

CORNING OPTICAL COMMUNICATIONS GENERIC SPECIFICATION FOR BASE 8 PRE-TERMINATED SOLUTIONS

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Corning Optical Communications reserves the right to update this specification without prior notification.

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1 Base 8 Systems: General

Base 8 Pre-terminated systems include factory-terminated system components which can be quickly mated to form an end-to-end optical link between patching locations and/or equipment ports. The solution is a high density system with rapid installation time that enables migration to parallel transmissions from 40G all the way to 400G systems.

- Base 8 Pre-terminated systems are modular solutions that include fiber trunks terminated with 8-fiber MTP® array connectors which mate at each end to a transition harness or transition module. Harnesses are cable assemblies which transition from an 8-fiber MTP array connector to single-fiber connectors. Modules have an identical configuration but they are protected in a modular case. Modular system solutions offer a greater degree of flexibility in managing equipment moves, adds, or changes. An example of this type of system is given in Figure 1.

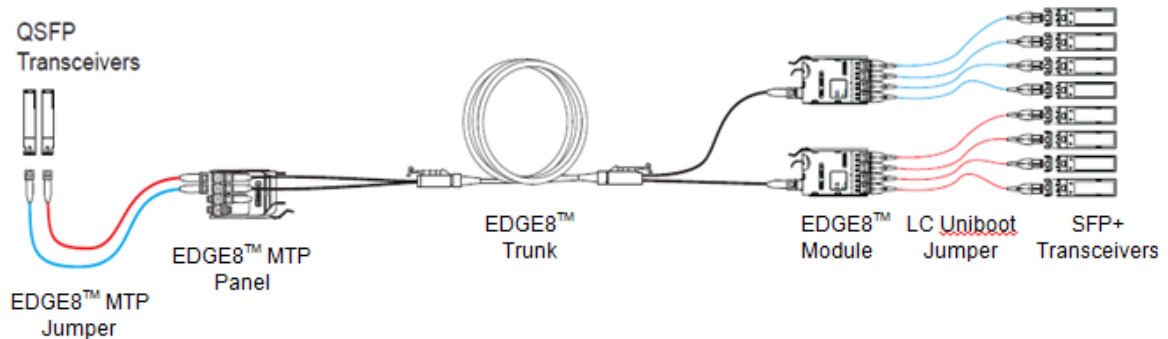


Figure 1: Modular Base 8 System connecting QSFP to SFP+ Transceiver Ports with base-8 modules, LC and MTP jumpers.

- 1.1 To maintain proper system polarity, components shall be specified to comply with Universal wiring as described in section 8 for new builds.
- 1.2 Insertion loss specifications of individual components represent the expected performance when mated to other system components of like specification.

1.3 Trunk Function and Construction

- 1.3.1 The operational temperature range for trunks shall be -10°C to +60°C.
- 1.3.2 The installation temperature range for trunks shall be 0°C to +60°C.
- 1.3.3 Trunks shall be all-dielectric construction.
- 1.3.4 Trunks shall be constructed with MTP® PRO connectors with a push-pull boot at both ends and Hybrid Trunks shall be terminated with MTP® connectors on one end and LC duplex Uniboot connectors on the other.
- 1.3.5 Trunks, including standard trunk, hybrid trunk and extender trunk assemblies, shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the trunks until the first connector mating.
- 1.3.6 MTP-MTP indoor trunk fiber count shall be specified as 8, 16, 24, 32, 48, 64, 72, 96, 144, 192, and 288.
- 1.3.7 Trunks shall be furcated (subdivided) into 8-fiber legs (subunits). Standard leg length shall be 840 mm +70/-0mm.
- 1.3.8 Hybrid Trunks standard leg length shall be 840 mm +70/-0mm) on the MTP end and 300 mm, 600 mm, 1000 mm, 1200 mm, 1500 mm, 2000 mm or 2500 mm on the LC end.
- 1.3.9 Extender trunks shall have a standard leg length of 840 mm (+70/-0 mm) on the module end and a leg length of 1500 mm (+70/-0 mm) on the other of the cable assembly.
- 1.3.10 Trunk length shall be specified as the distance between furcation points at each end of the cable and shall not be inclusive of the length of the legs at each end.
- 1.3.11 MTP trunk furcation plugs for fiber counts 8-144f shall consist of a molded square outer shell filled with an epoxy encapsulate.
- 1.3.12 Hybrid trunk furcation plugs for fiber counts 8-144f shall consist of a molded square outer shell filled with an epoxy encapsulate on the MTP end and a molded circular outer shell filled with an epoxy encapsulate on the LC end.
- 1.3.13 The MTP trunk furcation plugs shall be square in order to facilitate plug rotation in 90 degree increments. This feature allows mounting the trunk into the hardware in any orientation and avoids standing torsional forces applied to the cable.
- 1.3.14 144-288 fiber dielectric indoor LSZH trunks utilize a heat shrink furcation.
- 1.3.15 Dielectric trunks will utilize a single strain relief location in the housings
- 1.3.16 The furcation plug shall accommodate a field installable snap - on device to secure the plug into the hardware. A single and double stack snap on devices shall be offered for the square furcations. Double stack snap on devices allow securing twice the trunk density within the hardware.
- 1.3.17 Armored trunks will utilize 2 strain relief locations in the housings with a field installable snap on device.
- 1.3.18 Heat shrink furcation trunks will utilize a single wide snap on device.

- 1.3.19 The trunk shall incorporate a flexible boot at the back of the epoxy plug, in order to provide a uniformly smooth transition between the plug and the trunk cable.
- 1.3.20 A tool-less snap on device shall be used to secure the Hybrid trunk's LC Uniboot duplex furcation end into the hardware.
- 1.3.21 Trunk furcations shall provide a mounting point for a protective pulling grip and shall be capable of sustaining the rated tensile load of 100 lbf (450 N).
- 1.3.22 Trunk furcations shall incorporate mechanically designed features that allow securing the trunks inside or outside a connector housing.
- 1.3.23 The trunk components shall be ROHS compliant.
- 1.3.24 Trunk cables shall be manufactured with ultra-bendable fiber and meet the fiber performance specifications mentioned in Table 2.
- 1.3.25 The trunk cable shall have a minimum bend radius of five times the cable outside diameter.
- 1.3.26 LSZH rated trunk cables shall meet the application requirements of Low Smoke (IEC 61034), Zero Halogen (IEC 60754-1), Flame Retardant (IEC 60332-3), Non-Corrosive (IEC 60754-2).

LSZH rated trunk cables shall equally meet the CPR requirements of EN 50575 and have a minimum CPR rating of C_{ca}-s1a, d1, a1.

- 1.3.27 The trunk cable shall meet the outer diameters specified in Table 1.

Table 1: Trunk cable outer diameter

Trunk Fiber Count	LSZH Trunk Cable OD (mm)
8	4.5
16	7.2
24	7.2
32	8.3
48	8.3
64	11.3
72	11.3
96	11.3
144	13.5
192	15.2
288	17.6

- 1.3.28 The trunk legs shall be round and have a 2.0 mm outer diameter with no preferential bend for easy routing.
- 1.3.29 Trunks shall meet the connector performance specifications of TIA/EIA-568.3-D, *Optical Fiber Cabling Components Standard*, (normative) Annex A

1.4 Trunk Fiber Types, Optical Specifications, and Jacket Color

- 1.4.1 Available fiber types and their optical performance specifications shall be as indicated in Table 2.
- 1.4.2 Trunk jacket color shall be as indicated in Table 2.
- 1.4.3 SECURE jacket color scheme is different to the one shown in table 2. Color scheme for SECURE represents different security levels specified by the customer. Available jacket colors are highlighted in table 2a.
- 1.4.4 SECURE coloring is available for trunks in fiber counts 144 and below.

Table 2: Trunk - Available Fiber Types, Optical Specifications, Jacket Colors

Property	Multimode			Single-mode
	OM3 Ultra-Bendable optimized 50um (850/1300nm)	OM4 Ultra-Bendable optimized 50um (850/1300nm)	OM5 Ultra-Bendable optimized 50um (850/1300nm)	OS2 Bend-Improved Single-mode (1310/1550nm)
Cabled Fiber Attenuation, max (dB/Km)	2.8/1.0	2.8/1.0	2.8/1.0	0.4/0.3
Minimum Over Filled Launch (OFL) Bandwidth (MHz*km) ¹	1500/500	3500/500	3500/500	-/-
Minimum Effective Modal Bandwidth (EMB) (MHz*km) ²	2000/-	4700/-	4700/-	-/-
Jacket Color	Aqua	Aqua	Lime Green	Yellow

Note (1): As predicted by RML BW, per TIA/EIA 455-204 and IEC 60793-1-41 for intermediate performance laser based systems (up to 1 Gb/s).

Note (2): As predicted by minEMBc, per TIA/EIA 455-220 and IEC 60793-1-49 for high performance laser-based systems (up to 10 Gb/s).

Table 2a: Trunk SECURE jacket color options

MTP Trunk SECURE Jacket Color Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
	Aqua

1.5 Trunk Connectivity

- 1.5.1 Where modular trunks are specified, connectors shall be MTP® having 8 fibers per ferrule.
- 1.5.2 MTP terminated primary trunks shall have pinned MTP connectors on both ends.
- 1.5.3 MTP terminated primary trunks shall comply with TIA/EIA 568 Type B array cable.
- 1.5.4 MTP terminated extender trunks shall have non-pinned MTP® connectors at one end to be interconnected with a primary trunk and pinned MTP® connectors at the other end.
- 1.5.5 MTP terminated extender trunks shall comply with TIA/EIA 568 Type A array cable.
- 1.5.6 Where specified in hybrid trunks, LC Uniboot duplex connectors are used.
- 1.5.7 SECURE color scheme for keyed and color MTPs represent different security levels specified by the customer. Available colors and keys are highlighted in table 2c and 2d.
- 1.5.8 Where specified in Hybrid trunks, LC duplex connectors are used.
- 1.5.9 SECURE color scheme for keyed and color LCs represent different security levels specified by the customer. Available colors and keys are highlighted in table 2e
- 1.5.10 SECURE connectivity coloring and MTP connector keying is available for trunks in fiber counts 144 and below.

Table 2c: MTP SECURE Color Options

MTP Connector Housing Color Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
	Aqua

Table 2d: MTP Keyed Color Options

MTP Connector Housing Keyed Color Options	Keyed Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	Red
	Yellow
	Violet
	Rose
	Aqua

Table 2e: LC Colored Options

LC Color Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
Aqua	

1.6 Trunk Protective Pulling Grips and Covers

- 1.6.1 Both ends of a trunk shall have a protective packaging over the furcation, legs, and connectors. Customer may specify a protective pulling grip on one end, both ends, or neither end.
- 1.6.2 Pulling grips shall be fastened to the furcation in a manner that isolates the cable assembly components (connectors and legs) from tension, torsion, crush, and bending loads encountered when following recommended installation practices.
- 1.6.3 Pulling grips shall withstand a maximum pulling force of 100 lbf (450 N).
- 1.6.4 Trunk pulling grip diameter and minimum allowable bend radius shall be as indicated in Table 3.
- 1.6.5 For size 1 and size 2 furcations, the pulling grip consists of three components. The components include a zipper bag, a corrugated tube and two coupling shelves that allow quick and easy removal of the pulling grip.

1.6.6 The pulling grip for trunks that utilize a heat shrink furcation consists of three components. The components include a expand mesh, a corrugated tube, and a heat shrink that allow quick and easy removal of the pulling grip.

Table 3: Pulling Grip Specifications – LSZH MTP® Terminated Trunks

Cable Type/ Fiber count (LSZH)	Grip Outer Diameter (cm)	Recommended Minimum Duct Size
8-24 Fibers	4.5	2.5 in
16-288 Fibers	5.2	3.0 in

1.7 Trunk Packaging


- 1.7.1 Trunk packaging options are shown in Table 3.1.
- 1.7.2 The plastic reel shall be constructed with 100% recyclable polypropylene  material.

Table 3.1. Packaging of non-armored indoor trunks

Fiber Count	Length (m)	Packaging (No pulling grip option)
8-96	2-30	Plastic bag inside a cardboard box
8-96	> 30	Plastic reel
144	2-55	
	> 50	
192	2-45	
	> 45	
288	2-25	
	>25	

2 Harness Specifications and Options

2.1 Harness Function and Construction

- 2.1.1 The operational temperature range for harnesses shall be -10°C to +60°C.
- 2.1.2 The installation temperature range for harnesses shall be 0°C to +60°C.
- 2.1.3 Harnesses shall be 8-fiber cable assemblies used as a transition between MTP terminated trunk legs and end equipment ports or patch panels.

- 2.1.4 Harness cable shall be available LSZH rating and comply to a minimum CPR rating of E_{ca}.
- 2.1.5 The harness shall provide a means to transition from MTP connectors to LC duplex connectors. The break-out legs shall be 2 mm and use a single two-fiber non-preferential bend cable terminated with LC Uniboot connectors and share a single boot.
- 2.1.6 Harnesses shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the harness until the first connector mating.
- 2.1.7 The harness break-out point shall be a molded epoxy plug.
- 2.1.8 Harness shall be color coded according to Table 5.
- 2.1.9 Five specific break-out leg lengths with stagger shall be offered to match the majority of the electronic equipment port layout.
- 2.1.10 Staggered harnesses shall be offered in lengths from 1 m to 6 m. Non-Staggered harnesses shall be available in lengths from 1 m to 60 m.
- 2.1.11 Harness length shall be measured from the MTP connector to the end of the furcation point.

2.2 Harness Jacket Color, Fiber Types, and Optical Specifications

- 2.2.1 Available fiber types and their optical performance specifications shall be as indicated in Table 5.
- 2.2.2 SECURE jacket color scheme is different to the one shown in table 5. Color scheme for SECURE represents different security levels specified by the customer. Available jacket colors are highlighted in table 4.

Table 4: Harness SECURE jacket color options

Harness SECURE Jacket Color Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	Red
	Yellow
	Violet
	Rose
	Aqua

2.3 Harness Connectivity

- 2.3.1 Harnesses shall be terminated with a pinned or non-pinned MTP® PRO connector with a push-pull boot depending on the application and legs shall be terminated with LC Uniboot style connectors.

- 2.3.1.1 MTP PRO is not available on SECURE keyed MTP connector options
- 2.3.2 The MTP PRO connector shall have the ability to either add or remove pins with the field tool for MTP PRO connectors.
- 2.3.3 The MTP PRO connector shall have the ability to reverse polarity on MM MTPs utilizing the field tool for MTP PRO connectors without the need to remove the MTP housing.
- 2.3.4 The MTP PRO connector shall be equipped with a Push-Pull boot to enable easier mating/unmating in extremely dense applications.
- 2.3.5 SECURE color scheme for keyed and color MTPs represent different security levels specified by the customer. Available colors and keys are highlighted in table 4a and 4b.
- 2.3.6 SECURE color scheme for keyed and color LCs represent different security levels specified by the customer. Available colors and keys are highlighted in table 4c.

Table 4a: MTP SECURE Color Options

MTP Connector Housing Colored Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
Aqua	

Table 4b: MTP Keyed Color Options

MTP Connector Housing Keyed Colored Options¹	Keyed Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	Red
	Yellow
	Violet
	Rose
	Aqua

Table 4c: LC Colored Options

LC Colored Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
	Aqua

Table 5: Components Optical Specifications - Available Fiber Types, Colors.

Property	Multimode			Single-mode
	OM3 Ultra-Bendable optimized 50um (850/1300nm)	OM4 Ultra-Bendable optimized 50um (850/1300nm)	OM5 Ultra-Bendable optimized 50um (850/1300nm)	OS2 Bend-Improved Single-mode (1310/1550nm)
Fiber Attenuation, max (dB/Km)	2.8/1.0	2.8/1.0	2.8/1.0	0.4/0.3
Minimum Over Filled Launch (OFL) Bandwidth (MHz*km) ¹	1500/500	3500/500	3500/500	-/-
Minimum Effective Modal Bandwidth (EMB) (MHz*km) ²	2000/-	4700/-	4700/-	-/-
Jacket Color	Aqua	Aqua	Lime Green	Yellow
Break-out leg Color	Aqua	Aqua	Lime Green	Yellow

Note (1): As predicted by RML BW, per TIA/EIA 455-204 and IEC 60793-1-41 for intermediate performance laser based systems (up to 1 Gb/s).

Note (2): As predicted by minEMBc, per TIA/EIA 455-220 and IEC 60793-1-49 for high performance laser-based systems (up to 10 Gb/s).

3 LC and MTP Jumper Specification

3.1 LC Duplex – LC Duplex Jumper Specification

- 3.1.1 The operational temperature range for jumpers shall be -10°C to +60°C.
- 3.1.2 The installation temperature range for jumpers shall be 0°C to +60°C.
- 3.1.3 The LC duplex jumper shall be a 2-fiber cable assembly useful as a transition between the LC side of a harness or module and end equipment ports.
- 3.1.4 The LC jumper shall be FRNC/LSZH rated.
- 3.1.5 The jumper shall have duplex LC connectors and share a single boot for both connectors.
- 3.1.6 Jumpers shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the jumpers until the first connector mating.
- 3.1.7 The boot shall have an overall length of 65 mm measured from the connector to the end of the boot.
- 3.1.8 The jumper should have a mechanism that allows for reversing the polarity in the field. An identifier shall be incorporated on the connector to determine if polarity has been reversed.
- 3.1.9 The jumper shall be constructed with a single 2 mm round cable with no preferential bend that allows easy routing and reduces jumper congestion in the housings and vertical managers.

3.2 MTP-MTP Jumper Specification

- 3.2.1 MTP® jumpers shall be constructed with 2 mm round cable.
- 3.2.2 MTP jumpers shall be available in TIA/EIA 568 Type A and Type B.
- 3.2.3 MTP jumpers shall be offered in any combination of pinned and non-pinned versions.
- 3.2.4 MTP jumpers shall be FRNC/LSZH rated.
- 3.2.5 MTP connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP adapters.
- 3.2.6 The MTP PRO connector shall have the ability to either add or remove pins with the field tool for MTP PRO connectors.
- 3.2.7 The MTP PRO connector shall have the ability to reverse polarity on MM MTPs utilizing the field tool for MTP PRO connectors without the need to remove the MTP housing.
- 3.2.8 MTP jumpers shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the MTP jumpers until the first connector mating.
- 3.2.9 Jumpers shall be terminated with a non-pinned or pinned MTP® PRO connector with a push-pull boot depending on the application.
 - 3.2.9.1.1 MTP PRO is not available on SECURE keyed MTP-MTP jumpers

- 3.2.10 The MTP PRO connector shall have the ability to either add or remove pins with the field tool for MTP PRO connectors.
- 3.2.11 The MTP PRO connector shall have the ability to reverse polarity on MM MTPs utilizing the field tool for MTP PRO connectors without the need to remove the MTP housing.
- 3.2.12 SECURE color scheme for keyed and color MTPs represent different security levels specified by the customer. Available colors and keys are highlighted in table 5a and 5b.

Table 5a: MTP SECURE Color Options

MTP Connector Housing Colored Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
	Aqua

Table 5b: MTP Keyed Color Options

MTP Connector Housing Keyed Colored Options¹	Keyed Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	Red
	Yellow
	Violet
	Rose
	Aqua

3.3 Jumper Jacket Color, Fiber types, and Optical Specifications.

- 3.3.1 Available fiber types and their optical performance specifications shall be as indicated in Table 5.
- 3.3.2 SECURE jacket color scheme is different to the one shown in table 5. Color scheme for SECURE represents different security levels specified by the customer. Available jacket colors are highlighted in table 5c.

Table 5c: Jumper SECURE jacket color options

Jumper SECURE Jacket Color Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
	Aqua

4 Adapter Panel Specification

4.1 MTP panel function and construction

- 4.1.1 MTP panels shall meet the following dimensions 125.91 mm x 60.85 mm x 11.81mm (L x W x H).
- 4.1.2 Panels shall provide a means for joining MTP terminated trunks entering the back of an MTP adapter panel to a MTP terminated extender trunk or harness or MTP jumper entering at the front of the panel up to 24 fibers.
- 4.1.3 Panels shall be dimensionally compatible with rack-mountable connector housings.
- 4.1.4 Panel design shall permit front and rear installation into the housings.
- 4.1.5 Panel shall be available with up to 4 MTP adapters.
- 4.1.6 The MTP adapters on the panels shall have the capability to be changed from a TIA/EIA Type A adapter to a TIA/EIA Type B adapter and vice versa, without the need of any tools.
- 4.1.7 MTP panel shall have VFL compatible shutter adapters at the front plane with the exception of SECURE keyed versions. The shutter adapter shall eliminate the need to remove and re-install dust caps at the front. The MTP adapter shall be color coded as indicated in Table 6.
- 4.1.8 SECURE MTP keyed adapter panel color scheme is different to the one shown in table 6. Color scheme for keyed panels represent different security levels specified by the customer. Available colors and keys are highlighted in table 6a and 6b.
- 4.1.9 Keyed adapters are available up to 24 fibers and colored adapters are available up to 32 fibers.

5 Module Specifications and Options

- 5.1.1 Module Function and Construction
- 5.1.2 The operational and installation temperature range for modules shall be -10°C to +60°C.
- 5.1.3 Modules shall provide a means for joining MTP terminated trunks entering the back of an appropriately designed connector housing to LC jumpers or cables entering the front of the housing.
- 5.1.4 Modules shall contain one 8-fiber cable assembly within a protective housing.
- 5.1.5 Modules shall have shutter LC adapters at the front.
- 5.1.6 Modules shall be dimensionally compatible with rack-mountable connector housings.
- 5.1.7 The small form module shall meet the following dimensions 124.97 x 60.85 mm x 11.81 mm (L x W x H). It shall provide a high density solution when loaded into the 01U, 01U-SP, 02U and 04U base 8 high density housings.
- 5.1.8 Modules shall permit front and rear installation into the housings.
- 5.1.9 When uninstalling a module from the back; a rear accessible retention trigger and finger handle must be present in order to facilitate this operation. An I.D. and warranty seal label shall be affixed to every module.
- 5.1.10 When mounted in a connector housing, the adapter sleeves shall be accessible from the front, thus providing a cross-connection point with other modules.
- 5.1.11 Modules shall contain discrete fiber and port identification. This fiber and port identification shall be printed on top and bottom of the modules.
- 5.1.12 A pre-terminated MTP® port breakout module shall also be available. This module shall be offered in pinned and non-pinned MTP versions and with tail lengths from 1 m to 25 m in increments of 1 foot (1 m).
- 5.1.13 MTP connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP adapters.

5.2 Module Connectivity

- 5.2.1 Cable assemblies within modules shall be terminated with non-pinned MTP connector at the back and LC connector at the front.
- 5.2.2 Each module shall contain 8 fiber terminations.
- 5.2.3 All connectors shall be inside the module but shall be accessible for mating through adapter sleeves mounted through the wall of the module.
- 5.2.4 Module connectivity shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the module connectors until the first connector mating.
- 5.2.5 Modules shall have self-retracting shutter adapter mechanism that allows a single hand operation. The shutter adapter shall eliminate the

- need to remove and re-install dust caps. The shutter adapter shall be VFL compatible. The adapter sleeves shall be color coded as indicated in Table 6.
- 5.2.6 SECURE color scheme for keyed and color MTPs represent different security levels specified by the customer. Available colors and keys are highlighted in table 6a and 6b.
- 5.2.7 SECURE color scheme for keyed and color LCs represent different security levels specified by the customer. Available colors and keys are highlighted in table 6c.

5.3 Module Fiber Types and Optical Specifications

- 5.3.1 Available fiber types and their optical performance specifications shall be as indicated in Table 6. Module insertion loss performance shall be as indicated in Table 7.

Table 6: Modules - Available Fiber Types, Optical Specifications, Adapter Colors

Property	Multimode			Single-mode
	OM3 Ultra-Bendable optimized 50um (850/1300nm)	OM4 Ultra-Bendable optimized 50um (850/1300nm)	OM5 Ultra-Bendable optimized 50um (850/1300nm)	OS2 Bend-Improved Single-mode (1310/1550nm)
Fiber Attenuation, max (dB/Km)	2.8/1.0	2.8/1.0	2.8/1.0	0.4/0.3
Minimum Over Filled Launch (OFL) Bandwidth (MHz*km) ¹	1500/500	3500/500	3500/500	-/-
Minimum Effective Modal Bandwidth (EMB) (MHz*km) ²	2000/-	4700/-	4700/-	-/-
Adapter color: LC MTP®	Aqua Aqua	Aqua Aqua	Lime Green	Blue Black

Note (1): As predicted by RML BW, per TIA/EIA 455-204 and IEC 60793-1-41, for intermediate performance laser based systems (up to 1 Gb/s).

Note (2): As predicted by minEMBc, per TIA/EIA 455-220 and IEC 60793-1-49 for high performance laser-based systems (up to 10 Gb/s).

Table 6a: MTP Adapter SECURE Color Options

MTP Adapter Colored Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow

	Violet
	Rose
	Aqua

Table 6b: MTP Adapter Keyed Options

MTP Adapter Keyed Colored Options	Keyed Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	Red
	Yellow
	Violet
	Rose
	Aqua

Table 6c: LC Adapter SECURE and Keyed Color Options

LC Adapter¹	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
	Aqua

Note (1): No shutters available for keyed LC adapters

6 Front Access Breakout modules

6.1 Module Function and Construction

- 6.1.1 Front access breakout modules shall provide a means for joining MTP terminated trunks entering from the front of an appropriately designed connector housing to LC jumpers or cables entering the front of the housing.
- 6.1.2 The operational and installation temperature range for modules shall be -10°C to +60°C.
- 6.1.3 Modules shall contain one 8-fiber cable assembly within a protective housing.
- 6.1.4 Modules shall have shutter LC adapters at the front.

- 6.1.5 Modules shall be dimensionally compatible with base 12 rack-mountable connector housings.
- 6.1.6 The small form module shall meet the following dimensions 124mm x 90mm mm x 12 mm (L x W x H). It shall provide a high density solution when loaded into the 01U, 01U-SP, 02U and 04U base 12 high density housings.
- 6.1.7 Modules shall permit front and rear installation into the housings.
- 6.1.8 When uninstalling a module from the back; a rear accessible retention trigger and finger handle must be present in order to facilitate this operation. An I.D. and warranty seal label shall be affixed to every module.
- 6.1.9 When mounted in a connector housing, the adapter sleeves shall be accessible from the front, thus providing a cross-connection point with other modules.
- 6.1.10 Modules shall contain discrete fiber and port identification. This fiber and port identification shall be printed on top and bottom of the modules.
- 6.1.11 MTP connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP adapters.

6.2 Module Connectivity

- 6.2.1 Cable assemblies within front access port breakout module shall be terminated with either a pinned or non-pinned MTP connector at the front and a LC connector at the front.
- 6.2.2 Each module shall contain 8 fiber terminations.
 - 6.2.2.1 All connectors shall be inside the module but shall be accessible for mating through adapter sleeves mounted through the wall of the module.
- 6.2.3 Front access breakout modules shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the module connectors until the first connector mating.
- 6.2.4 Modules shall have self-retracting shutter adapter mechanism that allows a single hand operation. The shutter adapter shall eliminate the need to remove and re-install dust caps. The shutter adapter shall be VFL compatible. The adapter sleeves shall be color coded as indicated in Table 6.
- 6.2.5 SECURE color scheme for keyed and color MTPs represent different security levels specified by the customer. Available colors and keys are highlighted in table 6d and 6e.
- 6.2.6 SECURE color scheme for keyed and color LCs represent different security levels specified by the customer. Available colors and keys are highlighted in Table 6f.

Table 6d: MTP SECURE Color Options

MTP SECURE Color Options	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
Aqua	

Table 6e: MTP Adapter Keyed Options

MTP Keyed Colored Options	Keyed Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	Red
	Yellow
	Violet
	Rose
	Aqua

Table 6f: LC Adapter SECURE Color Options

LC Adapter¹	Colors Available
	Blue
	Orange
	Green
	Brown
	Slate
	White
	Red
	Black
	Yellow
	Violet
	Rose
Aqua	

6.3 Module Fiber Types, Jacket Color, and Optical Specifications

- 6.3.1 Available fiber types and their optical performance specifications shall be as indicated in Table 6. Module insertion loss performance shall be as indicated in Table 7.

7 Base-12 footprint module with 8F

7.1 Module Function and Construction

- 7.1.1 Module shall provide a means for joining MTP terminated trunks entering the back of an appropriately designed connector housing to LC jumpers or cables entering the front of the housing.
- 7.1.2 The operational and installation temperature range for modules shall be -10°C to +60°C.
- 7.1.3 Module shall contain one 8-fiber cable assembly within a protective housing.
- 7.1.4 Module shall have shutter LC adapters at the front.
- 7.1.5 Module shall be dimensionally compatible with base 12 rack-mountable connector housings.
- 7.1.6 The small form module shall meet the following dimensions 124 mm x 90 mm x 12 mm (L x W x H). It shall provide a high density solution when loaded into the 01U, 01U-SP, 02U and 04U base 12 high density housings.
- 7.1.7 Module shall permit front and rear installation into the housings.
- 7.1.8 When uninstalling a module from the back; a rear accessible retention trigger and finger handle must be present in order to facilitate this operation. An I.D. and warranty seal label shall be affixed to every module.
- 7.1.9 When mounted in a connector housing, the adapter sleeves shall be accessible from the front, thus providing a cross-connection point with other modules.
- 7.1.10 Module shall contain discrete fiber and port identification. This fiber and port identification shall be printed on top and bottom of the modules.
- 7.1.11 MTP connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP adapter.

7.2 Module Connectivity

- 7.2.1 Cable assemblies within modules shall be terminated with either a pinned or non-pinned MTP connector and LC connectors at the front.
- 7.2.2 Each module shall contain 8 fiber terminations.
- 7.2.3 All connectors shall be inside the module but shall be accessible for mating through adapter sleeves mounted through the wall of the module.

- 7.2.4 Modules shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the module connectors until the first connector mating.
- 7.2.5 Modules shall have self-retracting shutter adapter mechanism that allows a single hand operation. The shutter adapter shall eliminate the need to remove and re-install dust caps. The shutter adapter shall be VFL compatible. The adapter sleeves shall be color coded as indicated in Table 6.

7.3 Module Fiber Types and Optical Specifications

- 7.3.1 Available fiber types and their optical performance specifications shall be as indicated in Table 6. Module insertion loss performance shall be as indicated in Table 7.

8 Components Insertion Loss Specifications

All components shall meet the maximum insertion loss values indicated in Table 7.

Table 7: Components Optical Specifications - Available Fiber Types

Property	Multimode			Single-mode
	OM3 Ultra-Bendable optimized 50um (850/1300nm)	OM4 Ultra-Bendable optimized 50um (850/1300nm)	OM5 Ultra- Bendable optimized 50um (850/1300nm)	OS2 Bend-Improved Single-mode (1310/1550nm)
Insertion Loss, max (dB) ⁽¹⁾				
MTP® mated pair loss	0.25	0.25	0.25	0.35
LC mated Pair loss	0.10	0.10	0.10	0.25
Module Loss	0.35	0.35	0.35	0.60

Note (1): Insertion loss specifications when mated to other system components of a like performance.

9 Port Tap Module: General

The port tap module is a module with a fiber optic splitter inside that divides the optical signal into two or more outputs, one for live link traffic and the other(s) for monitoring. The live traffic continues through the system link while the monitor traffic is sent to a monitoring device which filters the data and sends it to various software tools for analysis, where it is then viewed in application-layer software.

9.1 Module Function and Construction

- 9.1.1 The port tap modules shall be dimensionally compatible with Corning Optical Communications EDGE® rack-mountable connector housings.
- 9.1.2 The port tap module shall have dimensions of 124.97 x 60.85 mm x 11.81 mm (L x W x H).
- 9.1.3 The port tap modules shall permit front and rear installation into the housing. When uninstalling a module from the back; a rear-accessible retention trigger must be present in order to facilitate this operation.
- 9.1.4 The port tap module shall have a label providing part number, serial number, human and machine readable barcode affixed to it for identification.
- 9.1.5 The port tap module shall contain splitters for dividing the optical power signal, one output of the splitter provides signal to the live network and the other(s) to the monitoring port.
- 9.1.6 The port tap module shall be available in three configurations:
 - 9.1.6.1 Configuration A – The port tap module shall provide connectivity for LC connectors entering at the front, having two live LC duplex ports providing connectivity to the live network and one LC duplex tap port providing connectivity to the monitoring devices. The LC ports shall be constructed with LC shuttered-adapter
 - 9.1.6.2 Configuration B - The port tap module shall support two MTP® connectors entering the back of the module and four LC duplex adapters in the front. One MTP® port provides connectivity to the live network link, and the other MTP® provides connectivity to monitoring devices. The front of the module shall provide LC shuttered-adapter connectivity to the live network.
 - 9.1.6.3 Configuration C – The port tap module shall support one live MTP® connector entering the back of the module and another live MTP® connector entering at the front of the module providing connectivity to the live network link. The module shall also have an MTP port located at the front or the back of the module providing connectivity to monitoring devices.

9.1.7 The Bi-Di port tap module shall be available only with 50/50 split ratio, OM4 fiber and in a single configuration:

9.1.7.1 Bi-Di Configuration – The port tap module shall provide connectivity for LC connectors entering at the front, having two live LC duplex ports providing connectivity to the live network and two LC duplex tap ports providing connectivity to the monitoring devices. The LC ports shall be constructed with LC shuttered-adapters.

10 Tap Harness Specifications

10.1 Tap harness function and construction

10.1.1 The Tap harnesses shall be 8-fiber cable assemblies and shall be able to be constructed in two different configurations:

10.1.1.1 Configuration 1: One 8-fiber MTP connector to two 4-fiber MTP connectors that plug into monitoring electronics

10.1.1.2 Configuration 2: One 8-fiber MTP connector to eight LC simplex connectors that plug into monitoring electronics

10.1.2 The break-out legs shall be 2 mm in diameter and shall be terminated with LC simplex connectors

10.1.3 The operational temperature range for harnesses shall be -10°C to +60°C.

10.1.4 The installation temperature range for harnesses shall be 0°C to +60°C.

10.1.5 Harnesses shall be manufactured utilizing a proprietary connector cleaning process and shall be shipped with optimized dust caps that are engineered to maintain connector end-face cleanliness of the harness until the first connector mating.

10.1.6 The harness break-out point shall be a heat shrink furcation.

10.1.7 The harness leg length shall be 300 mm (+70/-0 mm) or 600 mm (+70/-0 mm).

10.1.8 Tap harnesses shall be available in lengths from 1 m to 60 m in length.

10.1.9 Harness length shall be measured from the MTP connector to the end of the furcation point.

10.1.10 Tap harnesses shall be available in TIA/EIA 568 Type B.

10.2 Harness Connectivity

- 10.2.1 MTP-LC Tap harnesses shall be terminated with an MTP® PRO connector depending on the application and legs shall be terminated with simplex LC connectors.
- 10.2.2 The MTP PRO connector shall have the ability to either add or remove pins with the field tool for MTP PRO connectors.
- 10.2.3 The MTP PRO connector shall have the ability to reverse polarity on MM MTPs utilizing the field tool for MTP PRO connectors without the need to remove the MTP housing.

1. High Density Rack Mountable Housings

1.1. Reference

Housings shall be mountable in an EIA-310 compatible 465 mm (18.3") rack. One EIA rack space or panel height (denoted as 1U) is defined as being 44.45 mm (1.75") in height.

1.2. Housings Construction

- 1.2.1. Housings shall be available in a 1U, 2U and 4U size.
- 1.2.2. The housing shall be modular allowing the installation of Base 8 modules in order to provide scalability in increments of 8 when loaded with LC modules.
- 1.2.3. The maximum 1U housing density shall be 72 LC Duplex ports (144 fibers) when is fully loaded with MTP-LC modules and 72 MPO/MTP® ports (576 fibers) when is fully loaded with MTP-MTP modules.
- 1.2.4. The maximum 2U housing density shall be 144 LC Duplex ports (288 fibers) when is fully loaded with MTP-LC modules and 144 MPO/MTP® ports (1152 fibers) when is fully loaded with MTP-MTP modules.
- 1.2.5. The maximum 4U housing density shall be 288 LC Duplex ports (576 fibers) when is fully loaded with MTP-LC modules and 288 MPO/MTP® ports (2304 fibers) when is fully loaded with MTP-MTP modules.
- 1.2.6. The unit shall have a frontal projection of 94 mm (3.69") when mounting brackets are installed in the standard position.
- 1.2.7. The unit shall not exceed a depth requirement of 460 mm (18.12") when mounting brackets are installed in the standard position.
- 1.2.8. Mounting brackets shall allow installation of the housing in twelve different frontal and rear projection positions.
- 1.2.9. The unit shall meet the design requirements of ANSI/TIA/EIA-568 and the plastics flammability requirements of UL 94 V-0.
- 1.2.10. Housings shall be manufactured using 20-gauge cold rolled steel or equivalent for structural integrity and shall be finished with a reflective silver powder coat for durability. The rack mounting screws shall be included, shall be black in color and include # 12-24 and #10-32.
- 1.2.11. Housings shall include two field installable slack management brackets at the front of the housing. The brackets shall provide jumper slack

management at the front of the housing and shall allow easy tray deployment when the tray is fully loaded with LC Uniboot jumpers.

- 1.2.12. The housing color shall be Silver, RAL9006.
 - 1.2.13. Housing dimensions
 - 1.2.13.1. The 1U housing shall have dimensions of 432 mm x 561 mm x 44 mm (W x D x H).
 - 1.2.13.2. The 1U housing shall have dimensions of 432 mm x 561 mm x 88 mm (W x D x H).
 - 1.2.13.3. The 1U housing shall have dimensions of 432 mm x 561 mm x 177 mm (W x D x H).
 - 1.2.14. Housings shall have an integrated, 90 degrees rotatable rear trunk mounting plates.
 - 1.2.15. Housings shall have side cable access with dust protection brushes.
 - 1.2.16. The unit shall have twelve trunk strain-relief locations for securing trunks. This trunk capacity can be doubled when using double stack strain-relief devices.
 - 1.2.17. Strain-relief plates shall allow a 90 degree rotation when rear entry of the trunks to the housing is desired. A special rear cover shall be available for this application.
 - 1.2.18. The housing shall incorporate five strap points in order to secure the trunk legs with hook-loop-straps preventing these from exiting the housing perimeter.
 - 1.2.19. The housing shall contain a front door. This door shall be hinged with a pivot point at the bottom of the housing. The door shall utilize a sliding latch mechanism to provide easy access when opening and closing.
 - 1.2.20. The unit shall have a removable back cover, in order to provide access and protection to the trunk strain relief area at the back of the housing. This cover shall have cable entry brushes.
 - 1.2.21. The housing shall provide a means to install a padlock and make the rear of the housing inaccessible for security reason.
 - 1.2.22. The housing shall allow to remove the back half of the housing for applications requiring a shallow housing or back to back housing installation.
 - 1.2.23. The connector housings shall have a labeling scheme that complies with ANSI/TIA/EIA-606.
- 1.3. Slidable Module Tray Construction
 - 1.3.1. The 1U housing shall have 4 sliding trays and each having a 6 modules capacity.
 - 1.3.2. The 2U housing shall have 8 sliding trays and each having a 6 modules capacity.
 - 1.3.3. The 1U housing shall have 12 sliding trays and each having a 6 modules capacity.
 - 1.3.4. Each Tray shall provide connectivity through 48 LC connectors when fully loaded with LC modules.
 - 1.3.5. Each individual tray shall have patch cord routing guides that allow a transition and jumper management point. The jumpers shall be able to exit through the right and left side of the housing. This jumper management

scheme shall provide access to individual trays to ease administration in high density applications.

- 1.3.6. The trays shall be manufactured using 18-gauge cold rolled steel or equivalent for structural integrity and shall be finished with reflective silver powder coat (RAL9006) for durability
- 1.3.7. The trays shall slide 92 mm (3.6") to the front in order to provide appropriate finger access to the connectors and modules. The tray shall have a close and open position with their respective mechanical stops.
- 1.3.8. Housing and trays shall provide access to each adapter port with no interference of adjacent ports. The accessibility to the connectors shall be tool-less.
- 1.3.9. The trays shall have a cut out in front of each module location in order to provide accessibility from top and bottom of adapters and modules.
- 1.3.10. The trays shall incorporate rails to facilitate front and rear module installation while providing a locking mechanism that secures the module in place.
- 1.3.11. The trays shall have protruding finger tabs on the sides to allow easy access to modules and connectors. The tabs shall have silkscreened numbers for tray identification.
- 1.3.12. The rails shall incorporate a release button, engraved with the word "push", which allows removal of modules from the front.
- 1.3.13. The trays shall provide visible module identification with the letters A, B, C, D, E and F.
- 1.3.14. The trays shall be full replaceable with Base 8 trays within the same housing for the event of migration from Base 12 to Base 8 systems.

11 Universal Polarity Management System

- 11.1 Base 8 Pre-Terminated systems shall be constructed with Universal Polarity management for proper system polarity and ease of deployment.

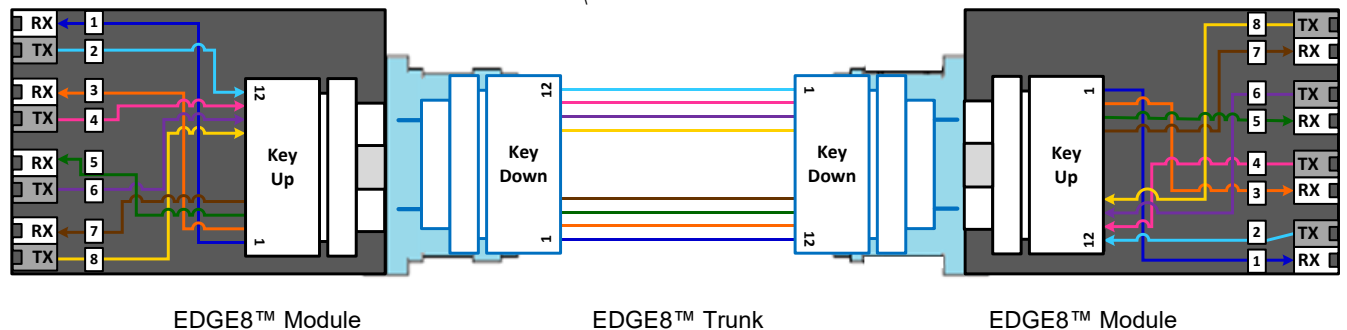


Figure 2: Universal Wiring Scheme – Module on Both Ends

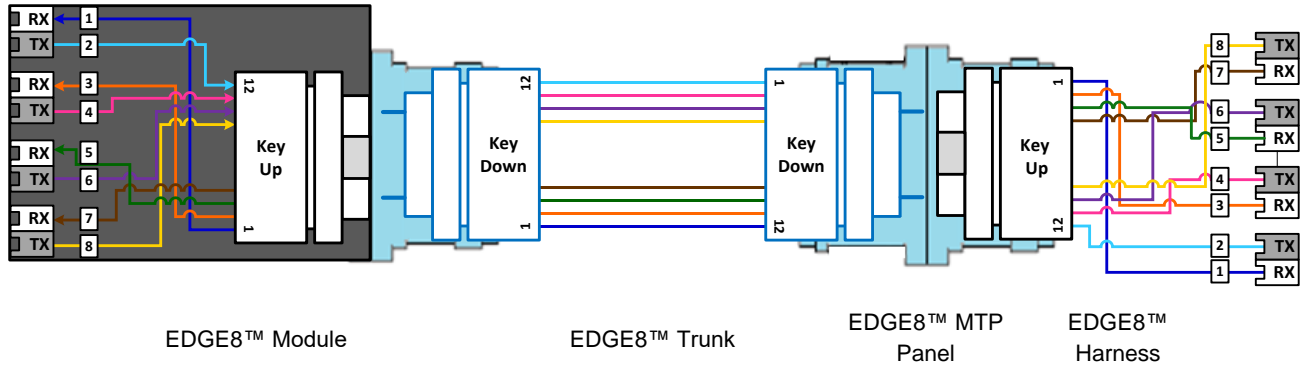


Figure 3: Universal Wiring Scheme – Harness on One End

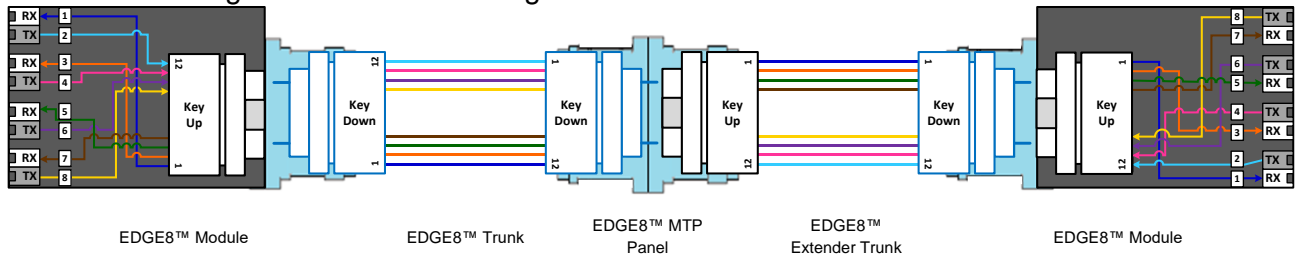


Figure 4: Universal Wiring Scheme – Module on Both Ends with Optional[®] Extender Trunk

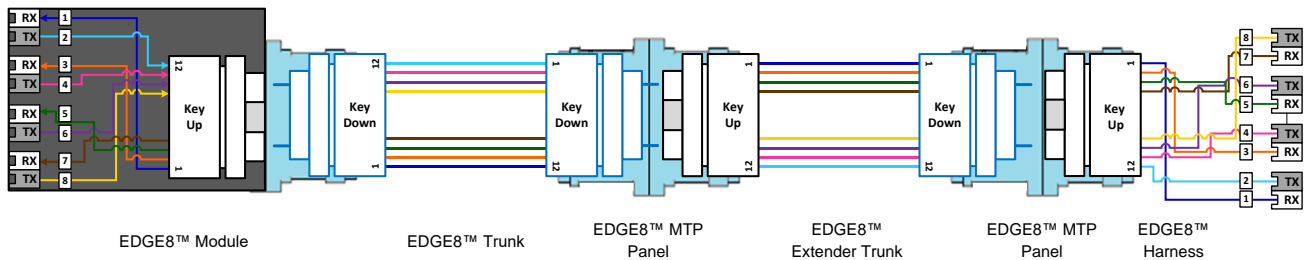


Figure 5: Universal Wiring Scheme – Harness on One End with Optional[®] Extender Trunk

10 Quality Assurance Provisions

- 10.1 All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.
- 10.2 The cable manufacturer shall be TL 9000 registered

11 Miscellaneous

11.1 At the request of the customer, the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

Gen Spec PGS 141 Revision History

Revision #	Date	Reason for Change
0	03/23/15	Document creation
1	2/21/2017	Removed EDGE8 references
2	9/07/2017	Added SECURE EMODs (LC panels) and SECURE panels
3	10/18/2017	Added WBMMF, armored trunks, fiber counts 192 and 288, keyhole adapter mounting bracket. Reformatted, added Master Format number, Quality Assurance Provisions and Miscellaneous sections
4	12/01/2017	Added MTP PRO to harnesses and jumpers
5	3/27/2018	Added Hybrid and Extender Trunks. Add SECURE to all components except Base 12 footprint 8f module.
6	11/15/2018	Added operational and installation temperature to trunks, jumpers, harnesses, and modules
7	Dec. 2020	Updated products that features proprietary cleaning process and optimized dust caps. Added tap modules and tap harnesses. Update SECURE and colored options to align with available product offerings.
8	April 2021	Updated to reflect EU CPR reference for LSZH cables and product features specific to EMEA.