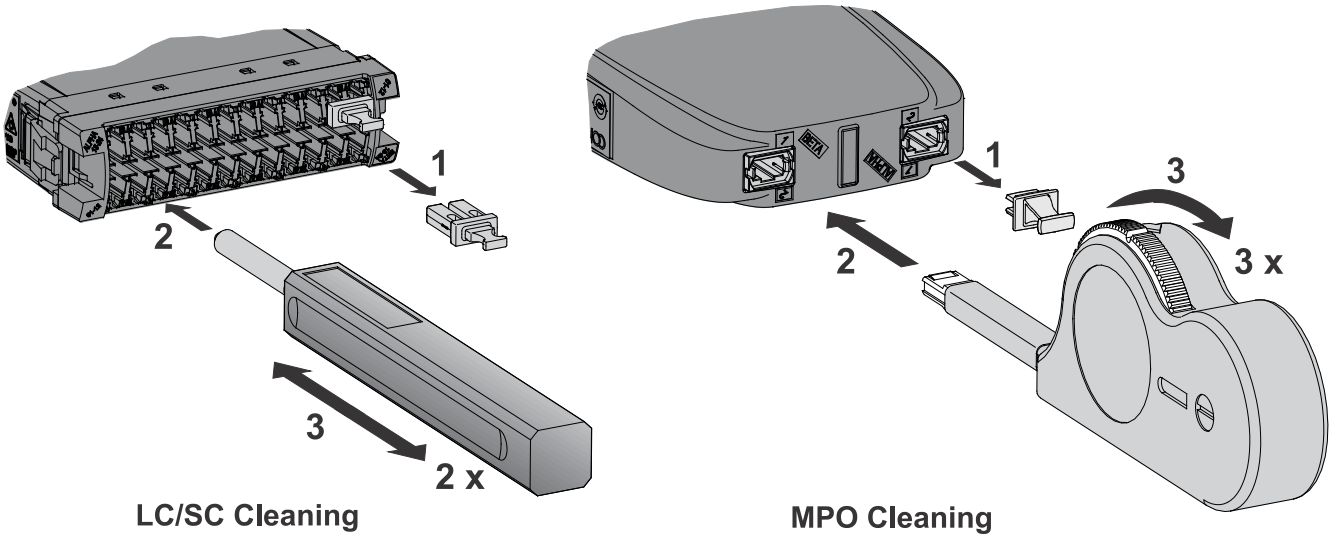


LC/SC and MPO Module Port Cleaning Instructions

The Fiber Optic Connector Cleaning and Inspection Kit (MID 760053199) contains all the tools and materials required to properly clean module ports.

Replacement consumables (MID 760053207) are available for the Cleaning and Inspection Kit.

For more information refer to http://docs.commscope.com/Public/CommEnt_Cleaning_Procedures.pdf



Clean each module port prior to installing a mating connector.

Tools Required

- LC/SC **IBC**™ cleaner
- MPO **IBC** cleaner

How to Contact Us

- To find out more about **CommScope**® products, visit us on the web at http://www.commscope.com/
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

760242968 | 360DMiP-12LC-SM

InstaPATCH® 360 TeraSPEED® Standard Module, 12 LC fibers (6 duplex ports), Blue, iPatch Ready

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber module

General Specifications

Functionality	Breakout
Adapters, quantity, front	6
Adapters, quantity, rear	1
Color, front	Blue
Color, rear	Gray
Data Module Type	Standard
Intelligence Type	iPatch® ready
Interface, front	LC/UPC
Interface, rear	MPO
Interface Feature, rear	Pinned | Reduced footprint
Shuttered	Yes
Total Fibers, quantity	12
Total Ports, quantity, front	12

Dimensions

Height	30.48 mm | 1.2 in
Width	91.44 mm | 3.6 in
Depth	116.84 mm | 4.6 in

Optical Specifications

Fiber Mode	Singlemode
Fiber Type	G.652.D and G.657.A1, TeraSPEED® | OS2

Insertion Loss Change, mating	0.3 dB
Insertion Loss Change, temperature	0.3 dB
Insertion Loss, maximum	1.05 dB

Environmental Specifications

Safety Standard	UL

Packaging and Weights

Packaging quantity	1

Regulatory Compliance/Certifications

Agency	**Classification**
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant

* Footnotes

Insertion Loss Change, mating	Maximum insertion loss change after 500 matings
Insertion Loss Change, temperature	Maximum insertion loss change from -10 °C to +60 °C (+14 °F to +140 °F)

COMMSCOPE®

Application guide

High speed migration SYSTIMAX® InstaPATCH® 360 and SYSTIMAX Ultra-Low-Loss configuration guideline

Contents

SYSTIMAX® preterminated fiber-optic cabling systems configuration guide

Introduction

SYSTIMAX® InstaPATCH® 360 and SYSTIMAX 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 InstaPATCH 360 and SYSTIMAX ULL. Detailed instructions outline the design and deployment of SYSTIMAX preterminated fiber infrastructure systems.

Polarity control

SYSTIMAX preterminated systems provide polarity control mechanisms that ensure signals are correctly routed through array fiber modules, trunks and fanout cables. Both SYSTIMAX ULL and SYSTIMAX InstaPATCH 360 use Method B trunks and aligned-key adapters.

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.

The new SYSTIMAX ULL system uses the Enhanced Method B fiber routing within the modules and fanout cables, eliminating the ALPHA/BETA orientation and port labeling.

The MPO connector, MPO pins, keys and polarity

The MPO connector was developed by NTT-AT in the mid-1980s and is internationally standardized in IEC 61754-7 as well as TIA/EIA 604-5. Both InstaPATCH 360 and SYSTIMAX ULL connectors are factory terminated in pinned and unpinned versions, as shown in Figure 1.

Male MPO (pinned) “MX” Female MPO (unpinned)

Figure 1. Pinned and unpinned MPO connectors

The pinned MPO is commonly referred to as male, or MPO(m), while the MPO without pins is referred to as female, or MPO(f). With the exception of the pins, the MPO connectors are identical. A pair of MPO connectors are mated by aligning the precision guide pins on the MPO(m) connector with the pin holes in the MPO(f) connector.

Depending on the application, MPO connectors are available in 8-fiber, 12-fiber or 24-fiber configurations. InstaPATCH 360 trunks and modules are available with 12-fiber MPO connectors (black boot). SYSTIMAX ULL MMF trunks and modules are available in 12-fiber as well as 8t-fiber (gray boot) and 24-fiber MPO connectors (red boot) SMF are available in 8- and 12-fiber; see Figure 2.

Figure 2. MPO connector fiber counts

MPO connectors with aqua colored grips denote OM2, OM3 or OM4 fiber type, lime green denotes OM5, green denote SM for InstaPATCH 360 and SYSTIMAX ULL.

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).

Note that two female 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 male MPO connectors will not insert and latch in an adapter without inflicting permanent damage to one or both of the connectors.

MPO connectors and adapters have interlocking lugs and notches (commonly referred to as “keys”) that ensure proper orientation of the mating connectors. MPO keys are critical components of both polarity management and singlemode angle management.

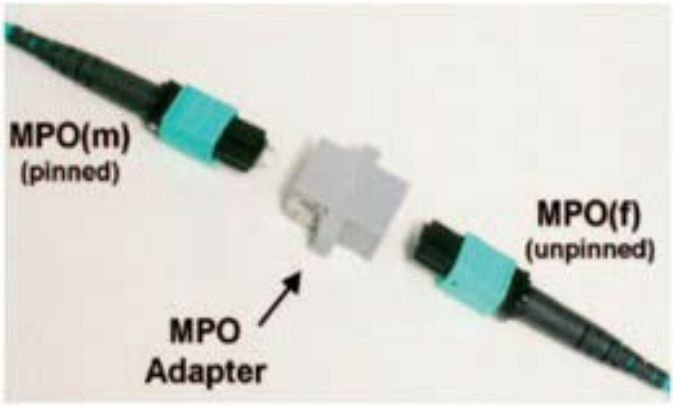


Figure 3. MPO connectors and MPO adapter

InstaPATCH® 360 and SYSTIMAX ULL systems assure correct system polarity regardless of the network design topology. 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. Both systems utilize Method B polarity control, which uses “aligned key” MPO adapters. Key orientation on MPO connectors is established in the factory to implement specific polarity design criteria. Both InstaPATCH 360 and SYSTIMAX ULL take advantage of the TIA/EIA 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 mated pair of MPO connectors in an InstaPATCH 360 or SYSTIMAX ULL link.

Aligned-key adapters are easily recognized by their light gray color; opposed-key adapters are black in color, as shown in Figure 4.

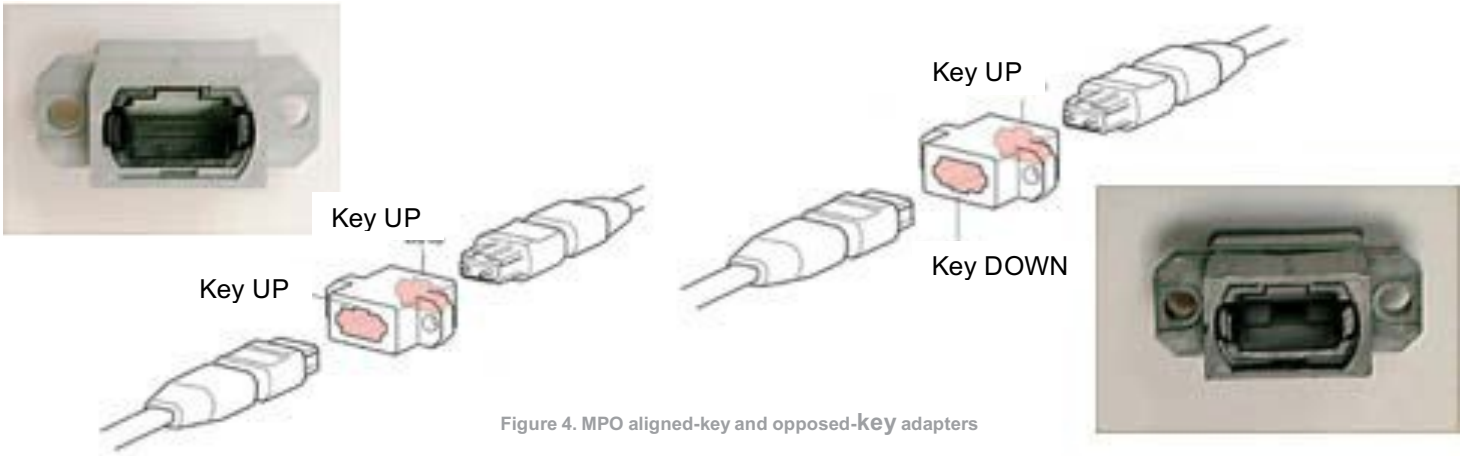


Figure 4. MPO aligned-key and opposed-key adapters

CommScope fiber-optic cable

InstaPATCH 360 products are available with CommScope LazrSPEED® 300 (OM3), LazrSPEED 550 (OM4), LazrSPEED 550 wideband (OM5), or TeraSPEED SM fiber. SYSTIMAX ULL products are available with LazrSPEED 550 (OM4) LazrSPEED 550 wideband (OM5) or TeraSPEED SM fiber.

LazrSPEED 300 and 550 products are identified with an aqua-color jacket and LazrSPEED 550 wideband jackets are lime green. InstaPATCH 360 and SYSTIMAX ULL SM products are identified with a yellow jacket.

InstaPATCH 360 cable assemblies are available in 12-fiber round (IPD) cordage types up to a total fiber count of 144 fibers.

SYSTIMAX ULL cable assemblies are available in 8-fiber, 12-fiber or 24-fiber round (IPD) cordage types up to a total of 144 fibers.

Product Descriptions

Data modules (DM)

Modules 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 modules contain male MPO connectors and are intended to be used with InstaPATCH 360 trunk cables. SYSTIMAX ULL modules contain female MPO connectors and are intended to be used with SYSTIMAX ULL trunk cables.

InstaPATCH 360 modules 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 16).

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

Visual identification of DM modules

InstaPATCH 360 DM modules have a rounded housing with a small color icon on the back, which denotes fiber type. ALPHA/BETA labeling and may have either one or two MPO adapters on the back; see Figure 5. The aqua color denotes OM4 LazrSPEED 550 fiber, lime green color denotes OM5 WB fiber and blue denotes SM.

Figure 5. InstaPATCH 360 DM module

SYSTIMAX ULL DM modules have a squared-off housing with a large, colored bulkhead on the back that denotes fiber type and may have 1, 2 or 3 MPO adapters on the back.
SYSTIMAX ULL DM modules may also be identified by gray-colored latch assists on the front; see Figure 6.

Figure 6. SYSTIMAX ULL DM module

SYSTIMAX ULL module variations

In addition to multiple fiber types, SYSTIMAX ULL modules are also available with one 24-fiber(MMF), two 12-fiber, or three 8-fiber MPOs on the back—and all SYSTIMAX ULL DM modules have 24 LCs on the front, arranged in 12 duplex LC ports differently based on MPO type.

SYSTIMAX ULL modules with two 12-fiber MPOs are similar to InstaPATCH 360 modules with two 12-fiber MPO adapters on the back, but due to internal fiber routing changes that eliminate the need for ALPHA/BETA, port labeling has changed on the front and the rear. The MPO ports are simply numbered 1 and 2 and the duplex LC ports are numbered 1-12 starting in the lower 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 7.

DM12-24LC-LS-UL

Figure 7. SYSTIMAX ULL 12-fiber MPO module

SYSTIMAX MMF ULL modules are also available with a single 24-fiber MPO on the back. The duplex LC ports are numbered 1-12 starting in the lower left corner (same as 12-fiber MPO version); see Figure 8.

DM24-24LC-WB-ULL

Figure 8. SYSTIMAX ULL 24-fiber MPO module

SYSTIMAX ULL modules are also available with three 8-fiber MPOs on the back. In this version, the duplex LC ports are arranged differently. They are arranged in three groups of four, identified by the color of the LC 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 9.

DM08-24LC-WB-ULL

Figure 9. SYSTIMAX ULL eight-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 eight aligned-key MPO adapters. These are used to connect trunk cables to equipment cords, fanout cables and trunk extensions. InstaPATCH 360 and SYSTIMAX ULL use the same MPO adapter panels; see Figure 10.

360DP-8MPO

Figure 10. MPO adapter panel

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 one 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 SYSTIMAX ULL trunks are available in multiples of 8, 12 or 24 fibers, up to a total of 144 fibers.

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

InstaPATCH 360 trunks have *female unpinned* MPO connectors on both ends for connection to InstaPATCH 360 modules or MPO adapter pass-through panels.

SYSTIMAX ULL trunks have *male pinned* MPO connectors on both ends for connection to SYSTIMAX ULL modules or MPO adapter pass-through panels.

MPO(f)-MPO(m) trunk extension cables

Extension cables are used to extend the reach of a 24-fiber MMF trunk cable. Extension cables share the same construction as MPO-to-MPO trunk cables; however, trunk extensions must have female MPOs on one end and male MPOs on the other to mate with the trunk that is being extended. One end will be mated to a trunk and the other end will be mated to a module, fanout or equipment cord.

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 11.

Figure 11. 24-fiber trunk extension fiber polarity

EHD Modules

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

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

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

Figure 14. SYSTIMAX EHD 24-DM-24LC-WB-B_ULL

EHD TeraSPEED modules are available in 2X12f to 24LC and 3X8f to 24LC. EHD LazrSPEED 550 and 550 WB are available in 1X24f to 24LC, 2X12f to 24LC and 3X8f to 24LC.

Figure 15. SYSTIMAX Splice module

EHD Splice modules are available in LazrSPEED OM4 and TeraSPEED SM with stranded and ribbon fiber options.

MPO-MPO cross-connect 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-connects have male pinned MPO connectors on both ends for patching between InstaPATCH 360 trunks.

SYSTIMAX ULL trunks have female unpinned MPO connectors on both ends for connection to SYSTIMAX ULL modules' trunks.

Ruggedized fanout cables

Ruggedized fanout cables—also known as hydra cables, direct attach or breakout cables—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 male or female MPO. Care must be taken to order the correct fanout type or an incompatible mating will result. Ruggedized fanout cables use the same cable and construction as trunks' cables, but the total fiber count is limited to 96. These cables are typically used when cable routing exits the cabinet or rack.

InstaPATCH 360 ruggedized fanout cables are available with LC, SC or ST connectors; SYSTIMAX ULL ruggedized fanouts are available only with LC connectors.

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 can be configured with MPO connectors on both ends—or on just one end with simplex or duplex connectors on the other.

SYSTIMAX InstaPATCH array cables are available with either 12-fiber or 24-fiber MPO connectors. SYSTIMAX ULL array cords are available with 8-fiber (gray), 12-fiber (black) or 24-fiber (red) MPO connectors. 8-fiber and 12-fiber cords are 3.0 millimeters in diameter and 24-fiber cords are 3.6 millimeters. These cables are used typically when cable routing remains within the rack or cabinet.

InstaPATCH 360 array fanout cables are available with LC, SC or ST connectors, SYSTIMAX ULL array fanout cables are available only with LC connectors.

SYSTIMAX ULL MPO-MPO array cables have female MPO connectors on each end, thus eliminating the possibility of plugging a male MPO into and damaging electronic equipment.

Comparison of Method B polarity to enhanced Method B

Due to its topology independence and ease of implementation, CommScope has long been an advocate of Method B polarity for MPO-based systems. InstaPATCH 360 requires the use of ALPHA/BETA modules. ALPHA/BETA is describing the flippable orientation of the modules when they are installed in a shelf or panel. One module is in ALPHA orientation and the other module is in BETA. Flipping modules keeps like-numbered ports in the same place on both ends of a channel; see Figures 16 and 17. (Port 1 will always be bottom left on the module.)

Figure 16. ALPHA/BETA modules used in InstaPATCH 360

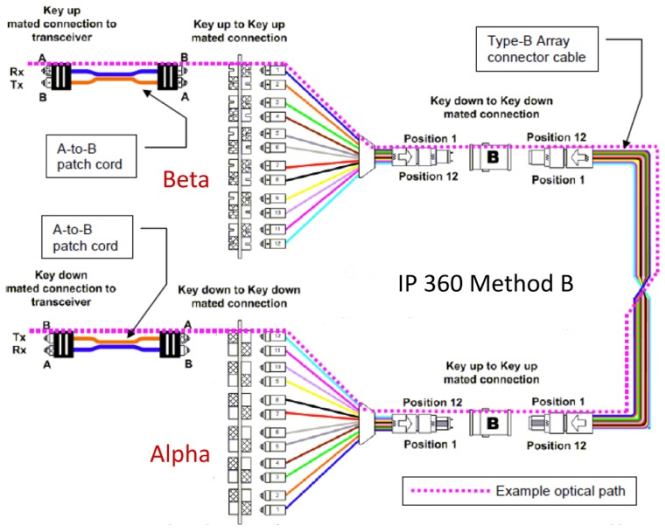


Figure 17. InstaPATCH 360 Method B

SYSTIMAX 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 18 and 19.

Figure 18. Modules used in SYSTIMAX ULL

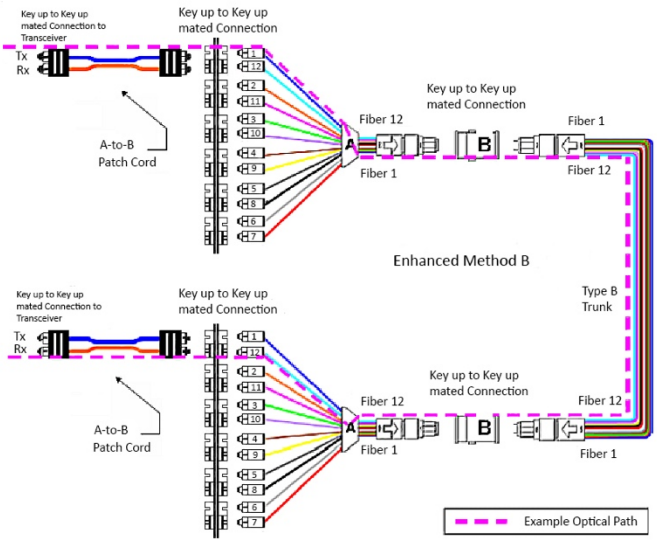


Figure 19. SYSTIMAX ULL enhanced Method B

SM ferrule angle and InstaPATCH 360 Method B

SM 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 -55 decibels or better. Since Method B polarity requires the use of aligned-key MPO adapters, male and female MPO connectors used in InstaPATCH 360 cable assemblies are angled in opposite directions. Male MPO connectors (MX) are angled down relative to the key and female connectors (MP) are angled up, as illustrated in Figure 20.

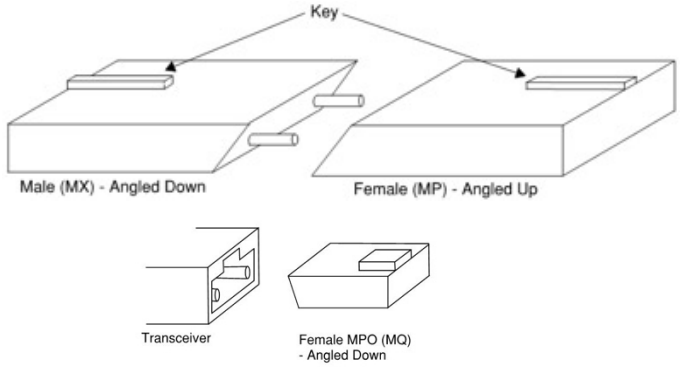


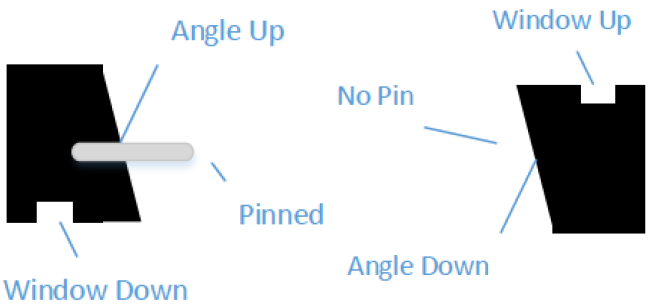
Figure 20. InstaPATCH 360 SM MPO angle orientation

These opposing angles ensure physical contact between fibers when the connectors are mated together; however, when an equipment connection is required, the female MPO connector must match the angle of the electronic equipment. All SM MPO-based transceivers are designed to accept female MPO connectors with down angles. As a result, a third MPO variant was introduced for InstaPATCH 360 SM MPO equipment cables. This down-angled female MPO connector is identified in InstaPATCH 360 systems with the code “MQ.” MQ connectors are identical in every respect to MP connectors except for the direction of the angle—making them compatible with SM transceivers but incompatible with MX connectors.

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

SM ferrule angle and SYSTIMAX ULL Enhanced Method B

For Enhanced Method B the angles on SM MPO connectors have been reversed. Male connectors are angle up relative to the key and female connectors are angled down. This eliminates the need for special MPO connectors to interface with electronics.

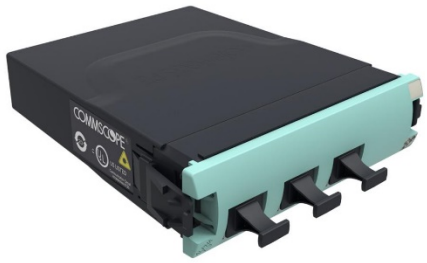


Conversion Modules (CM)

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 module allows for three 8-fiber transceivers to use two 12 fiber trunks without any dark fiber.

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

InstaPATCH 360 CM modules come in both SM and OM4 MM. They are both available in a 2x3 or double density 4x6 configurations.



360CM12-2x3-LS Front View

360CM-2x3-LS Rear View

360CM12-4X6-TS Front View

360CM12-4X6-TS Rear View

SYSTIMAX ULL CM modules use the same square back housing as the InstaPATCH CM modules. The SYSTIMAX ULL version can be visually identified by gray-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.

SYSTIMAX ULL CM modules are available in OM4 (Aqua), OM5 (Lime Green in color) and SM (Blue in color)
SYSTIMAX ULL CM Modules are available with either two 12-fiber MPOs or a single 24-fiber MPO on the back.

CM12-2x3-LSOM4 ULL Front View

CM12-4X6-SM ULL Front View

CM12-4X6-SM ULL Rear View

SYSTIMAX ULL CM module variations

Specialty 24-fiber Cable Assemblies

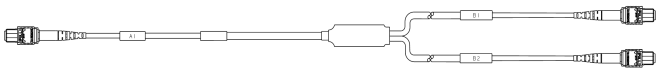
IP360 1X2 Bi-furcated Fanouts

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 female (connector code 2P), but the 12-fiber MPO connectors may be either male or female, depending on the application. Connector code CP or CX are used for IP360 assemblies.

SYSTIMAX ULL 1X2 Bi-Furcated Fanouts
The ULL 24-fiber MPO connector is always female (connector code 2C) with the 12-fiber connectors male or female (connector codes MP and MX).

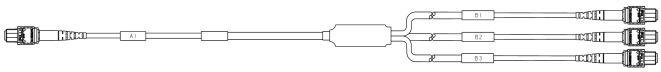
1X2 Bi-furcated fanouts with OM4 fiber are available in both InstaPATCH and SYSTIMAX ULL. OM5 versions are only available in SYSTIMAX ULL.



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 male or female, depending on the application (connector code QP or QX).

1X3 Tri-furcated fanouts with OM4 and SM fiber are available in both InstaPATCH. OM5 is only available in SYSTIMAX ULL.



2x3 Fanouts

2X3 Fanouts serve much the same purpose as CM Modules 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 female 8-fiber MPO connectors.

	End A MM	End B MM	End A SM	End B SM
IP360	QP	PP, PX	QQ	PP, PX
ULL	QP	MP, MX	QP	MP, MX

2X3Fanouts with OM4 and SM fiber are available in InstaPATCH. OM4, OM5 and SM versions are available in SYSTIMAX 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 module 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 21.

Figure 21. Labeling of duplex end of InstaPATCH 360 fanout cables

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

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 22.

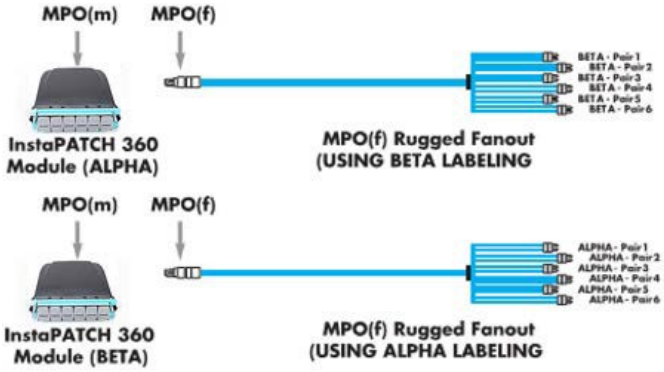


Figure 22. InstaPATCH 360 module orientation and use of ALPHA/BETA labeling in fanout cables.

Typical MPO configurations for InstaPATCH 360 systems

Using trunks to interconnect to modules

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

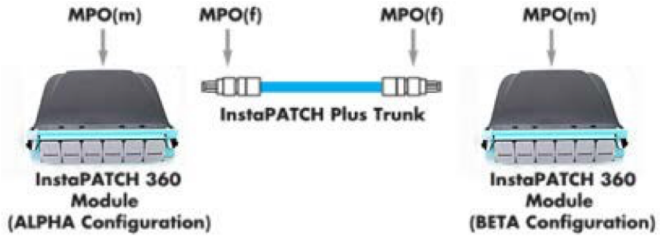


Figure 23. InstaPATCH 360 modules in ALPHA/BETA orientation

Using trunk extension cables

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

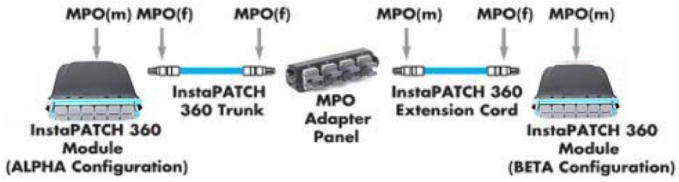


Figure 24. InstaPATCH 360 extension cables

Using MPO-MPO array/equipment cables

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

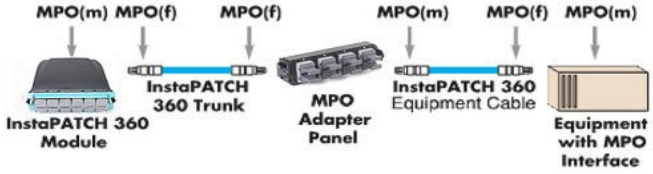


Figure 25. InstaPATCH 360 array/equipment cables

Note—for SM InstaPATCH applications, the MPO connector mating 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 20.

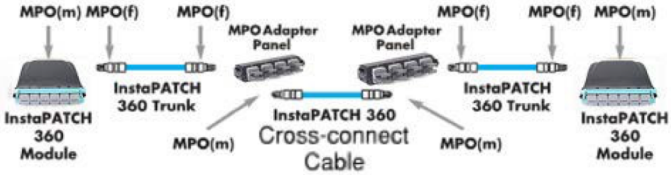


Figure 20. InstaPATCH 360 cross-connect cable

Using rugged or array fanout cables with modules

When fanout cables mate to InstaPATCH 360 modules, as illustrated in Figure 26, the fanout MPO must be female.

Figure 26. InstaPATCH 360 MPO(f) fanout cable

Using rugged or array fanout cables with trunks

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

When fanout cables mate to InstaPATCH 360 trunks through an MPO adapter panel, the fanout must have a male MPO connector; see Figure 27.

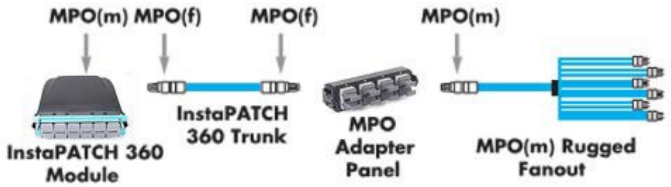
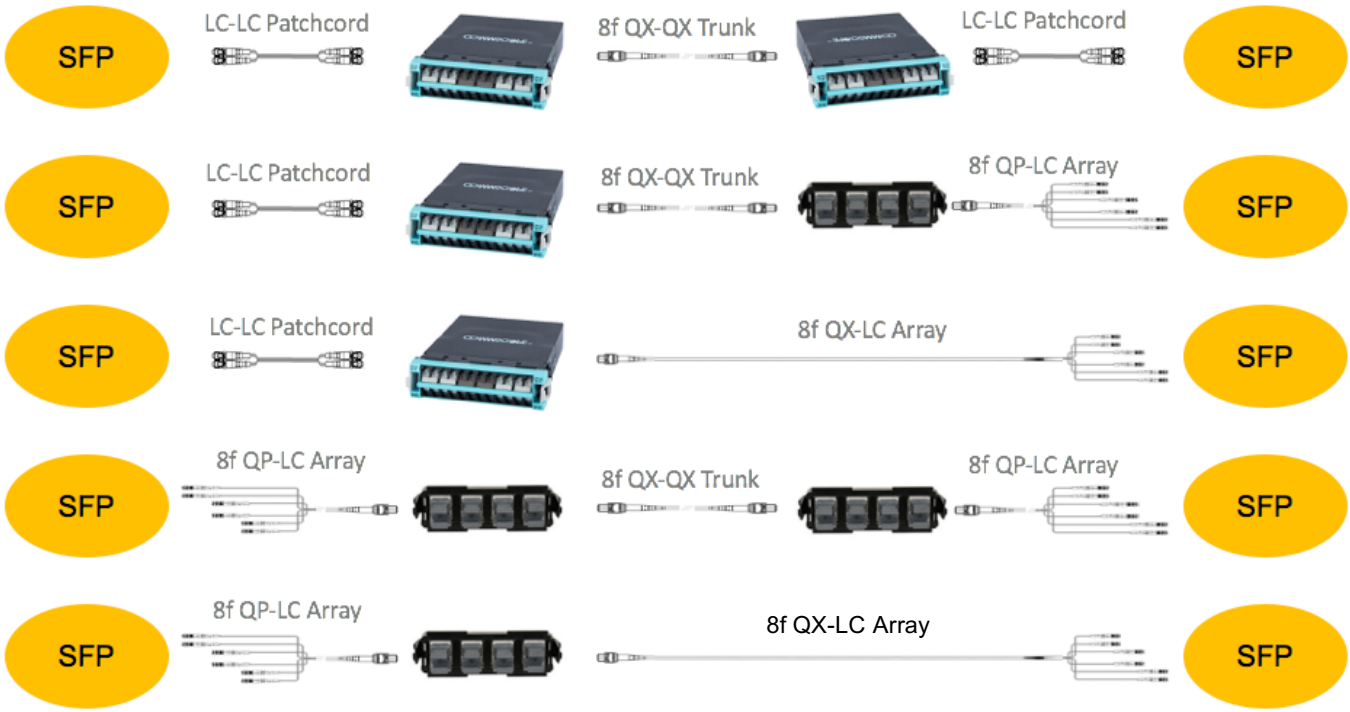


Figure 27. InstaPATCH 360 MPO(m) fanout cable

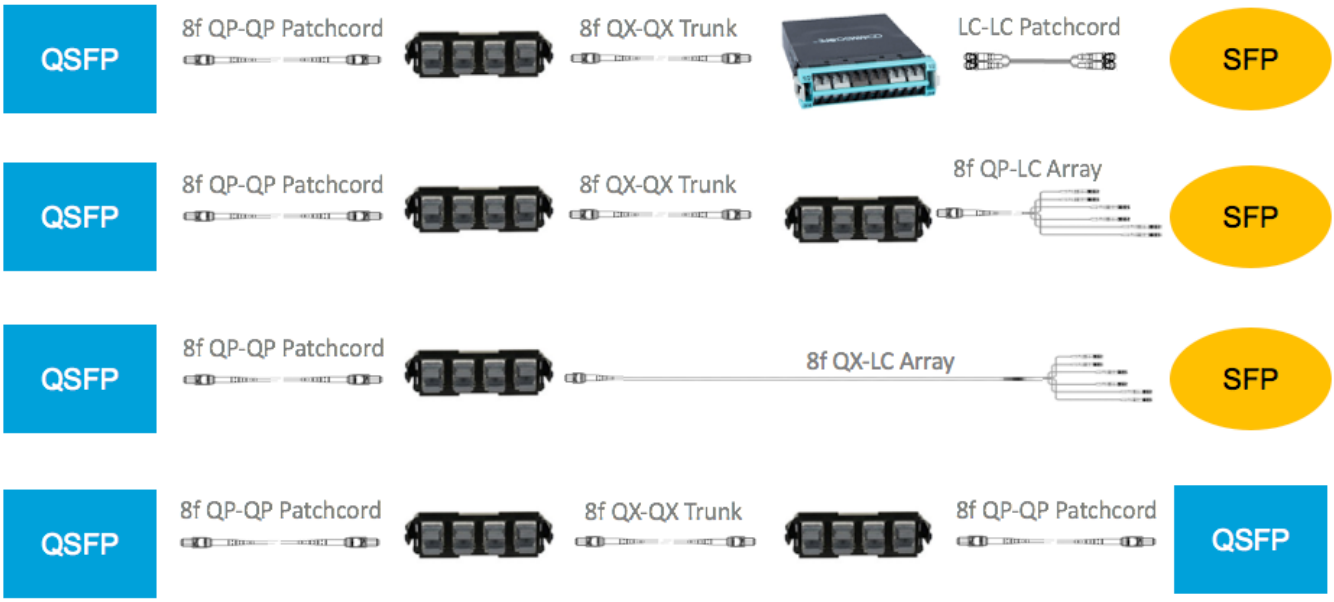
SYSTIMAX ULL Enhanced Method B MPO Configurations

SYSTIMAX ULL Distribution Modules (DM), Conversion Modules (CM), 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 singlemode components.

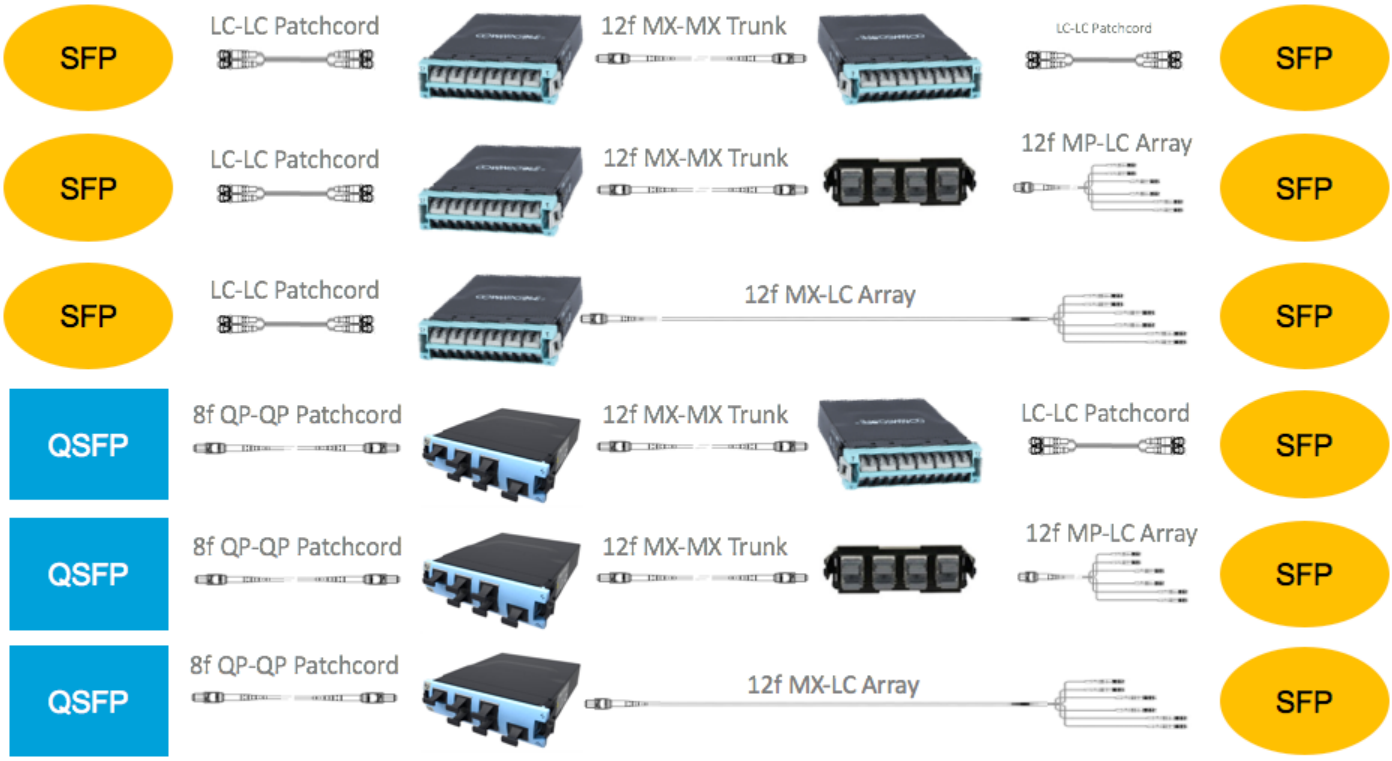
MPO8 Duplex configurations



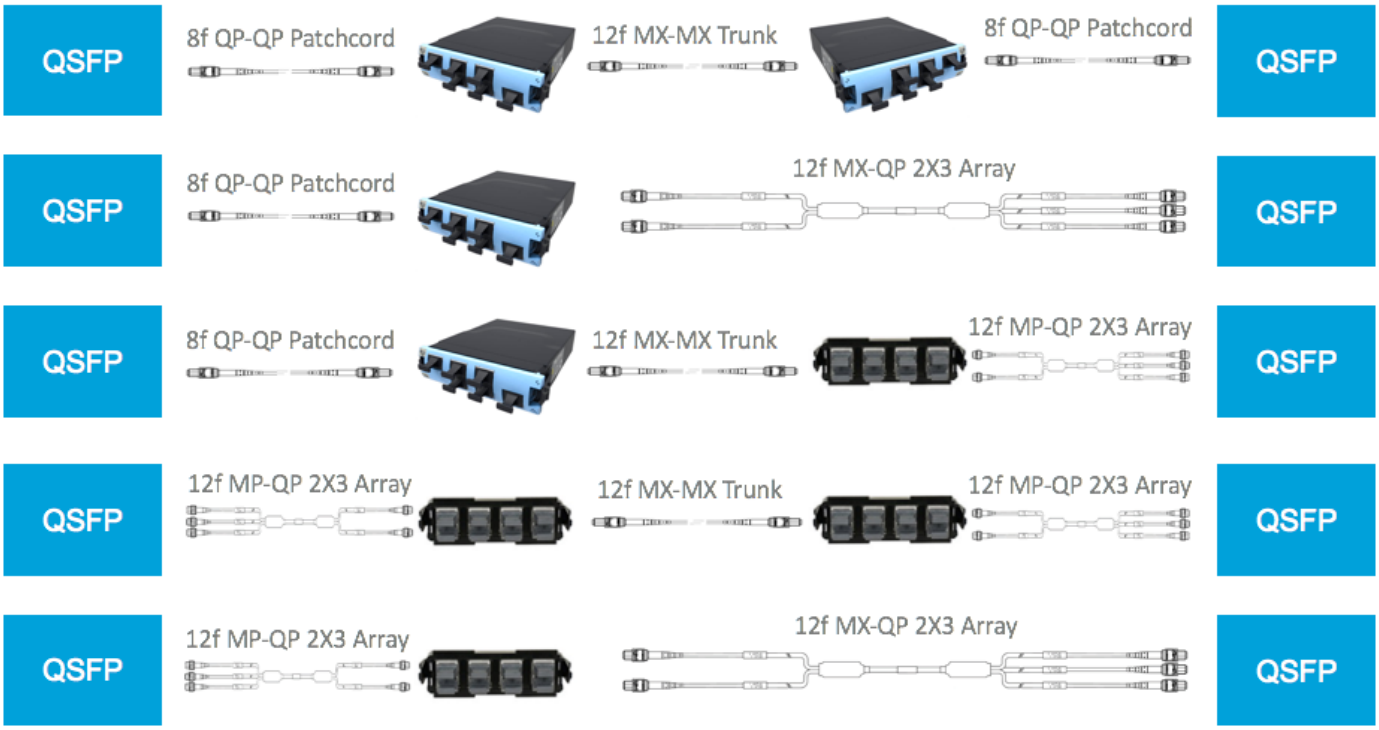
MPO8 QSFP Configurations



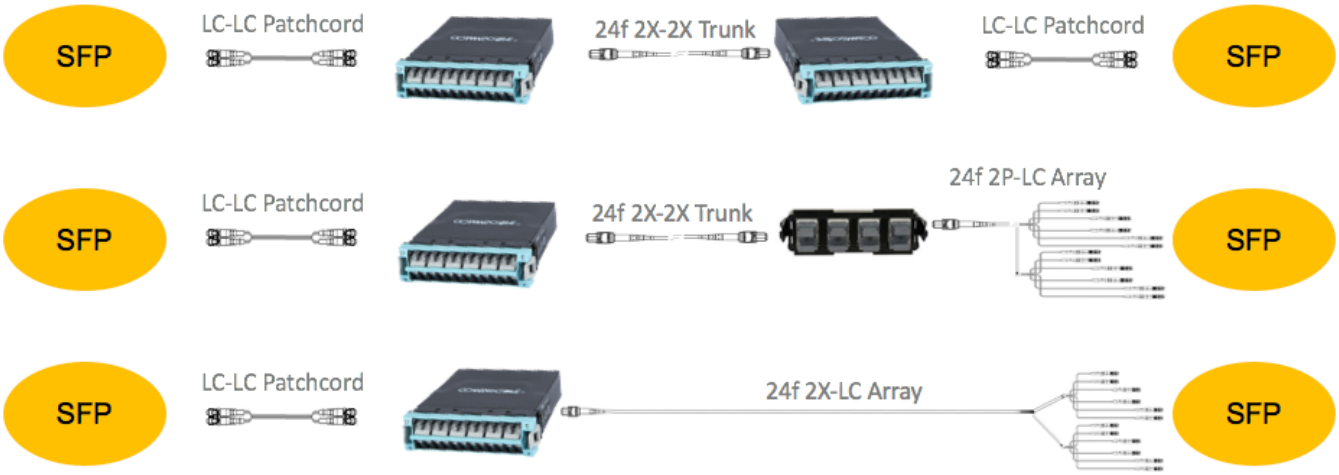
MPO12 Duplex Configurations



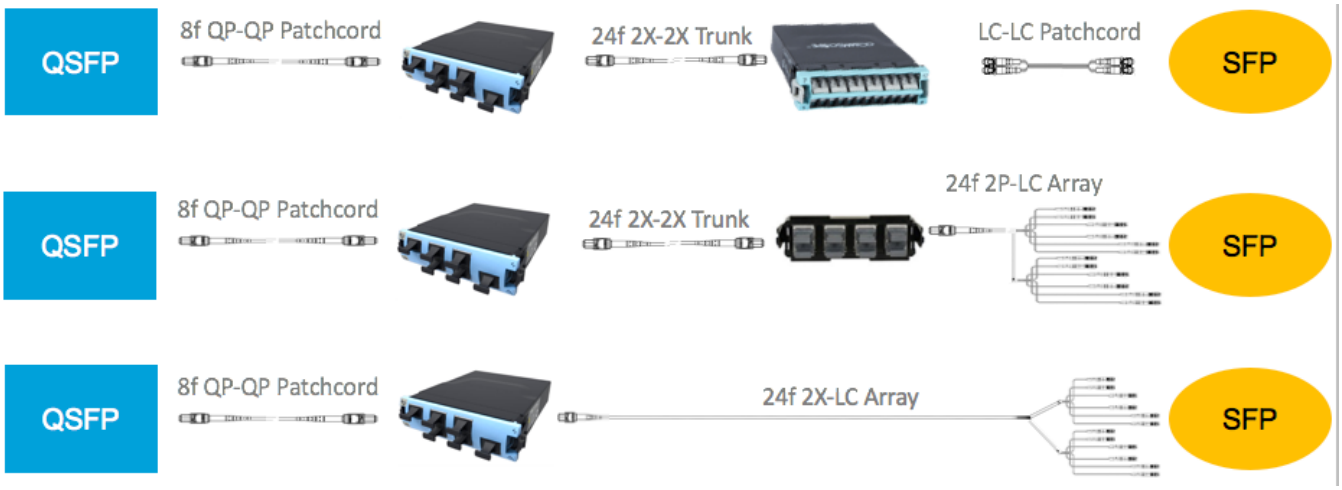
MPO12 QSFP



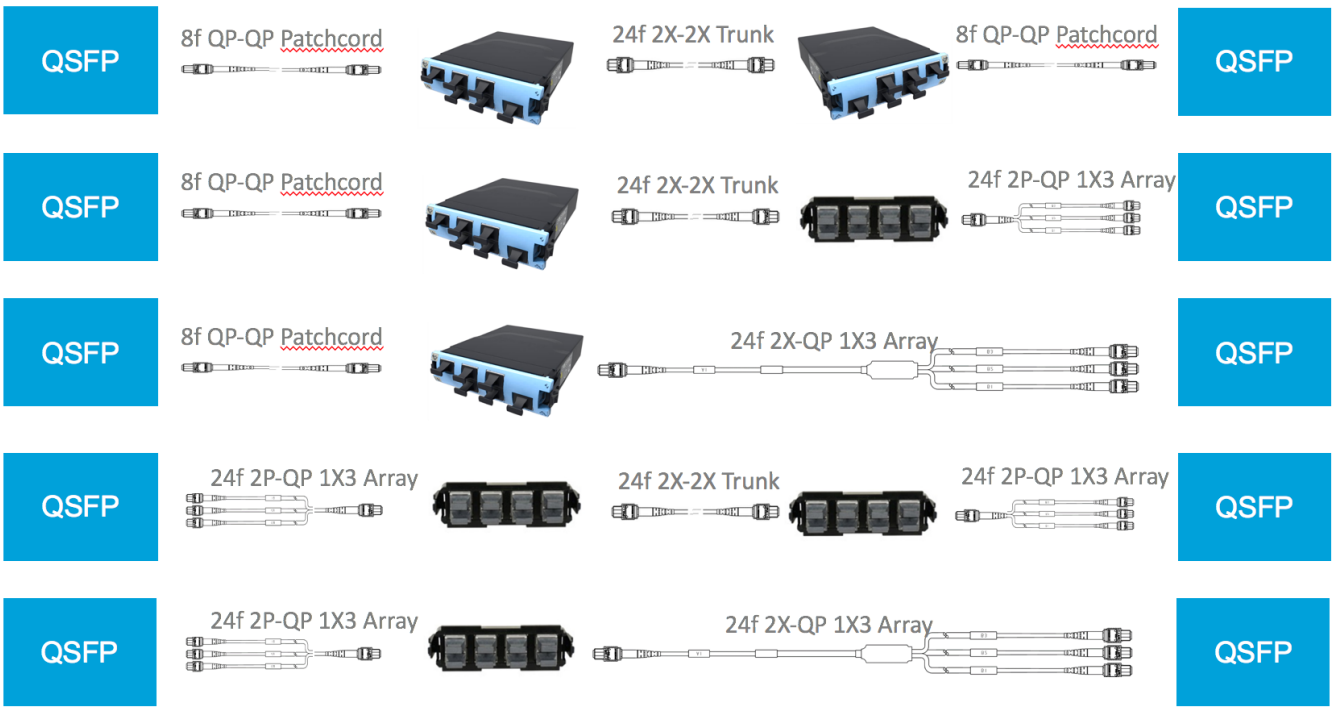
MPO24 Duplex



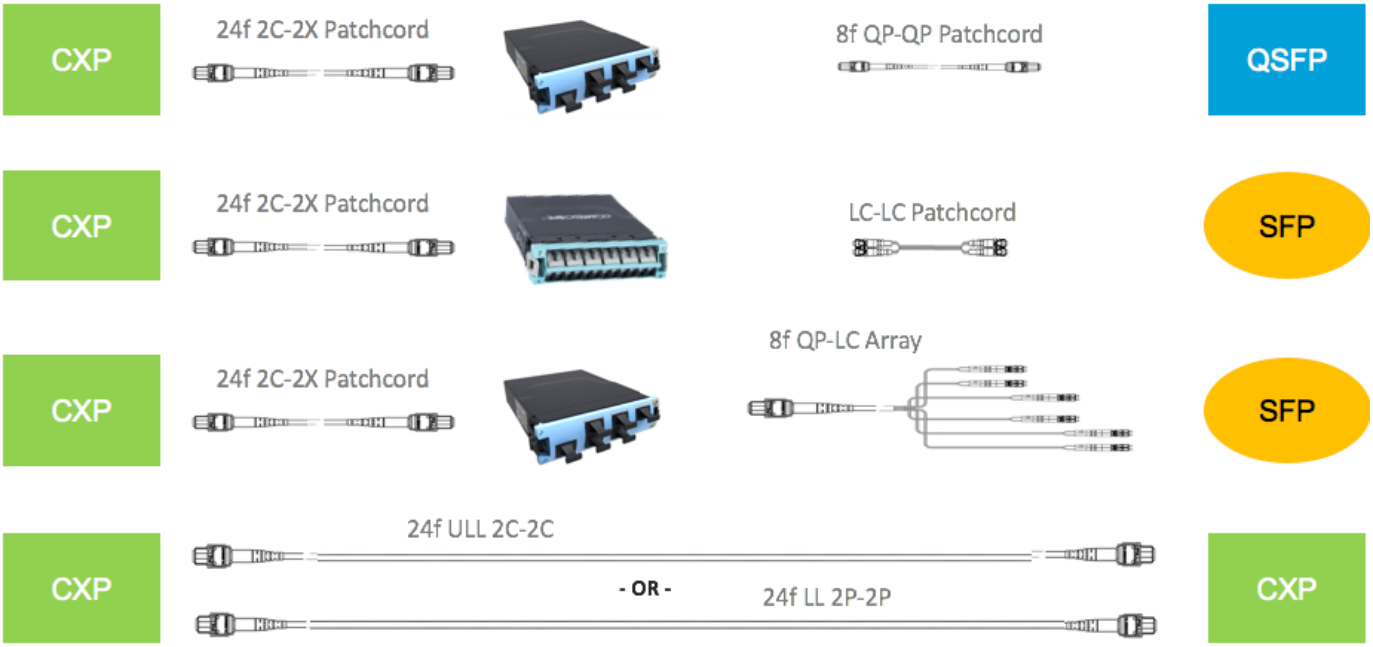
MPO24 QSFP/Duplex



MPO24 QSFP



MPO24 CXP/CFP



SYSTIMAX IP360 and ULL configuration rules

Instapatch 360 Basic configuration rules

InstaPATCH® 360 Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) 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(f) 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(m) 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.

SYSTIMAX ULL basic configuration rules

SYSTIMAX ULL Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) connector and an aligned-key MPO adapter (keying option k=2, key-up to key-up).

SYSTIMAX ULL Rule Number 2:
Adding or removing MPO pins in the field is not allowed.

SYSTIMAX ULL Rule Number 3:
Any SYSTIMAX ULL direct connection to an DM or CM or EHD Module, or to an MPO optical array transceiver shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 4:
Any connection to SYSTIMAX ULL trunks terminated in MPO Adapter panels shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 5:
Only SYSTIMAX solutions® factory-manufactured components shall be used in an SYSTIMAX ULL channel or link.

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.

COMMSCOPE®

commscope.com

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

TP-108195.3-EN (10/17)

CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
https://www.dekra.us/en/audits/

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17021-1 MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	**Site Activities**
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
Site Address	**Site Activities**
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou,Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing &First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
Commscope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karanataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou,Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:
Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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IAF

证 书 附 录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技（苏州）有限公司

中国江苏省苏州工业园区启明路77 号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料（网络跳线、配线装置等）的生产。

认证结构: **多场所**

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No: **EMS 648387**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Euless Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

LIMITED WARRANTY

1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A,** (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization**. Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver**. If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15^{th}) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

(a) improper installation or misapplication of parts;
(b) chain or system failures induced by other products or components;
(c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
(d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
(e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
(f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
(g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
(h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
(i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
(j) use of the Product for purposes other than that for which it was designed; or
(k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.	Hardware One (1) Year Software Ninety (90) Days
Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
Category C Products Intentionally left blank.	
Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
Category E Products Intentionally left blank	
Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
Category F1 Products All CHP Headend Optical (HEO) Elements	Hardware Three (3) Years Software Ninety (90) Days
Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.	Hardware Five (5) Years Software Ninety (90) Days
Category G2 Products All CH3 Headend (HEO) Elements	One (1) year
Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories	Hardware Three (3) Years Software Ninety (90) Days

Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.	Hardware One (1) Year Software Ninety (90) Days
Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™® Workforce Management, Mobile TV, SecureMedia and Titanium	Hardware One (1) Year Software Ninety (90) Days
Category J Products Intentionally left blank	
Category K Products Intentionally left blank.	
Category L Products Intentionally left blank	
Category M Products Intentionally left blank.	
Category N Products Intentionally left blank.	
Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS	DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days
Category P Products Intentionally left blank.	
Category P1 Products Intentionally left blank	
Category Q Products Intentionally left blank	
Category R Products Intentionally left blank	
Category R1 Products Intentionally left blank	
Category S Products Intentionally left blank	
Category S1 Products Intentionally left blank	

LIMITED WARRANTY

Category T Products RUCKUS Wi-Fi	Hardware: - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an "e" suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** Software Ninety (90) Days
Category T1 Products RUCKUS ICX Switches	- ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product
Category T2 Products Intentionally left blank	
Category U Products Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC) NovuX Products Prodigy Products FDH Products Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable Assemblies OSP "Box" Products Mini-RDTs and RDTs FOSC™, FIST™ and Tenio™ OSP Copper Connect and Closure Products HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes Fiber Optic Panels, including Accessories, Mounting Hardware, Modules Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables, Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks Passive Optical Components and Value Added Modules (VAMs) FiberGuide® : Fiber cable Management System Optical Distribution Frames, including Modules, Blocks, Accessories and Hardware Cabinets Cable and Apparatus Products Alifabs™ Cabinets & Ancillary Products Alifabs™ Telecommunications Towers and Accessories Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets	One (1) year

LIMITED WARRANTY

Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products Electronic Enclosure Products (Cabinets) Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines) PowerShift™ & Power Products	Two (2) years
Category W Products ValuSite® Products I-Line Accessory Products Microwave Antennas Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)	Three (3) years
Category X Products Broadband RF Connectivity Products Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products	Five (5) years
Category Y Products QR® Coaxial Cable	Five (5) years
Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products * RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller's connectors in accordance with the installation instructions.	One (1) year
Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products * CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller's connectors by Seller or its certified distributor	Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.
Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products * HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller's connectors by Seller or its certified distributor.	Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.
Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment. Software Ninety (90) Days
Category DD Products In- Building and Fixed Subscriber Antennas	The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment

LIMITED WARRANTY

Category EE Products OneCell® Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days
Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software	Ninety (90) days
Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products	Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year
Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems	Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.
Category II Products SiteRise™ Solutions	One (1) year on workmanship for the Solution.
Category JJ Products Copper Structured Cabling Products Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)	One (1) year from the date of Installation
Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)	One (1) year from the date of completion of the work.
Category LL Products imVision Overlays and Controllers	Three (3) years

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.

RoHS Certificate of Compliance

COMMSCOPE®

Product Name: 360DMiP-12LC-SM

Product Number: 760242968

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by:

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

COMMSCOPE®

TECP-96-194 Rev C May 2019

LC and MPO Connectors

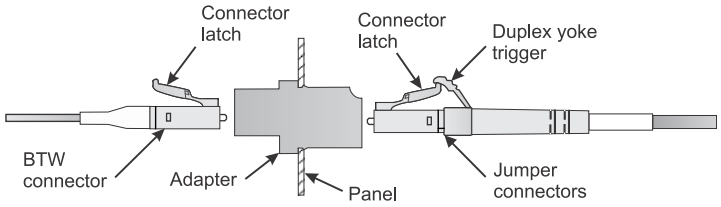
Instructions for Use

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

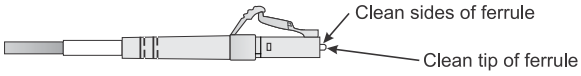
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

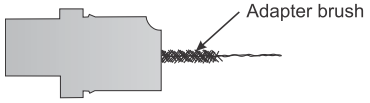
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



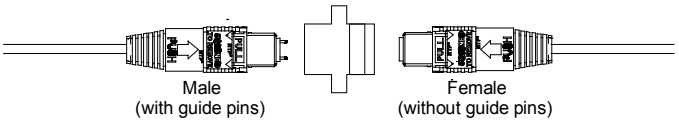
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



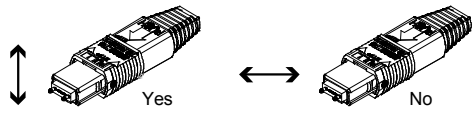
3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

   Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.

Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

COMMSCOPE®

How to Contact Us

- For product information and support, visit us on the web at http://www.commscope.com/SupportCenter
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

Instructions for Use

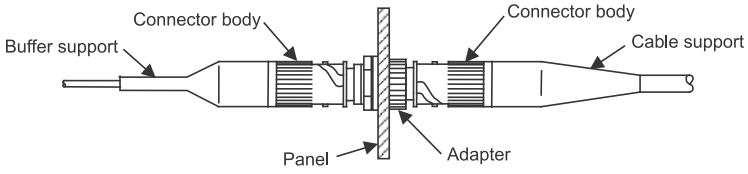
ST® and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST® Connectors into Adapter

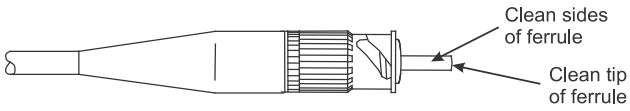
1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the **ST** cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of **ST** connectors, use the **ST** cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



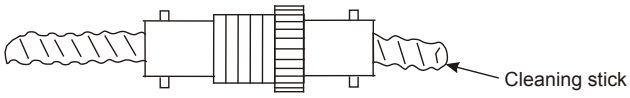
Clean *ST* Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.

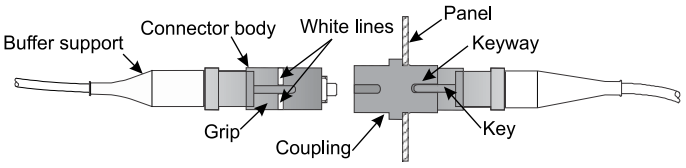


Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

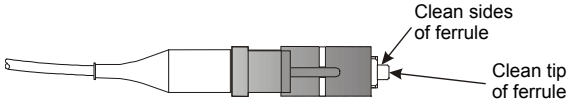


Clean SC Connector and Adapter

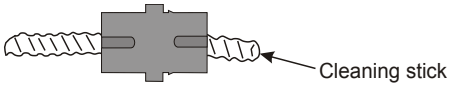
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.

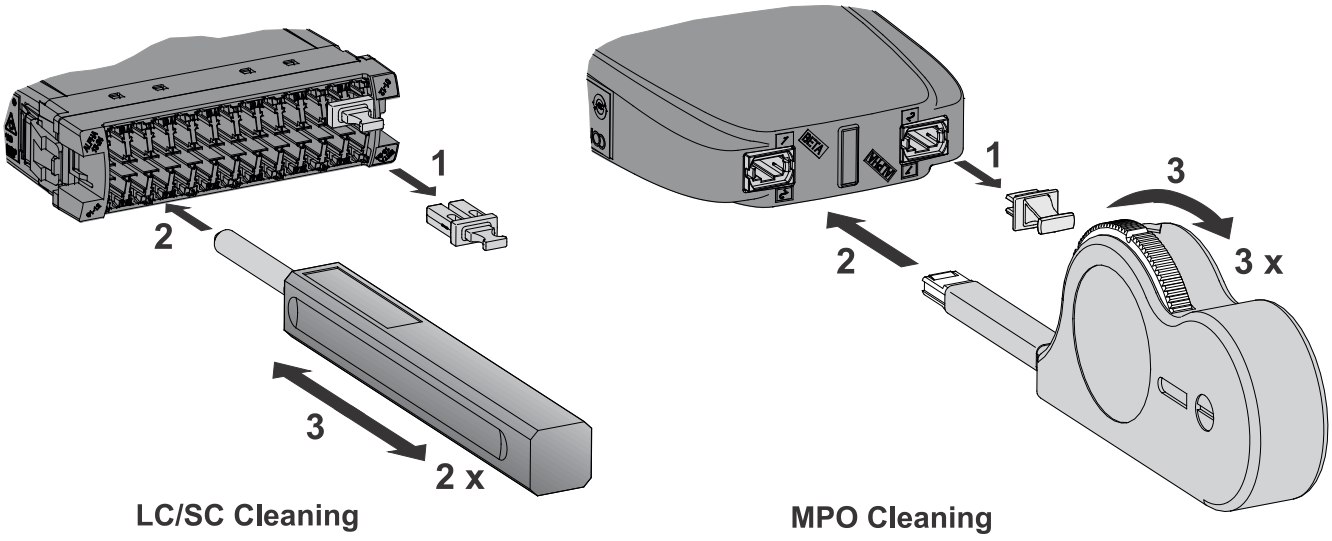


LC/SC and MPO Module Port Cleaning Instructions

The Fiber Optic Connector Cleaning and Inspection Kit (MID 760053199) contains all the tools and materials required to properly clean module ports.

Replacement consumables (MID 760053207) are available for the Cleaning and Inspection Kit.

For more information refer to http://docs.commscope.com/Public/CommEnt_Cleaning_Procedures.pdf



Clean each module port prior to installing a mating connector.

Tools Required

- LC/SC **IBC**™ cleaner
- MPO **IBC** cleaner

How to Contact Us

- To find out more about **CommScope**® products, visit us on the web at http://www.commscope.com/
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

760242972 | 360DMiP-24LC-SM

InstaPATCH® 360 TeraSPEED® Standard Module, 24 LC fibers (12 duplex ports), Blue, iPatch Ready

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber module

General Specifications

Functionality	Breakout
Adapters, quantity, front	12
Adapters, quantity, rear	2
Color, front	Blue
Color, rear	Gray
Data Module Type	Standard
Intelligence Type	iPatch® ready
Interface, front	LC/UPC
Interface, rear	MPO
Interface Feature, rear	Pinned | Reduced footprint
Shuttered	Yes
Total Fibers, quantity	24
Total Ports, quantity, front	24

Dimensions

Height	30.48 mm | 1.2 in
Width	91.44 mm | 3.6 in
Depth	116.84 mm | 4.6 in

760242972 | 360DMiP-24LC-SM

Optical Specifications

Fiber Mode	Singlemode
Fiber Type	G.652.D and G.657.A1, TeraSPEED® | OS2
Insertion Loss Change, mating	0.3 dB
Insertion Loss Change, temperature	0.3 dB
Insertion Loss, maximum	1.05 dB

Environmental Specifications

Safety Standard	UL

Packaging and Weights

Packaging quantity	1

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant

* Footnotes

Insertion Loss Change, mating	Maximum insertion loss change after 500 matings
Insertion Loss Change, temperature	Maximum insertion loss change from -10 °C to +60 °C (+14 °F to +140 °F)

COMMSCOPE®

Application guide

High speed migration SYSTIMAX® InstaPATCH® 360 and SYSTIMAX Ultra-Low-Loss configuration guideline

Contents

SYSTIMAX® preterminated fiber-optic cabling systems configuration guide

Introduction

SYSTIMAX® InstaPATCH® 360 and SYSTIMAX 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 InstaPATCH 360 and SYSTIMAX ULL. Detailed instructions outline the design and deployment of SYSTIMAX preterminated fiber infrastructure systems.

Polarity control

SYSTIMAX preterminated systems provide polarity control mechanisms that ensure signals are correctly routed through array fiber modules, trunks and fanout cables. Both SYSTIMAX ULL and SYSTIMAX InstaPATCH 360 use Method B trunks and aligned-key adapters.

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.

The new SYSTIMAX ULL system uses the Enhanced Method B fiber routing within the modules and fanout cables, eliminating the ALPHA/BETA orientation and port labeling.

The MPO connector, MPO pins, keys and polarity

The MPO connector was developed by NTT-AT in the mid-1980s and is internationally standardized in IEC 61754-7 as well as TIA/EIA 604-5. Both InstaPATCH 360 and SYSTIMAX ULL connectors are factory terminated in pinned and unpinned versions, as shown in Figure 1.

Male MPO (pinned) “MX” Female MPO (unpinned)

Figure 1. Pinned and unpinned MPO connectors

The pinned MPO is commonly referred to as male, or MPO(m), while the MPO without pins is referred to as female, or MPO(f). With the exception of the pins, the MPO connectors are identical. A pair of MPO connectors are mated by aligning the precision guide pins on the MPO(m) connector with the pin holes in the MPO(f) connector.

Depending on the application, MPO connectors are available in 8-fiber, 12-fiber or 24-fiber configurations. InstaPATCH 360 trunks and modules are available with 12-fiber MPO connectors (black boot). SYSTIMAX ULL MMF trunks and modules are available in 12-fiber as well as 8t-fiber (gray boot) and 24-fiber MPO connectors (red boot) SMF are available in 8- and 12-fiber; see Figure 2.

Figure 2. MPO connector fiber counts

MPO connectors with aqua colored grips denote OM2, OM3 or OM4 fiber type, lime green denotes OM5, green denote SM for InstaPATCH 360 and SYSTIMAX ULL.

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).

Note that two female 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 male MPO connectors will not insert and latch in an adapter without inflicting permanent damage to one or both of the connectors.

MPO connectors and adapters have interlocking lugs and notches (commonly referred to as “keys”) that ensure proper orientation of the mating connectors. MPO keys are critical components of both polarity management and singlemode angle management.

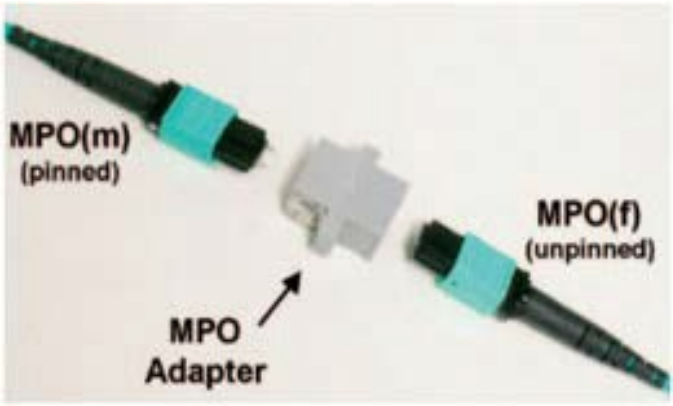


Figure 3. MPO connectors and MPO adapter

InstaPATCH® 360 and SYSTIMAX ULL systems assure correct system polarity regardless of the network design topology. 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. Both systems utilize Method B polarity control, which uses “aligned key” MPO adapters. Key orientation on MPO connectors is established in the factory to implement specific polarity design criteria. Both InstaPATCH 360 and SYSTIMAX ULL take advantage of the TIA/EIA 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 mated pair of MPO connectors in an InstaPATCH 360 or SYSTIMAX ULL link.

Aligned-key adapters are easily recognized by their light gray color; opposed-key adapters are black in color, as shown in Figure 4.

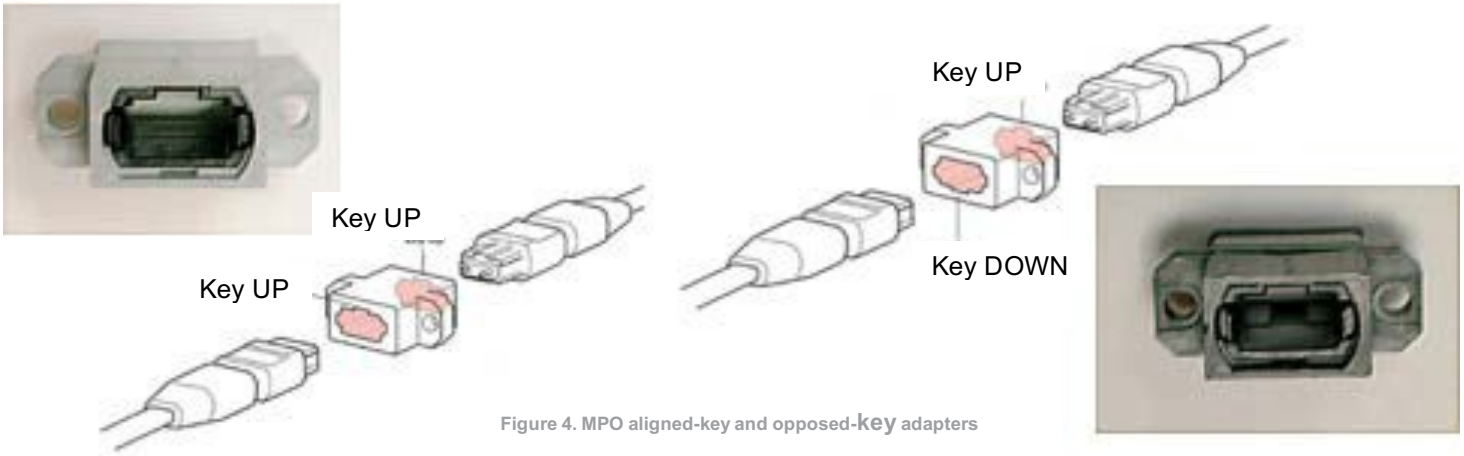


Figure 4. MPO aligned-key and opposed-key adapters

CommScope fiber-optic cable

InstaPATCH 360 products are available with CommScope LazrSPEED® 300 (OM3), LazrSPEED 550 (OM4), LazrSPEED 550 wideband (OM5), or TeraSPEED SM fiber. SYSTIMAX ULL products are available with LazrSPEED 550 (OM4) LazrSPEED 550 wideband (OM5) or TeraSPEED SM fiber.

LazrSPEED 300 and 550 products are identified with an aqua-color jacket and LazrSPEED 550 wideband jackets are lime green. InstaPATCH 360 and SYSTIMAX ULL SM products are identified with a yellow jacket.

InstaPATCH 360 cable assemblies are available in 12-fiber round (IPD) cordage types up to a total fiber count of 144 fibers.

SYSTIMAX ULL cable assemblies are available in 8-fiber, 12-fiber or 24-fiber round (IPD) cordage types up to a total of 144 fibers.

Product Descriptions

Data modules (DM)

Modules 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 modules contain male MPO connectors and are intended to be used with InstaPATCH 360 trunk cables. SYSTIMAX ULL modules contain female MPO connectors and are intended to be used with SYSTIMAX ULL trunk cables.

InstaPATCH 360 modules 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 16).

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

Visual identification of DM modules

InstaPATCH 360 DM modules have a rounded housing with a small color icon on the back, which denotes fiber type. ALPHA/BETA labeling and may have either one or two MPO adapters on the back; see Figure 5. The aqua color denotes OM4 LazrSPEED 550 fiber, lime green color denotes OM5 WB fiber and blue denotes SM.

Figure 5. InstaPATCH 360 DM module

SYSTIMAX ULL DM modules have a squared-off housing with a large, colored bulkhead on the back that denotes fiber type and may have 1, 2 or 3 MPO adapters on the back.
SYSTIMAX ULL DM modules may also be identified by gray-colored latch assists on the front; see Figure 6.

Figure 6. SYSTIMAX ULL DM module

SYSTIMAX ULL module variations

In addition to multiple fiber types, SYSTIMAX ULL modules are also available with one 24-fiber(MMF), two 12-fiber, or three 8-fiber MPOs on the back—and all SYSTIMAX ULL DM modules have 24 LCs on the front, arranged in 12 duplex LC ports differently based on MPO type.

SYSTIMAX ULL modules with two 12-fiber MPOs are similar to InstaPATCH 360 modules with two 12-fiber MPO adapters on the back, but due to internal fiber routing changes that eliminate the need for ALPHA/BETA, port labeling has changed on the front and the rear. The MPO ports are simply numbered 1 and 2 and the duplex LC ports are numbered 1-12 starting in the lower 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 7.

DM12-24LC-LS-UL

Figure 7. SYSTIMAX ULL 12-fiber MPO module

SYSTIMAX MMF ULL modules are also available with a single 24-fiber MPO on the back. The duplex LC ports are numbered 1-12 starting in the lower left corner (same as 12-fiber MPO version); see Figure 8.

DM24-24LC-WB-ULL

Figure 8. SYSTIMAX ULL 24-fiber MPO module

SYSTIMAX ULL modules are also available with three 8-fiber MPOs on the back. In this version, the duplex LC ports are arranged differently. They are arranged in three groups of four, identified by the color of the LC 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 9.

DM08-24LC-WB-ULL

Figure 9. SYSTIMAX ULL eight-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 eight aligned-key MPO adapters. These are used to connect trunk cables to equipment cords, fanout cables and trunk extensions. InstaPATCH 360 and SYSTIMAX ULL use the same MPO adapter panels; see Figure 10.

360DP-8MPO

Figure 10. MPO adapter panel

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 one 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 SYSTIMAX ULL trunks are available in multiples of 8, 12 or 24 fibers, up to a total of 144 fibers.

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

InstaPATCH 360 trunks have *female unpinned* MPO connectors on both ends for connection to InstaPATCH 360 modules or MPO adapter pass-through panels.

SYSTIMAX ULL trunks have *male pinned* MPO connectors on both ends for connection to SYSTIMAX ULL modules or MPO adapter pass-through panels.

MPO(f)-MPO(m) trunk extension cables

Extension cables are used to extend the reach of a 24-fiber MMF trunk cable. Extension cables share the same construction as MPO-to-MPO trunk cables; however, trunk extensions must have female MPOs on one end and male MPOs on the other to mate with the trunk that is being extended. One end will be mated to a trunk and the other end will be mated to a module, fanout or equipment cord.

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 11.

Figure 11. 24-fiber trunk extension fiber polarity

EHD Modules

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

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

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

Figure 14. SYSTIMAX EHD 24-DM-24LC-WB-B_ULL

EHD TeraSPEED modules are available in 2X12f to 24LC and 3X8f to 24LC. EHD LazrSPEED 550 and 550 WB are available in 1X24f to 24LC, 2X12f to 24LC and 3X8f to 24LC.

Figure 15. SYSTIMAX Splice module

EHD Splice modules are available in LazrSPEED OM4 and TeraSPEED SM with stranded and ribbon fiber options.

MPO-MPO cross-connect 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-connects have male pinned MPO connectors on both ends for patching between InstaPATCH 360 trunks.

SYSTIMAX ULL trunks have female unpinned MPO connectors on both ends for connection to SYSTIMAX ULL modules' trunks.

Ruggedized fanout cables

Ruggedized fanout cables—also known as hydra cables, direct attach or breakout cables—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 male or female MPO. Care must be taken to order the correct fanout type or an incompatible mating will result. Ruggedized fanout cables use the same cable and construction as trunks' cables, but the total fiber count is limited to 96. These cables are typically used when cable routing exits the cabinet or rack.

InstaPATCH 360 ruggedized fanout cables are available with LC, SC or ST connectors; SYSTIMAX ULL ruggedized fanouts are available only with LC connectors.

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 can be configured with MPO connectors on both ends—or on just one end with simplex or duplex connectors on the other.

SYSTIMAX InstaPATCH array cables are available with either 12-fiber or 24-fiber MPO connectors. SYSTIMAX ULL array cords are available with 8-fiber (gray), 12-fiber (black) or 24-fiber (red) MPO connectors. 8-fiber and 12-fiber cords are 3.0 millimeters in diameter and 24-fiber cords are 3.6 millimeters. These cables are used typically when cable routing remains within the rack or cabinet.

InstaPATCH 360 array fanout cables are available with LC, SC or ST connectors, SYSTIMAX ULL array fanout cables are available only with LC connectors.

SYSTIMAX ULL MPO-MPO array cables have female MPO connectors on each end, thus eliminating the possibility of plugging a male MPO into and damaging electronic equipment.

Comparison of Method B polarity to enhanced Method B

Due to its topology independence and ease of implementation, CommScope has long been an advocate of Method B polarity for MPO-based systems. InstaPATCH 360 requires the use of ALPHA/BETA modules. ALPHA/BETA is describing the flippable orientation of the modules when they are installed in a shelf or panel. One module is in ALPHA orientation and the other module is in BETA. Flipping modules keeps like-numbered ports in the same place on both ends of a channel; see Figures 16 and 17. (Port 1 will always be bottom left on the module.)

Figure 16. ALPHA/BETA modules used in InstaPATCH 360

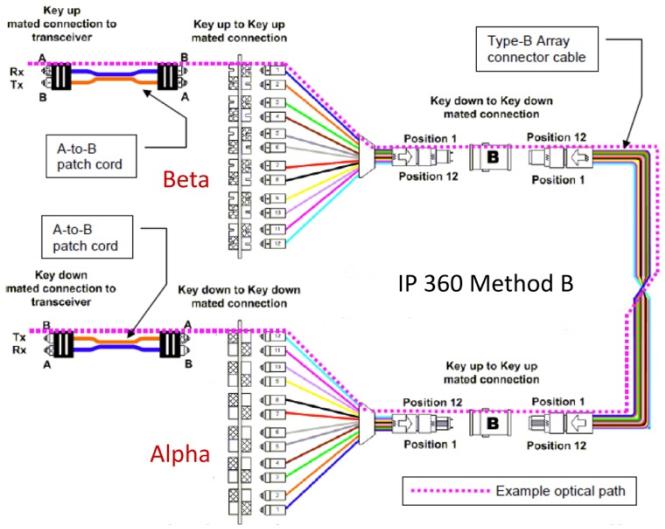


Figure 17. InstaPATCH 360 Method B

SYSTIMAX 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 18 and 19.

Figure 18. Modules used in SYSTIMAX ULL

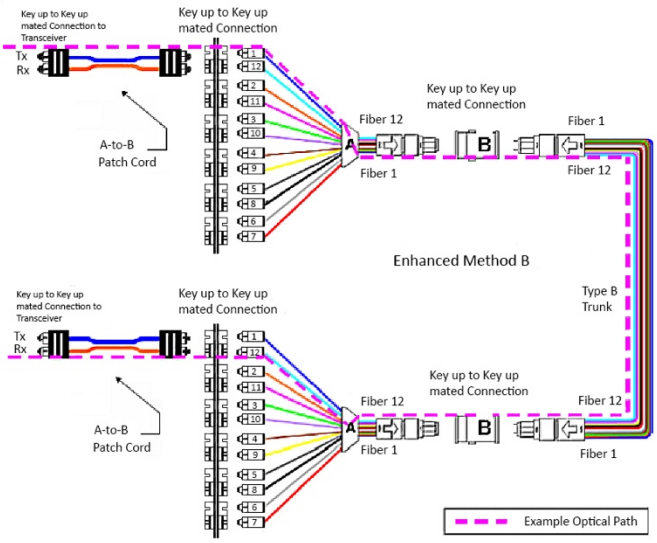


Figure 19. SYSTIMAX ULL enhanced Method B

SM ferrule angle and InstaPATCH 360 Method B

SM 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 -55 decibels or better. Since Method B polarity requires the use of aligned-key MPO adapters, male and female MPO connectors used in InstaPATCH 360 cable assemblies are angled in opposite directions. Male MPO connectors (MX) are angled down relative to the key and female connectors (MP) are angled up, as illustrated in Figure 20.

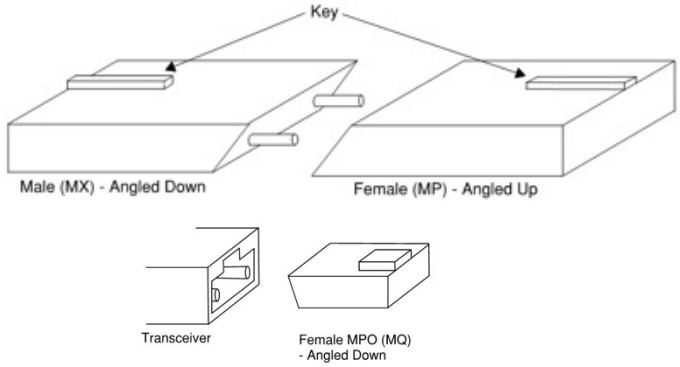


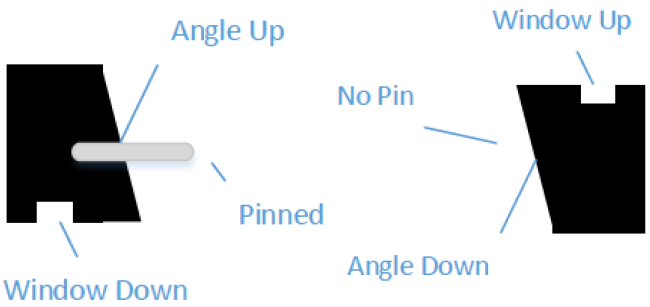
Figure 20. InstaPATCH 360 SM MPO angle orientation

These opposing angles ensure physical contact between fibers when the connectors are mated together; however, when an equipment connection is required, the female MPO connector must match the angle of the electronic equipment. All SM MPO-based transceivers are designed to accept female MPO connectors with down angles. As a result, a third MPO variant was introduced for InstaPATCH 360 SM MPO equipment cables. This down-angled female MPO connector is identified in InstaPATCH 360 systems with the code “MQ.” MQ connectors are identical in every respect to MP connectors except for the direction of the angle—making them compatible with SM transceivers but incompatible with MX connectors.

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

SM ferrule angle and SYSTIMAX ULL Enhanced Method B

For Enhanced Method B the angles on SM MPO connectors have been reversed. Male connectors are angle up relative to the key and female connectors are angled down. This eliminates the need for special MPO connectors to interface with electronics.

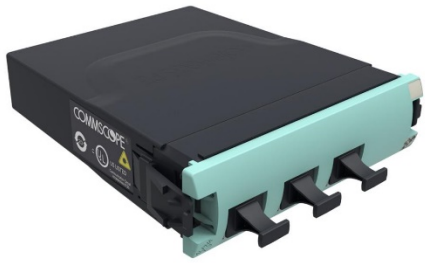


Conversion Modules (CM)

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 module allows for three 8-fiber transceivers to use two 12 fiber trunks without any dark fiber.

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

InstaPATCH 360 CM modules come in both SM and OM4 MM. They are both available in a 2x3 or double density 4x6 configurations.



360CM12-2x3-LS Front View

360CM-2x3-LS Rear View

360CM12-4X6-TS Front View

360CM12-4X6-TS Rear View

SYSTIMAX ULL CM modules use the same square back housing as the InstaPATCH CM modules. The SYSTIMAX ULL version can be visually identified by gray-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.

SYSTIMAX ULL CM modules are available in OM4 (Aqua), OM5 (Lime Green in color) and SM (Blue in color)
SYSTIMAX ULL CM Modules are available with either two 12-fiber MPOs or a single 24-fiber MPO on the back.

CM12-2x3-LSOM4 ULL Front View

CM12-4X6-SM ULL Front View

CM12-4X6-SM ULL Rear View

SYSTIMAX ULL CM module variations

Specialty 24-fiber Cable Assemblies

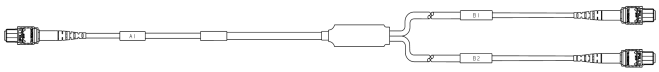
IP360 1X2 Bi-furcated Fanouts

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 female (connector code 2P), but the 12-fiber MPO connectors may be either male or female, depending on the application. Connector code CP or CX are used for IP360 assemblies.

SYSTIMAX ULL 1X2 Bi-Furcated Fanouts
The ULL 24-fiber MPO connector is always female (connector code 2C) with the 12-fiber connectors male or female (connector codes MP and MX).

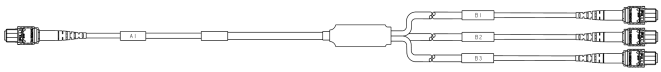
1X2 Bi-furcated fanouts with OM4 fiber are available in both InstaPATCH and SYSTIMAX ULL. OM5 versions are only available in SYSTIMAX ULL.



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 male or female, depending on the application (connector code QP or QX).

1X3 Tri-furcated fanouts with OM4 and SM fiber are available in both InstaPATCH. OM5 is only available in SYSTIMAX ULL.



2x3 Fanouts

2X3 Fanouts serve much the same purpose as CM Modules 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 female 8-fiber MPO connectors.

	End A MM	End B MM	End A SM	End B SM
IP360	QP	PP, PX	QQ	PP, PX
ULL	QP	MP, MX	QP	MP, MX

2X3Fanouts with OM4 and SM fiber are available in InstaPATCH. OM4, OM5 and SM versions are available in SYSTIMAX 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 module 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 21.

Figure 21. Labeling of duplex end of InstaPATCH 360 fanout cables

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

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 22.

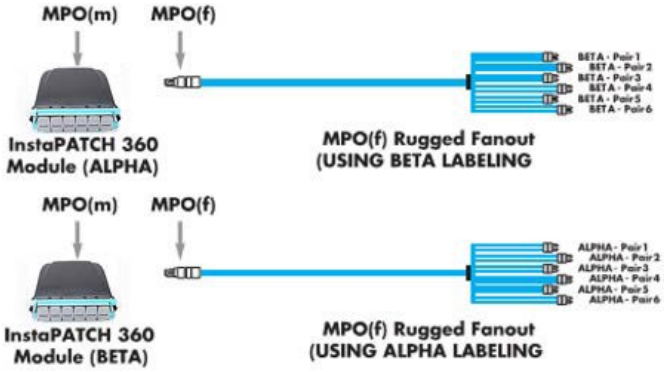


Figure 22. InstaPATCH 360 module orientation and use of ALPHA/BETA labeling in fanout cables.

Typical MPO configurations for InstaPATCH 360 systems

Using trunks to interconnect to modules

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

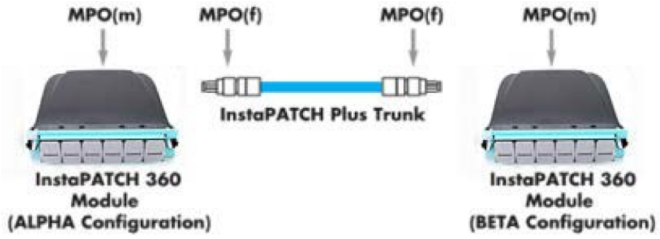


Figure 23. InstaPATCH 360 modules in ALPHA/BETA orientation

Using trunk extension cables

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

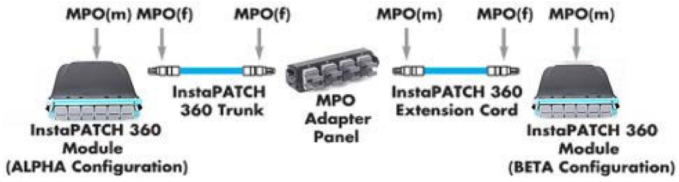


Figure 24. InstaPATCH 360 extension cables

Using MPO-MPO array/equipment cables

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

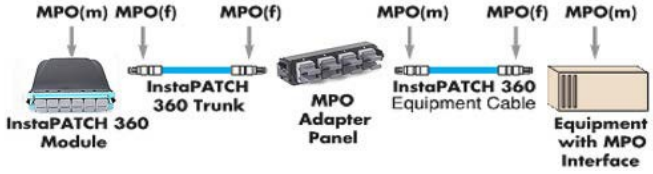


Figure 25. InstaPATCH 360 array/equipment cables

Note—for SM InstaPATCH applications, the MPO connector mating 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 20.

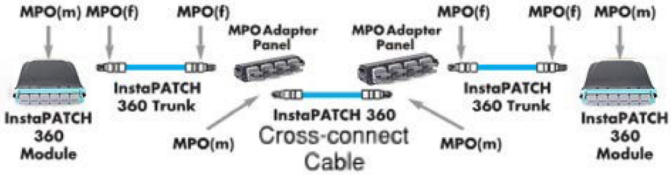


Figure 20. InstaPATCH 360 cross-connect cable

Using rugged or array fanout cables with modules

When fanout cables mate to InstaPATCH 360 modules, as illustrated in Figure 26, the fanout MPO must be female.

Figure 26. InstaPATCH 360 MPO(f) fanout cable

Using rugged or array fanout cables with trunks

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

When fanout cables mate to InstaPATCH 360 trunks through an MPO adapter panel, the fanout must have a male MPO connector; see Figure 27.

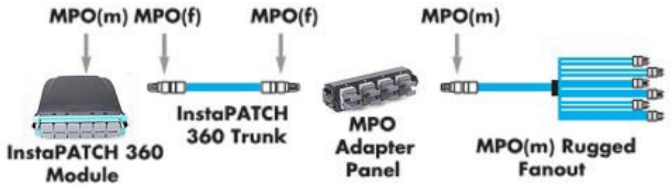
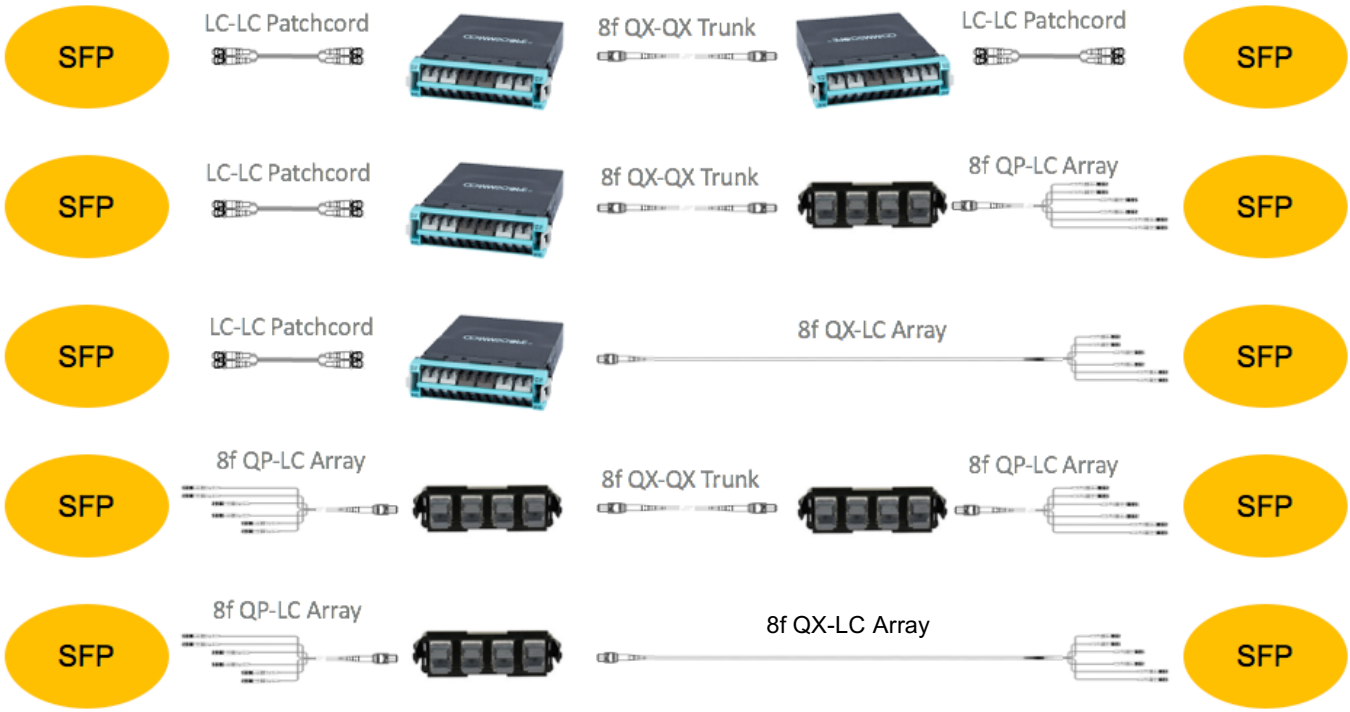


Figure 27. InstaPATCH 360 MPO(m) fanout cable

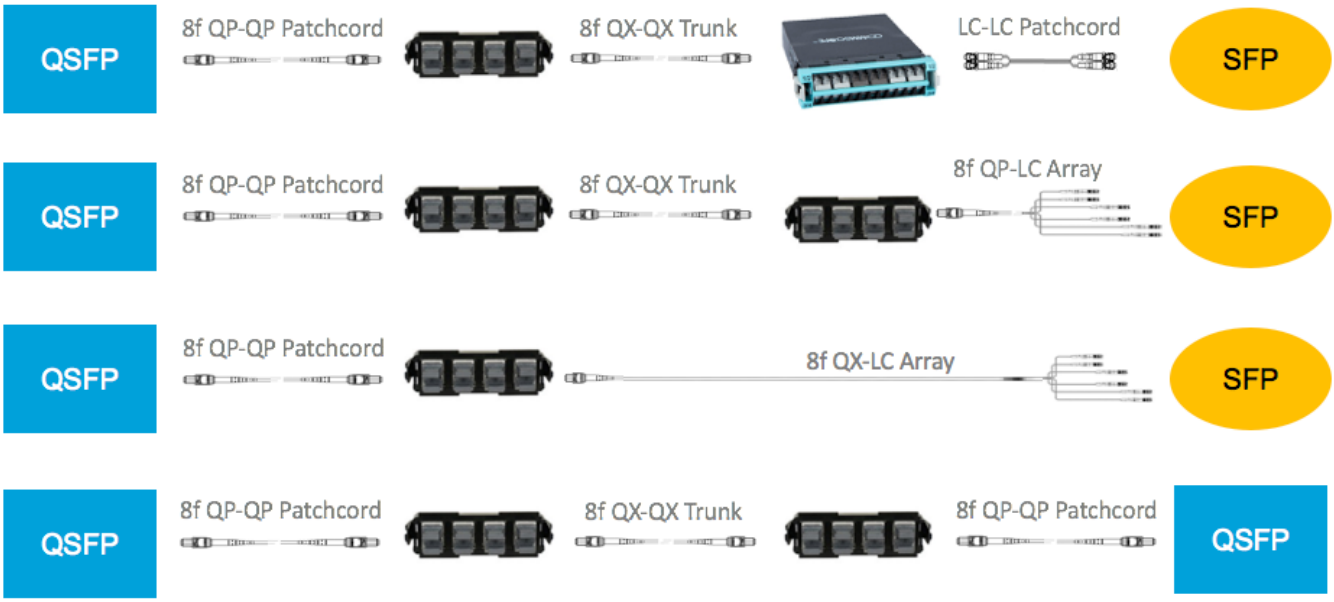
SYSTIMAX ULL Enhanced Method B MPO Configurations

SYSTIMAX ULL Distribution Modules (DM), Conversion Modules (CM), 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 singlemode components.

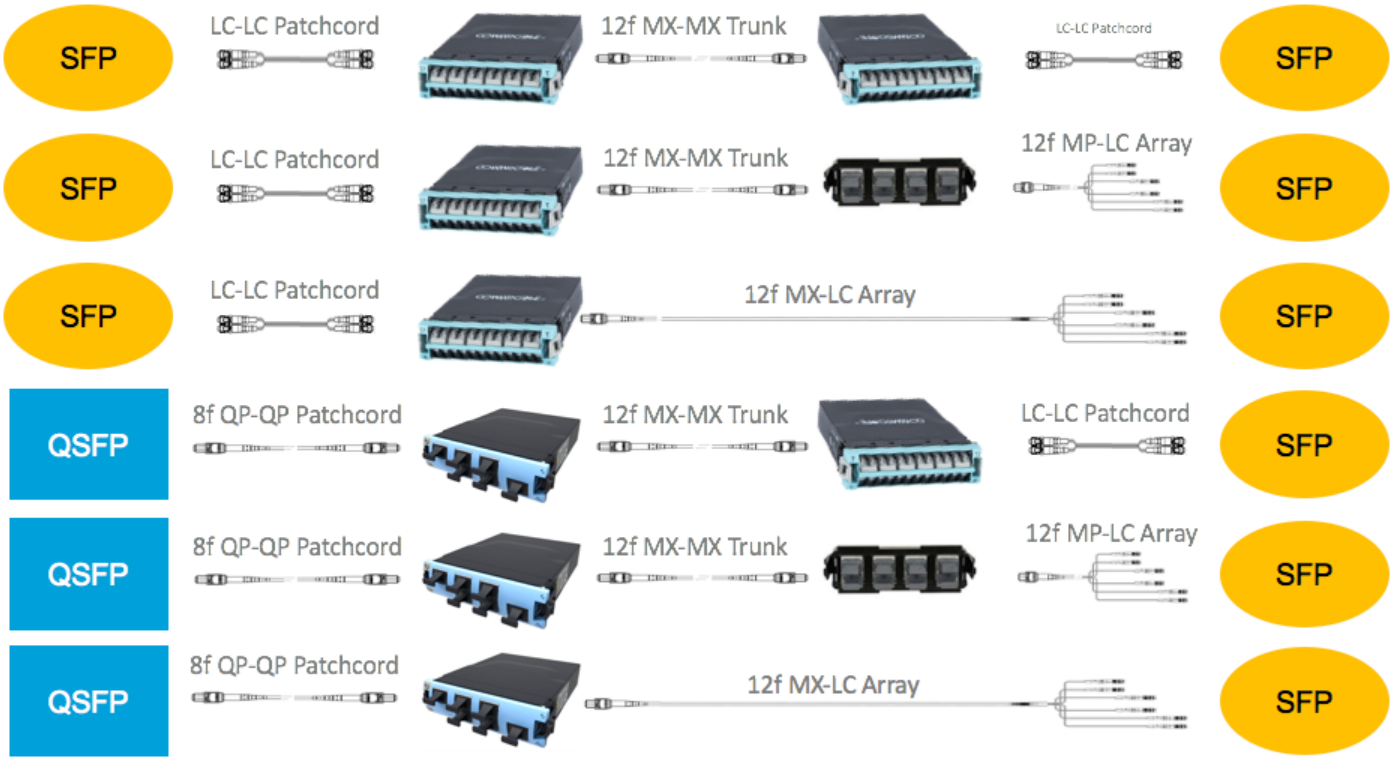
MPO8 Duplex configurations



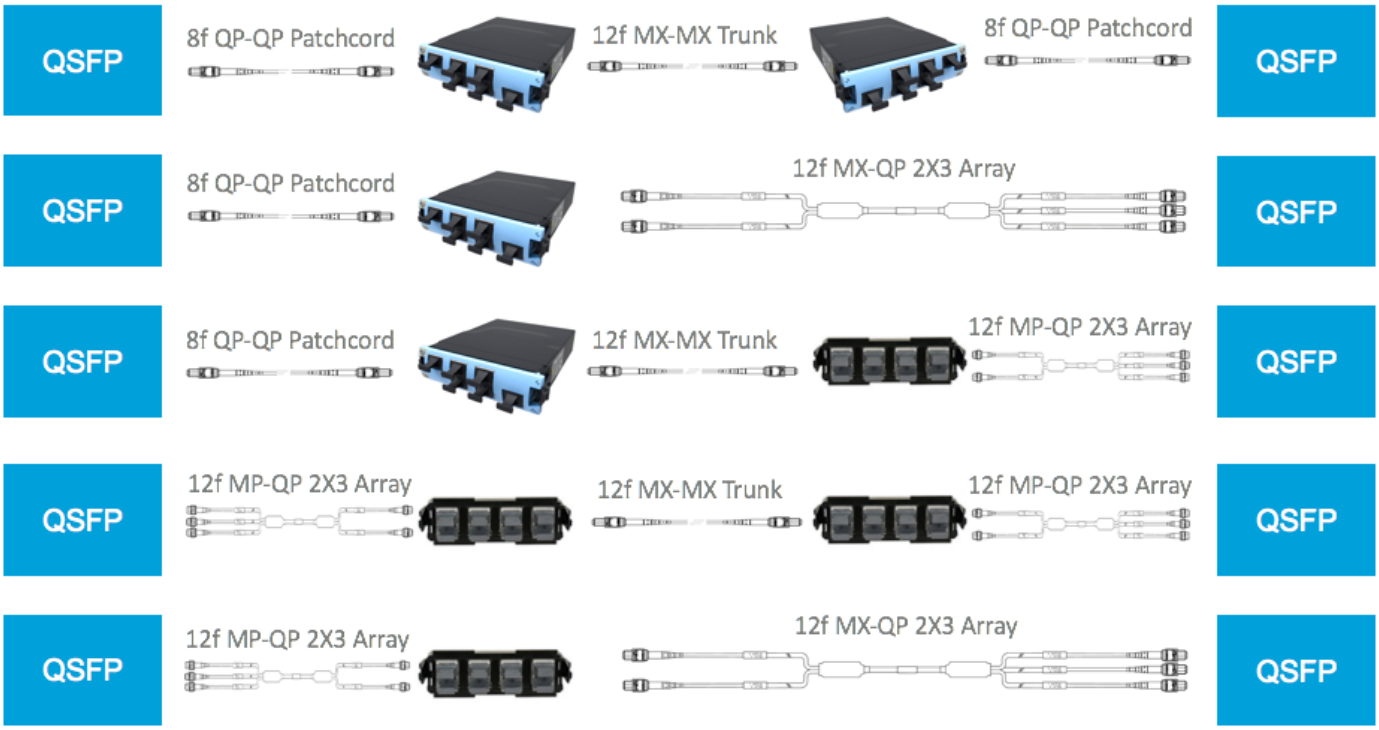
MPO8 QSFP Configurations



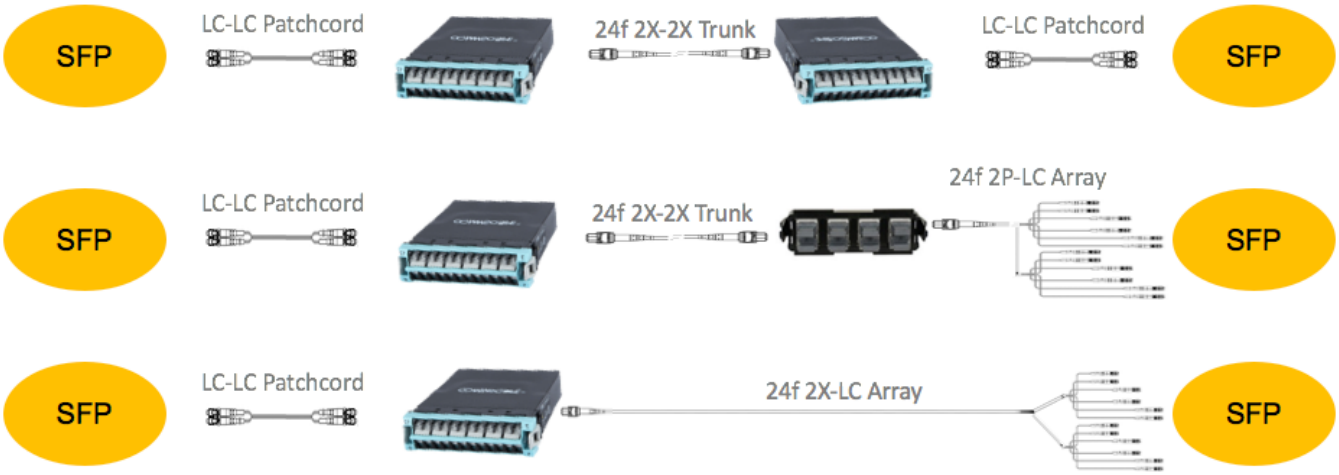
MPO12 Duplex Configurations



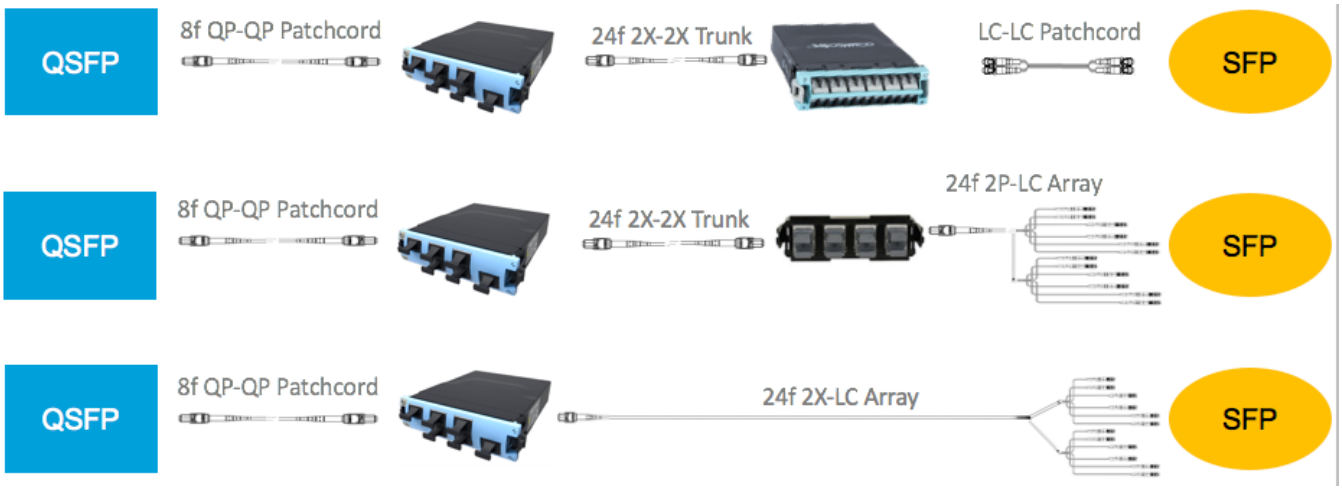
MPO12 QSFP



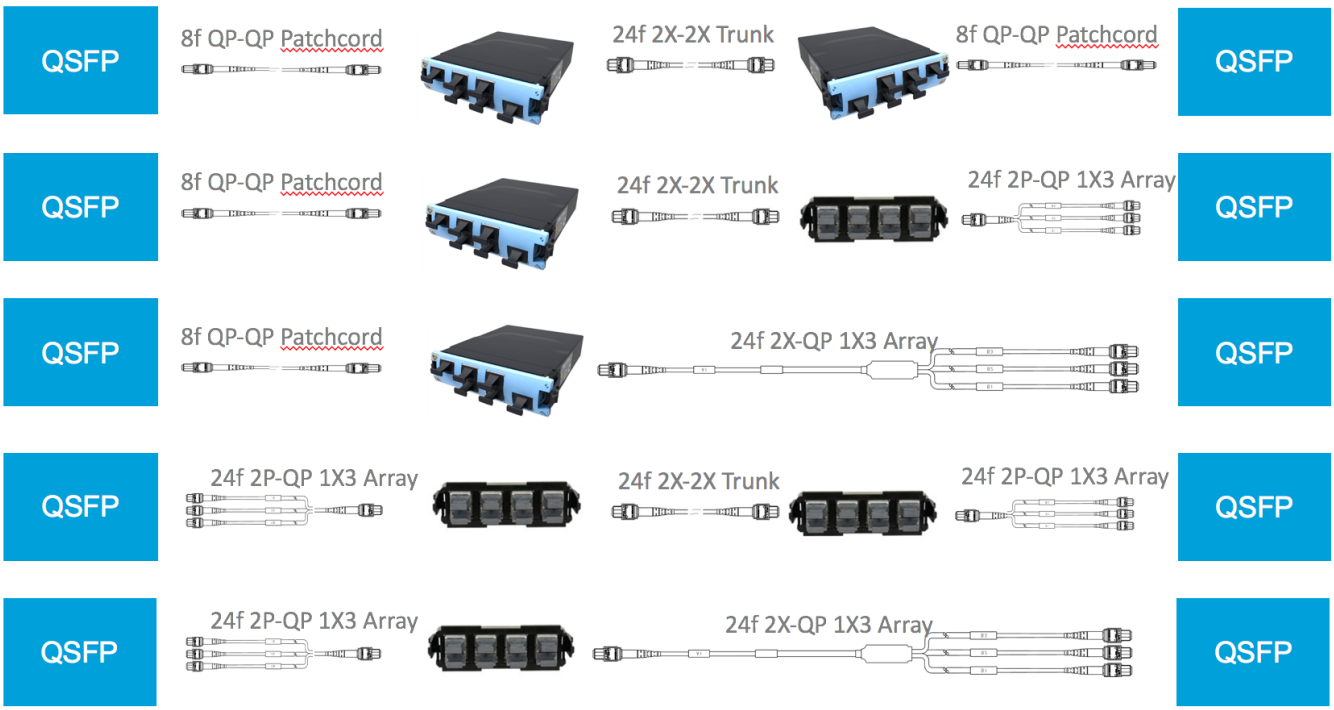
MPO24 Duplex



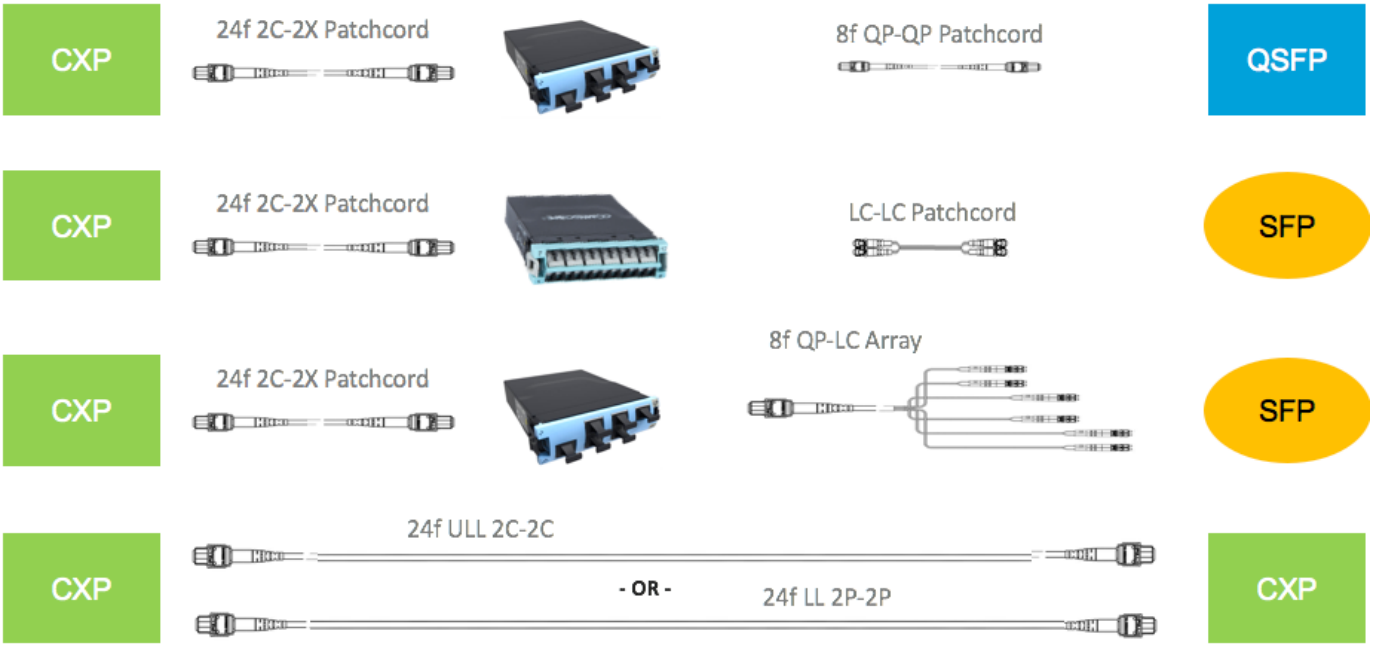
MPO24 QSFP/Duplex



MPO24 QSFP



MPO24 CXP/CFP



SYSTIMAX IP360 and ULL configuration rules

Instapatch 360 Basic configuration rules

InstaPATCH® 360 Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) 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(f) 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(m) 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.

SYSTIMAX ULL basic configuration rules

SYSTIMAX ULL Rule Number 1:
In each mated pair of MPO connectors there shall be an MPO(m) connector, an MPO(f) connector and an aligned-key MPO adapter (keying option k=2, key-up to key-up).

SYSTIMAX ULL Rule Number 2:
Adding or removing MPO pins in the field is not allowed.

SYSTIMAX ULL Rule Number 3:
Any SYSTIMAX ULL direct connection to an DM or CM or EHD Module, or to an MPO optical array transceiver shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 4:
Any connection to SYSTIMAX ULL trunks terminated in MPO Adapter panels shall be made with an MPO(f) connector.

SYSTIMAX ULL Rule Number 5:
Only SYSTIMAX solutions® factory-manufactured components shall be used in an SYSTIMAX ULL channel or link.

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.

TP-108195.3-EN (10/17)

CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None

Dr. Cem O. Onus
Managing Director

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(215) 997-4519
https://www.dekra.us/en/audits/

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Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

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ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	**Site Activities**
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
Managing Director

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ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

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Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

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Site Address	Site Activities
Site Address	**Site Activities**
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou,Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing &First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

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ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

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Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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Certificate Number: 111045.000
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The Quality Management System and implementation of:

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Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
Commscope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karanataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou,Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:
Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001

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证 书 附 录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技（苏州）有限公司

中国江苏省苏州工业园区启明路77 号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料（网络跳线、配线装置等）的生产。

认证结构: **多场所**

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10

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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No: **EMS 648387**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

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Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Euless Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

LIMITED WARRANTY

1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A,** (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization**. Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver**. If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15^{th}) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

(a) improper installation or misapplication of parts;
(b) chain or system failures induced by other products or components;
(c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
(d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
(e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
(f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
(g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
(h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
(i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
(j) use of the Product for purposes other than that for which it was designed; or
(k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.	Hardware One (1) Year Software Ninety (90) Days
Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
Category C Products Intentionally left blank.	
Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
Category E Products Intentionally left blank	
Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
Category F1 Products All CHP Headend Optical (HEO) Elements	Hardware Three (3) Years Software Ninety (90) Days
Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.	Hardware Five (5) Years Software Ninety (90) Days
Category G2 Products All CH3 Headend (HEO) Elements	One (1) year
Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories	Hardware Three (3) Years Software Ninety (90) Days

Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.	Hardware One (1) Year Software Ninety (90) Days
Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™® Workforce Management, Mobile TV, SecureMedia and Titanium	Hardware One (1) Year Software Ninety (90) Days
Category J Products Intentionally left blank	
Category K Products Intentionally left blank.	
Category L Products Intentionally left blank	
Category M Products Intentionally left blank.	
Category N Products Intentionally left blank.	
Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS	DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days
Category P Products Intentionally left blank.	
Category P1 Products Intentionally left blank	
Category Q Products Intentionally left blank	
Category R Products Intentionally left blank	
Category R1 Products Intentionally left blank	
Category S Products Intentionally left blank	
Category S1 Products Intentionally left blank	

LIMITED WARRANTY

Category T Products RUCKUS Wi-Fi	Hardware: - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an "e" suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** Software Ninety (90) Days
Category T1 Products RUCKUS ICX Switches	- ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product
Category T2 Products Intentionally left blank	
Category U Products Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC) NovuX Products Prodigy Products FDH Products Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable Assemblies OSP "Box" Products Mini-RDTs and RDTs FOSC™, FIST™ and Tenio™ OSP Copper Connect and Closure Products HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes Fiber Optic Panels, including Accessories, Mounting Hardware, Modules Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables, Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks Passive Optical Components and Value Added Modules (VAMs) FiberGuide® : Fiber cable Management System Optical Distribution Frames, including Modules, Blocks, Accessories and Hardware Cabinets Cable and Apparatus Products Alifabs™ Cabinets & Ancillary Products Alifabs™ Telecommunications Towers and Accessories Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets	One (1) year

LIMITED WARRANTY

Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products Electronic Enclosure Products (Cabinets) Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines) PowerShift™ & Power Products	Two (2) years
Category W Products ValuSite® Products I-Line Accessory Products Microwave Antennas Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)	Three (3) years
Category X Products Broadband RF Connectivity Products Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products	Five (5) years
Category Y Products QR® Coaxial Cable	Five (5) years
Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products * RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller's connectors in accordance with the installation instructions.	One (1) year
Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products * CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller's connectors by Seller or its certified distributor	Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.
Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products * HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller's connectors by Seller or its certified distributor.	Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.
Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment. Software Ninety (90) Days
Category DD Products In- Building and Fixed Subscriber Antennas	The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment

LIMITED WARRANTY

Category EE Products OneCell® Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days
Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software	Ninety (90) days
Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products	Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year
Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems	Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.
Category II Products SiteRise™ Solutions	One (1) year on workmanship for the Solution.
Category JJ Products Copper Structured Cabling Products Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)	One (1) year from the date of Installation
Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)	One (1) year from the date of completion of the work.
Category LL Products imVision Overlays and Controllers	Three (3) years

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.

RoHS Certificate of Compliance

COMMSCOPE®

Product Name: 360DMiP-24LC-SM

Product Number: 760242972

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by:

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

COMMSCOPE®

TECP-96-194 Rev C May 2019

LC and MPO Connectors

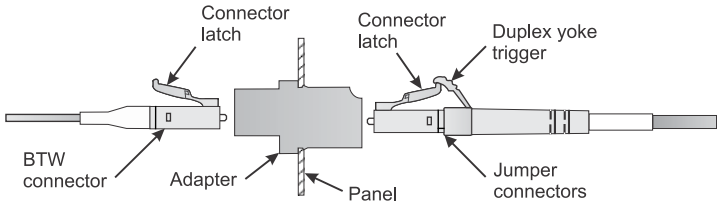
Instructions for Use

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

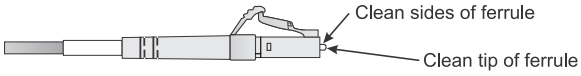
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

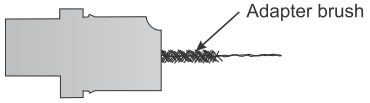
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



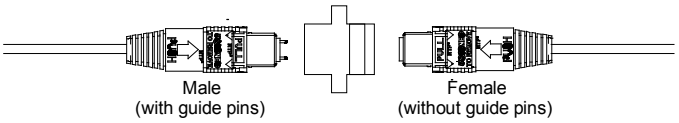
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



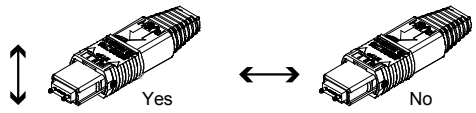
3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

   Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.

Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

COMMSCOPE®

How to Contact Us

- For product information and support, visit us on the web at http://www.commscope.com/SupportCenter
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

Instructions for Use

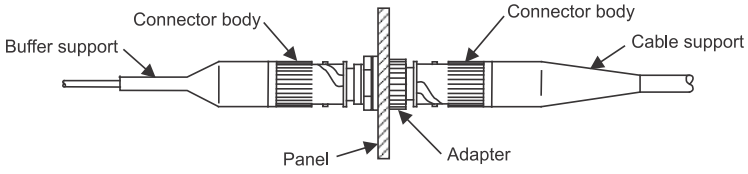
ST® and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST® Connectors into Adapter

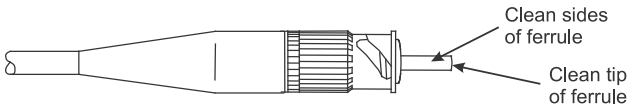
1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the **ST** cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of **ST** connectors, use the **ST** cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



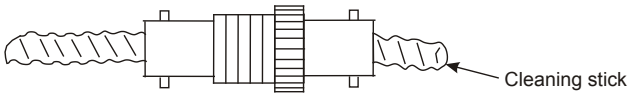
Clean *ST* Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.

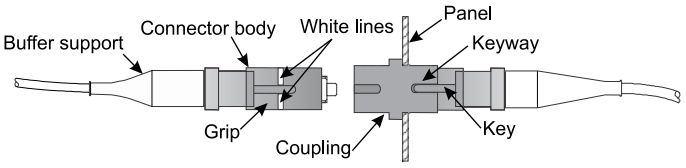


Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

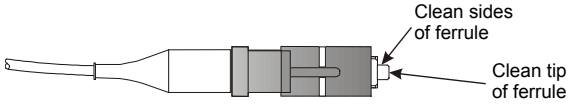


Clean SC Connector and Adapter

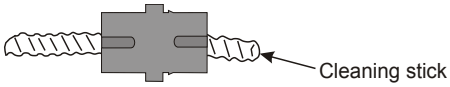
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
https://www.dekra.us/en/audits/

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17021-1 MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	**Site Activities**
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
Site Address	**Site Activities**
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou,Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing &First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
Commscope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karanataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou,Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:
Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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Atlanta, GA 30339 USA
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IAF

证 书 附 录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技（苏州）有限公司

中国江苏省苏州工业园区启明路77 号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料（网络跳线、配线装置等）的生产。

认证结构: **多场所**

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10

Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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ISO/IEC 17021-1
MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No: **EMS 648387**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Euless Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

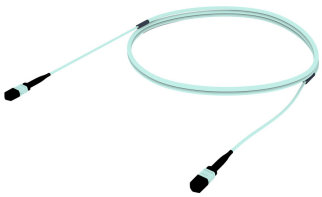
Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01
Effective Date: 2022-03-15
Latest Revision Date: 2022-04-21
Expiry Date: 2025-03-14

FJXMPMPAD

Base Product



OM4 MPO (Unpinned) to MPO (Unpinned), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Low Smoke Zero Halogen

- *Product complies with the Build America, Buy America Act (BABAA) requirements of the Infrastructure Investment and Jobs Act of 2021 (Pub. L. 117- 58, §§ 70901-70953), or is the subject of a waiver approved by the Secretary of Commerce or designee. Compliance requirements and waiver applicability vary based on government funding program. Check the laws and regulations for your specific program.

Product Classification

Regional Availability	Asia | Australia/New Zealand | China | Europe | India | Latin America | Middle East/Africa | North America
Portfolio	CommScope®
Product Type	Fiber trunk cable assembly
Product Brand	SYSTIMAX InstaPATCH® 360
Government Funding	Build America Buy America (BABA) compliant*
Ordering Note	For lengths greater than 999 ft (304 m), orders must be in meters | Minimum length may vary based on cable configuration | Not available in the United States or Canada

General Specifications

Color, boot A	Black
Color, connector A	Aqua
Color, boot B	Black
Color, connector B	Aqua
Construction Type	Stranded
Furcation Color	Aqua
Interface, Connector A	MPO-12/UPC Female
Interface Feature, connector A	Female
Interface, Connector B	MPO-12/UPC Female
Interface Feature, connector B	Female
Jacket Color	Aqua
Polarity	Method B (LL)
Fibers per Subunit, quantity	12

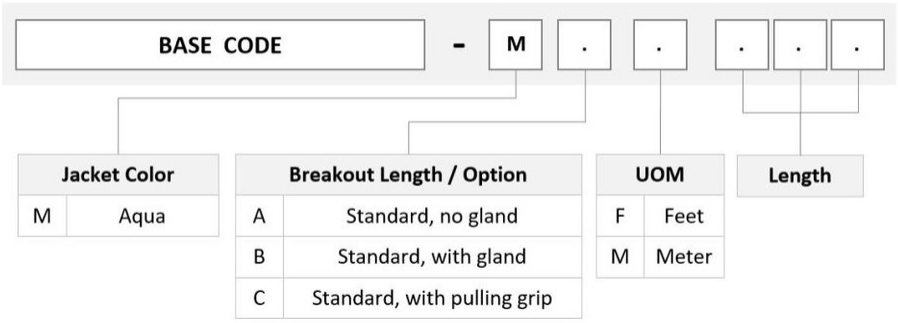
FJXMPMPAD

Total Fibers, quantity	12

Dimensions

Breakout Length	33 in
Cable Assembly Length Range (m)	3 – 999
Cable Assembly Length Range (ft)	10 – 999

Ordering Tree



Mechanical Specifications

Cable Retention Strength, maximum	11.24 lb @ 0 ° | 4.40 lb @ 90 °

Optical Specifications

Fiber Mode	Multimode
Fiber Type	OM4, LazrSPEED®

Environmental Specifications

Operating Temperature	-10 °C to +60 °C (+14 °F to +140 °F)
Environmental Space	Dual Rated LSZH/Riser | Indoor

Regulatory Compliance/Certifications

Agency	**Classification**
ANATEL	Compliant
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant

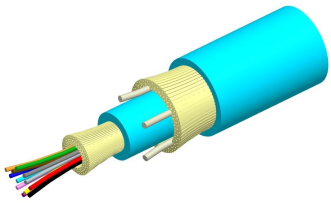
FJXMPMPAD

UK-ROHS	Compliant

Included Products

760067470 N-012-MP-5K-F12AQ/D	–	Fiber Indoor Cable, LazrSPEED® Low Smoke Zero Halogen Riser MPO Trunk Cable, 12 fiber, Gel-free, Multimode OM4, Dca Flame Rating, Feet jacket marking, Aqua jacket color
860647054	–	MPO12, LOW LOSS, FEMALE, OM3/4, AQUA, 3mm

760067470 | N-012-MP-5K-F12AQ/D



Fiber Indoor Cable, LazrSPEED® Low Smoke Zero Halogen Riser MPO Trunk Cable, 12 fiber, Gel-free, Multimode OM4, Dca Flame Rating, Feet jacket marking, Aqua jacket color

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber indoor cable
Product Series	N-MP

General Specifications

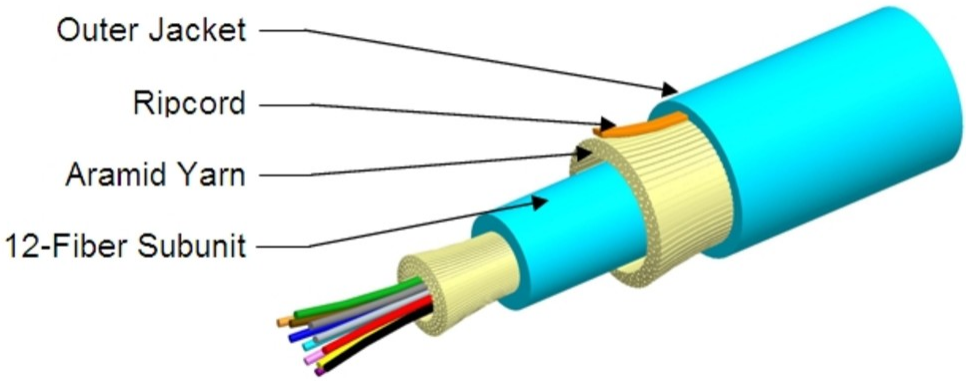
Cable Type	MPO trunk cable
Construction Type	Non-armored
Subunit Type	Gel-free
Jacket Color	Aqua
Jacket Marking	Feet
Total Fiber Count	12

Dimensions

Buffer Tube/Subunit Diameter	3 mm | 0.118 in
Diameter Over Jacket	5.4 mm | 0.213 in

Representative Image

760067470 | N-012-MP-5K-F12AQ/D



Mechanical Specifications

Minimum Bend Radius, loaded	81 mm | 3.189 in
Minimum Bend Radius, unloaded	54 mm | 2.126 in
Tensile Load, long term, maximum	200 N | 44.962 lbf
Tensile Load, short term, maximum	667 N | 149.948 lbf
Compression	10 N/mm | 57.101 lb/in
Compression Test Method	FOTP-41 | IEC 60794-1 E3
Flex	300 cycles
Flex Test Method	FOTP-104 | IEC 60794-1 E6
Impact	5.88 N-m | 52.042 in lb
Impact Test Method	FOTP-25 | IEC 60794-1 E4
Strain	See long and short term tensile loads
Strain Test Method	FOTP-33 | IEC 60794-1 E1
Twist	10 cycles
Twist Test Method	FOTP-85 | IEC 60794-1 E7
Vertical Rise, maximum	500 m | 1,640.42 ft

Optical Specifications

Fiber Type	OM4, LazrSPEED® 550 | OM4, LazrSPEED® 550

Environmental Specifications

Installation temperature	-20 °C to +60 °C (-4 °F to +140 °F)

Operating Temperature	-20 °C to +70 °C (-4 °F to +158 °F)
Storage Temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Cable Qualification Standards	ANSI/ICEA S-83-596 | Telcordia GR-409
EN50575 CPR Cable EuroClass Fire Performance	Dca
EN50575 CPR Cable EuroClass Smoke Rating	s1a
EN50575 CPR Cable EuroClass Droplets Rating	d1
EN50575 CPR Cable EuroClass Acidity Rating	a1
Environmental Space	Low Smoke Zero Halogen (LSZH) | Riser
Flame Test Listing	NEC OFNR-ST1 (ETL) and c(ETL)
Flame Test Method	IEC 60332-3 | IEC 60754-2 | IEC 61034-2 | UL 1666 | UL 1685

Environmental Test Specifications

Heat Age	-20 °C to +85 °C (-4 °F to +185 °F)
Heat Age Test Method	IEC 60794-1 F9
Low High Bend	-20 °C to +70 °C (-4 °F to +158 °F)
Low High Bend Test Method	FOTP-37 | IEC 60794-1 E11
Temperature Cycle	-20 °C to +70 °C (-4 °F to +158 °F)
Temperature Cycle Test Method	FOTP-3 | IEC 60794-1 F1

Packaging and Weights

Cable weight	28 kg/km | 18.815 lb/kft

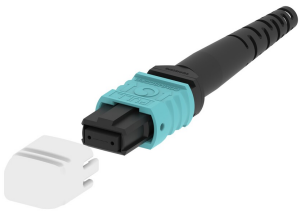
Regulatory Compliance/Certifications

Agency	Classification
CENELEC	EN 50575 compliant, Declaration of Performance (DoP) available
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant

* Footnotes

Operating Temperature	Specification applicable to non-terminated bulk fiber cable

860647054



MPO12, LOW LOSS, FEMALE, OM3/4, AQUA, 3mm

Product Classification

Regional Availability	Asia | Australia/New Zealand | EMEA | Latin America | North America
Portfolio	CommScope®
Product Type	Fiber connector

General Specifications

Color	Aqua
Color, boot	Black
Ferrule Geometry	Flat
Interface	MPO/UPC Female
Interface Feature	Unpinned
Total Fiber Count	12

Dimensions

Length	60.1 mm | 2.366 in
Compatible Cable Diameter	3 mm | 0.118 in

Material Specifications

Ferrule Material	Polymer

Mechanical Specifications

Cable Retention Strength, maximum	11.24 lb @ 0 °

Optical Specifications

Fiber Mode	Multimode
Fiber Type	OM3 | OM4
Insertion Loss Change, mating	0.2 dB
Optical Components Standard	ANSI/TIA-568-C.3

Insertion Loss Change, temperature	0.2 dB
Insertion Loss, maximum	0.27 dB
Return Loss, minimum	27 dB

Packaging and Weights

Packaging quantity	1

Regulatory Compliance/Certifications

Agency	**Classification**
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system

* Footnotes

Insertion Loss Change, mating	TIA-568: Maximum insertion loss change after 500 matings
Insertion Loss Change, temperature	Maximum insertion loss change from -10 °C to +60 °C (+14 °F to +140 °F)

LIMITED WARRANTY

1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A,** (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization**. Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver**. If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15^{th}) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

(a) improper installation or misapplication of parts;
(b) chain or system failures induced by other products or components;
(c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
(d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
(e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
(f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
(g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
(h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
(i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
(j) use of the Product for purposes other than that for which it was designed; or
(k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.	Hardware One (1) Year Software Ninety (90) Days
Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
Category C Products Intentionally left blank.	
Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
Category E Products Intentionally left blank	
Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
Category F1 Products All CHP Headend Optical (HEO) Elements	Hardware Three (3) Years Software Ninety (90) Days
Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.	Hardware Five (5) Years Software Ninety (90) Days
Category G2 Products All CH3 Headend (HEO) Elements	One (1) year
Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories	Hardware Three (3) Years Software Ninety (90) Days

Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.	Hardware One (1) Year Software Ninety (90) Days
Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™® Workforce Management, Mobile TV, SecureMedia and Titanium	Hardware One (1) Year Software Ninety (90) Days
Category J Products Intentionally left blank	
Category K Products Intentionally left blank.	
Category L Products Intentionally left blank	
Category M Products Intentionally left blank.	
Category N Products Intentionally left blank.	
Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS	DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days
Category P Products Intentionally left blank.	
Category P1 Products Intentionally left blank	
Category Q Products Intentionally left blank	
Category R Products Intentionally left blank	
Category R1 Products Intentionally left blank	
Category S Products Intentionally left blank	
Category S1 Products Intentionally left blank	

LIMITED WARRANTY

Category T Products RUCKUS Wi-Fi	Hardware: - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an "e" suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** Software Ninety (90) Days
Category T1 Products RUCKUS ICX Switches	- ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product
Category T2 Products Intentionally left blank	
Category U Products Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC) NovuX Products Prodigy Products FDH Products Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable Assemblies OSP "Box" Products Mini-RDTs and RDTs FOSC™, FIST™ and Tenio™ OSP Copper Connect and Closure Products HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes Fiber Optic Panels, including Accessories, Mounting Hardware, Modules Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables, Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks Passive Optical Components and Value Added Modules (VAMs) FiberGuide® : Fiber cable Management System Optical Distribution Frames, including Modules, Blocks, Accessories and Hardware Cabinets Cable and Apparatus Products Alifabs™ Cabinets & Ancillary Products Alifabs™ Telecommunications Towers and Accessories Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets	One (1) year

LIMITED WARRANTY

Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products Electronic Enclosure Products (Cabinets) Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines) PowerShift™ & Power Products	Two (2) years
Category W Products ValuSite® Products I-Line Accessory Products Microwave Antennas Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)	Three (3) years
Category X Products Broadband RF Connectivity Products Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products	Five (5) years
Category Y Products QR® Coaxial Cable	Five (5) years
Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products * RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller's connectors in accordance with the installation instructions.	One (1) year
Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products * CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller's connectors by Seller or its certified distributor	Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.
Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products * HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller's connectors by Seller or its certified distributor.	Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.
Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment. Software Ninety (90) Days
Category DD Products In- Building and Fixed Subscriber Antennas	The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment

LIMITED WARRANTY

Category EE Products OneCell® Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components	Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days
Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software	Ninety (90) days
Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products	Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year
Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems	Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.
Category II Products SiteRise™ Solutions	One (1) year on workmanship for the Solution.
Category JJ Products Copper Structured Cabling Products Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)	One (1) year from the date of Installation
Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)	One (1) year from the date of completion of the work.
Category LL Products imVision Overlays and Controllers	Three (3) years

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.

RoHS Certificate of Compliance

COMMSCOPE®

Product Name: FOA LS 550 MP(f)-MP(f) 12f IPD LSZH

Product Number: FJXMPMPAD

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by:

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

COMMSCOPE®

TECP-96-194 Rev C May 2019

LC and MPO Connectors

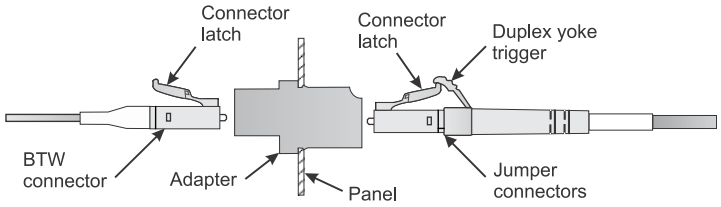
Instructions for Use

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

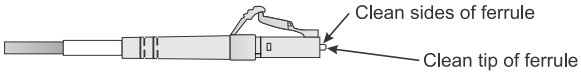
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

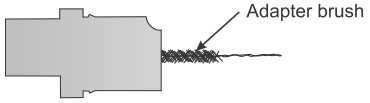
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



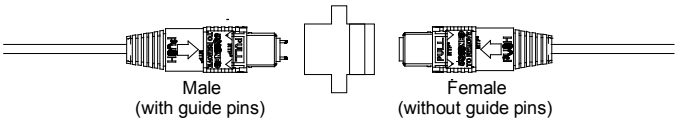
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



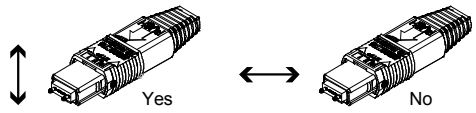
3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

   Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.

Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

COMMSCOPE®

How to Contact Us

- For product information and support, visit us on the web at http://www.commscope.com/SupportCenter
- For technical assistance:
  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
  - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

Instructions for Use

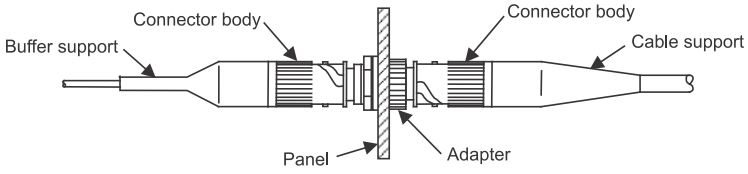
ST® and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST® Connectors into Adapter

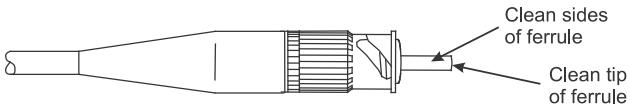
1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the **ST** cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of **ST** connectors, use the **ST** cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



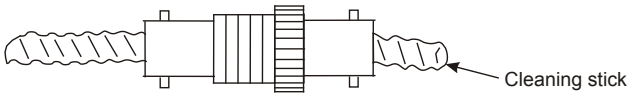
Clean *ST* Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.

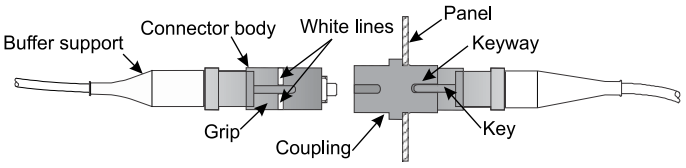


Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

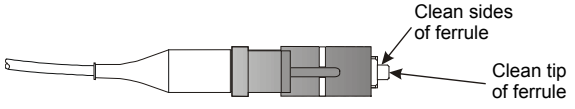


Clean SC Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.
Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.