

## CORNING OPTICAL COMMUNICATIONS GENERIC SPECIFICATION FOR EDGE8™ SOLUTIONS

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

### 1 EDGE8™ Systems: General

EDGE8™ 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. EDGE8™ is a high density system solution with rapid installation time that enables easy migration to parallel transmissions from 40G all the way up to 400G systems.

- EDGE8™ is a modular solution with fibre trunks terminated with 8 fibres into each MTP® array connector, which mate at each end to a transition harness, transition module or patch cables. Harnesses are cable assemblies which transition 8 fibres from an MTP® array connector to single-fibre 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, additions, or changes. An example of this type of system is given in Figure 1.

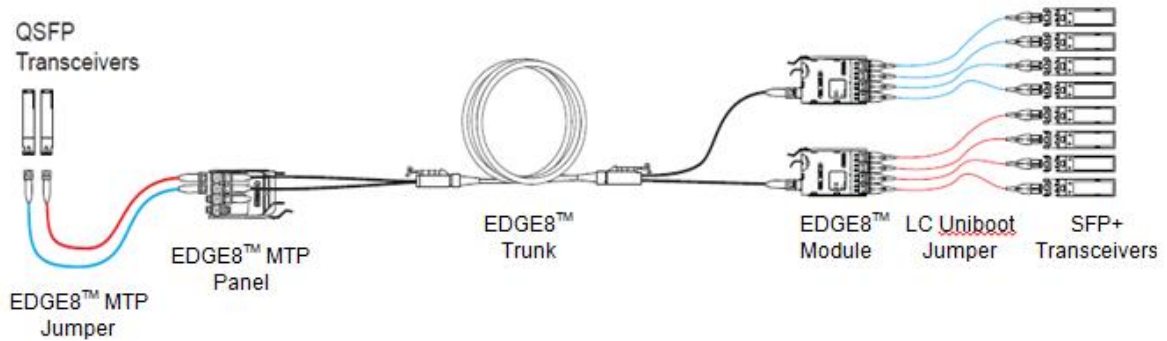


Figure 1: Modular EDGE8™ System connecting QSFP to SFP+ Transceiver Ports with base-8 modules, LC and MTP® patch cables.

- 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.

## 2 Trunk Specifications and Options

### 2.1 Trunk Function and Construction

- 2.1.1 The operational temperature range for trunks shall be -10°C to +60°C.
- 2.1.2 Trunks shall be all-dielectric construction.
- 2.1.3 Trunks shall be constructed with MTP® connectors at both ends.
- 2.1.4 Trunk fibre count shall be specified as 8, 16, 24, 32, 48, 64, 72 and 96.
- 2.1.5 Trunks shall be furcated (subdivided) into 8-fibre legs (subunits). Standard leg length shall be 33 in. +3/-0 in. (840 mm +70/-0mm).
- 2.1.6 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.
- 2.1.7 Trunk furcation plugs shall consist of a molded outer shell filled with an epoxy encapsulate.
- 2.1.8 The 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.
- 2.1.9 There shall be two plug sizes depending on the fibre count of the trunk. Trunks with 8 to 32 fibres shall be constructed with a size 1 plug. The size 1 plug dimension shall be 14.7 mm x 14.7 mm x 108.6 mm. The plug shall have a saddled area with dimensions of 11.5 mm x 11.5 mm x 46 mm in order to accommodate a field installable snap - on device to secure the plug into the hardware. Trunks with 48 to 144 fibres shall be constructed with a size 2 plug. The size 2 plug dimension shall be 20 mm x 20 mm x 108.6 mm. The plug shall have a saddled area with dimensions of 16.8 mm x 16.8 mm x 46.6 mm in order to accommodate a field installable snap - on device to secure the plug into the hardware.
- 2.1.10 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.
- 2.1.11 A tool-less snap - on device shall be used to secure the trunk into the hardware. For low fibre count trunks (8 through 32 fibres), size 1 single and double stack snap on devices shall be offered. For higher fibre count trunks (48 to 144 fibres) size 2 single and double stack snap on devices shall be offered. Double stack snap - on devices allow securing twice the trunk density within the hardware.
- 2.1.12 Trunk furcation plugs shall provide a mounting point for a protective pulling grip and shall be capable of sustaining the rated tensile load of 100 lbf.
- 2.1.13 Trunk furcation plugs shall incorporate mechanically designed features that allow securing the trunks inside or outside a connector housing.
- 2.1.14 The trunk components shall be ROHS compliant.
- 2.1.15 Trunk cables shall be manufactured with ultra-bendable fibre and meet the fibre performance specifications mentioned in Table 2.
- 2.1.16 The trunk cable shall have a minimum bend radius of five times the cable outside diameter.

- 2.1.17 Plenum rated trunk cables shall meet the application requirements of the National Electric Code® (NEC® Article 770) OFNP and FT-6.
- 2.1.18 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).
- 2.1.19 The trunk cable shall meet the outer diameters specified in Table 1.

Table 1: Trunk cable outer diameter

Trunk Fibre Count	Plenum Trunk Cable OD (mm)	LSZH Trunk Cable OD (mm)
8	5.0	4.5
16	7.0	7.2
24	7.0	7.4
32	8.1	8.5
48	8.1	9.0
64	10.2	10.0
72	10.2	11.0
96	10.2	11.0
144	12.5	NA

- 2.1.20 The trunk legs shall be round and have a 2.0 mm outer diameter with no preferential bend for easy routing.
- 2.1.21 Trunks shall meet the connector performance specifications of TIA/EIA-568-C.3, *Optical Fibre Cabling Components Standard*, (normative) Annex A.

## 2.2 Trunk Fibre Types, Optical Specifications, and Jacket Colour

- 2.2.1 Available fibre types and their optical performance specifications shall be as indicated in Table 2.
- 2.2.2 Trunk jacket colour shall be as indicated in Table 2.

Table 2: Trunk - Available Fibre Types, Optical Specifications, Jacket Colours

Property	Multimode		Single-Mode
	OM3 Ultra-Bendable optimised 50um (850/1300nm)	OM4 Ultra-Bendable optimised 50um (850/1300nm)	OS2 Bend-Improved Single-Mode (1310/1550nm)
Cabled Fibre Attenuation, max (dB/Km)	2.8/1.0	2.8/1.0	0.4/0.3
Minimum Over Filled Launch (OFL) Bandwidth (MHz*km) <sup>1</sup>	1500/500	3500/500	-/-
Minimum Effective Modal Bandwidth (EMB) (MHz*km) <sup>2</sup>	2000/-	4700/-	-/-
Jacket Colour	Aqua	Aqua	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).

### 2.3 Trunk Connectivity

- 2.3.1 Where modular trunks are specified, connectors shall be MTP® having 8 fibres per ferrule.
- 2.3.2 MTP® terminated primary trunks shall have pinned MTP® connectors on both ends.
- 2.3.3 MTP terminated primary trunks shall comply with TIA/EIA 568 Type B array cable.
- 2.3.4 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.
- 2.3.5 MTP® terminated extender trunks shall comply with TIA/EIA 568 Type A array cable.
- 2.3.6 MTP® connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP® adapters.

### 2.4 Trunk Protective Pulling Grips and Covers


- 2.4.1 Both ends of a trunk shall have a protective packaging over the furcation plug, legs, and connectors. Customer may specify a protective pulling grip on one end, both ends, or neither end.
- 2.4.2 Pulling grips shall be fastened to the epoxy furcation plug 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.
- 2.4.3 Pulling grips shall withstand a maximum pulling force of 100 lbf.
- 2.4.4 Trunk pulling grip diameter and minimum allowable bend radius shall be as indicated in Table 3.

- 2.4.5 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.

Table 3: Pulling Grip Specifications – MTP® Terminated Trunks

Cable Type/ Fibre count	Grip Outer Diameter (cm)	Recommended Minimum Duct Size/ Minimum bend Radius
8-32 Fibres	4.06	6.35 cm with 45.72 cm elbow
48-96 Fibres	5.46	7.62 cm with 45.72 cm elbow

## 2.5 Trunk Packaging

- 2.5.1 The trunk shall be packaged on a corrugated plastic reel with a removable flange. The trunk shall be secured to the reel with shrink wrap.
- 2.5.2 The plastic reel shall be constructed with 100% recyclable polypropylene  material.

## 3 Harness Specifications and Options

### 3.1 Harness Function and Construction

- 3.1.1 Harnesses shall be 8-fibre cable assemblies used as a transition between MTP® terminated trunk legs and end equipment ports or patch panels.
- 3.1.2 Harness cable shall be available with plenum or LSZH rating.
- 3.1.3 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-fibre non-preferential bend cable terminated with LC Uniboot connectors and share a single boot.
- 3.1.4 The harness break-out point shall be a molded epoxy plug.
- 3.1.5 The harness epoxy plug shall include a feature that allows mating two harnesses together in order to dress the fibres in an aesthetically pleasant manner. A hook-and-loop strap shall be provided with every harness in order to secure the harnesses together.
- 3.1.6 Harness shall be colour coded according to Table 5.
- 3.1.7 Five specific break-out leg lengths with stagger shall be offered to match the majority of the electronic equipment port layout.
- 3.1.8 Staggered harnesses shall be offered in lengths from 3 ft. to 20 ft. (1 m to 6 m) in length. Non-Staggered harnesses shall be available in lengths from 3 ft. to 200 ft. (1 m to 60 m) in length.
- 3.1.9 Harness length shall be measured from the MTP® connector to the end of the furcation point.

### 3.2 Harness Fibre Types and Optical Specifications

3.2.1 Available fibre types and their optical performance specifications shall be as indicated in Table 5.

### 3.3 Harness Connectivity

3.3.1 Harnesses shall be terminated with a non-pinned MTP® connector and legs shall be terminated with LC Uniboot style connectors.

3.3.2 MTP® connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP® adapters.

Table 5: Components Optical Specifications - Available Fibre Types, Colours.

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

## 4 Patch cable Specification

### 4.1 Patch cable function and construction

4.1.1 The LC patch cable shall be a 2-fibre cable assembly useful as a transition between the LC side of a harness or module and end equipment ports.

4.1.2 The LC patch cable shall be available in riser, plenum or LSZH rating.

4.1.3 The patch cable shall have an LC Uniboot connector.

4.1.4 The boot shall have an overall length of 2.63 in (67 mm) measured from the connector to the end of the boot.

- 4.1.5 The patch cable 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.
- 4.1.6 The patch cable shall be constructed with a single 2 mm round cable with no preferential bend that allows easy routing and reduces patch cable congestion in the housings and vertical managers.
- 4.1.7 MTP® patch cables shall be constructed with 2 mm round cable.
- 4.1.8 MTP® patch cables shall be available in TIA/EIA 568 Type A and Type B.
- 4.1.9 MTP® patch cables shall be offered in any combination of pinned and non-pinned versions
- 4.1.10 MTP® patch cables shall be available in plenum or LSZH rating.
- 4.1.11 MTP® connectors shall incorporate a shroud extender to facilitate removal of the connector from MTP® adapters.

#### 4.2 Patch cable Fibre types and Optical Specifications.

- 4.2.1 Available fibre types and their optical performance specifications shall be as indicated in Table 5.

### 5 Adapter Panel Specification

#### 5.1 Adapter panel function and construction

- 5.1.1 Panels shall meet the following dimensions 4.96 in x 2.40 in x 0.465 in (125.91 mm x 60.85 mm x 11.81mm) (L x W x H).
- 5.1.2 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® patch cable entering at the front of the panel.
- 5.1.3 Panels shall be dimensionally compatible with EDGE8™ rack-mountable connector housings.
- 5.1.4 Panel design shall permit front and rear installation into the EDGE8™ housings.
- 5.1.5 Panel shall be available with up to 4 MTP® adapters.
- 5.1.6 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.
- 5.1.7 MTP® panel shall have VFL compatible shutter adapters at the front plane. The shutter adapter shall eliminate the need to remove and re-install dust caps at the front. The MTP® adapter shall be colour coded as indicated in Table 6.

### 6 Module Specifications and Options

#### 6.1 Module Function and Construction

- 6.1.1 Modules shall provide a means for joining MTP® terminated trunks entering the back of an appropriately designed connector housing to LC patch cables or cables entering the front of the housing.
- 6.1.2 Modules shall contain one 8-fibre cable assembly within a protective housing.
- 6.1.3 Modules shall have shuttered LC adapters at the front.
- 6.1.4 Modules shall be dimensionally compatible with EDGE8™ rack-mountable connector housings.
- 6.1.5 The small form module shall meet the following dimensions 4.91 in x 2.40 in x 0.465 in (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 EDGE8™ housings.
- 6.1.6 Modules shall permit front and rear installation into the EDGE8™ housings.
- 6.1.7 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.
- 6.1.8 When mounted in a connector housing, the adapter sleeves shall be accessible from the front, thus providing a cross-connection point with other modules.
- 6.1.9 Modules shall contain discrete fibre and port identification. This fibre and port identification shall be printed on top and bottom of the modules.
- 6.1.10 A pre-terminated MTP® pigtail module shall also be available. This module shall be offered in pinned and non-pinned MTP® versions and with tail lengths from 3 feet up to 75 feet (1 m to 25 m) in increments of 1 foot (1 m).
- 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 modules shall be terminated with non-pinned MTP® connector at the back and LC connector at the front.
- 6.2.2 Each module shall contain 8 fibre terminations.
- 6.2.3 All connectors shall be inside the module but shall be accessible for mating through adapter sleeves mounted through the wall of the module.
- 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 colour coded as indicated in Table 6.

## 6.3 Module Fibre Types and Optical Specifications

- 6.3.1 Available fibre 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 Fibre Types, Optical Specifications, Adapter Colours

Property	Multimode		Single-mode
	OM3 Ultra-Bendable optimised 50um (850/1300nm)	OM4 Ultra-Bendable optimised 50um (850/1300nm)	OS2 Bend-Improved Single-mode (1310/1550nm)
Fibre Attenuation, max (dB/Km)	2.8/1.0	2.8/1.0	0.4/0.3
Minimum Over Filled Launch (OFL) Bandwidth (MHz*km) <sup>1</sup>	1500/500	3500/500	-/-
Minimum Effective Modal Bandwidth (EMB) (MHz*km) <sup>2</sup>	2000/-	4700/-	-/-
Adapter colour LC MTP®	Aqua Aqua	Aqua Aqua	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).

## 7 Components Insertion Loss Specifications

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

Table 7: Components Optical Specifications - Available Fibre Types

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

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

## 8 Universal Polarity Management System

8.1 EDGE8™ systems shall be constructed with Universal Polarity management for proper system polarity and ease of deployment.

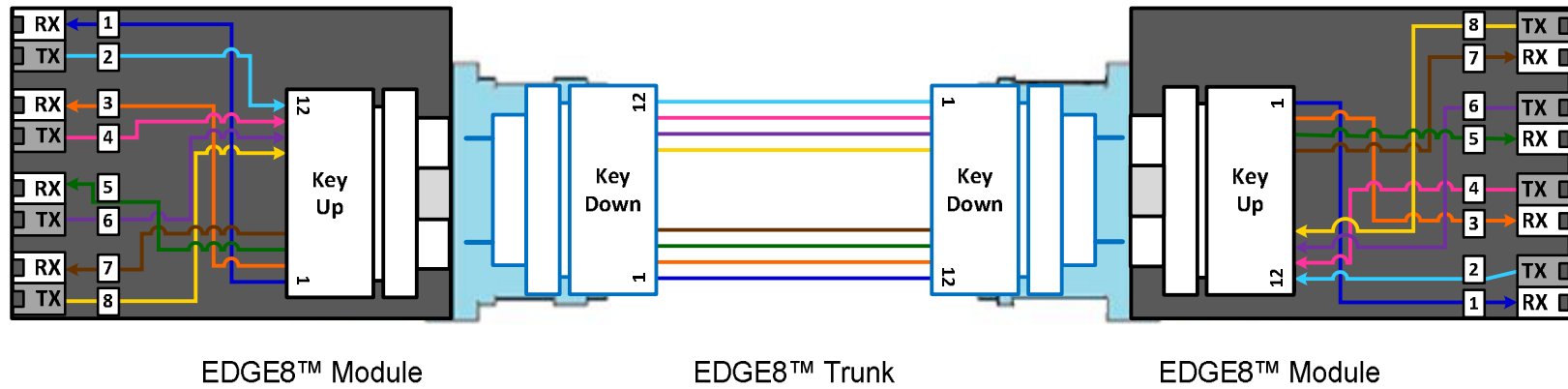


Figure 2: Universal Wiring Scheme – Module on Both Ends

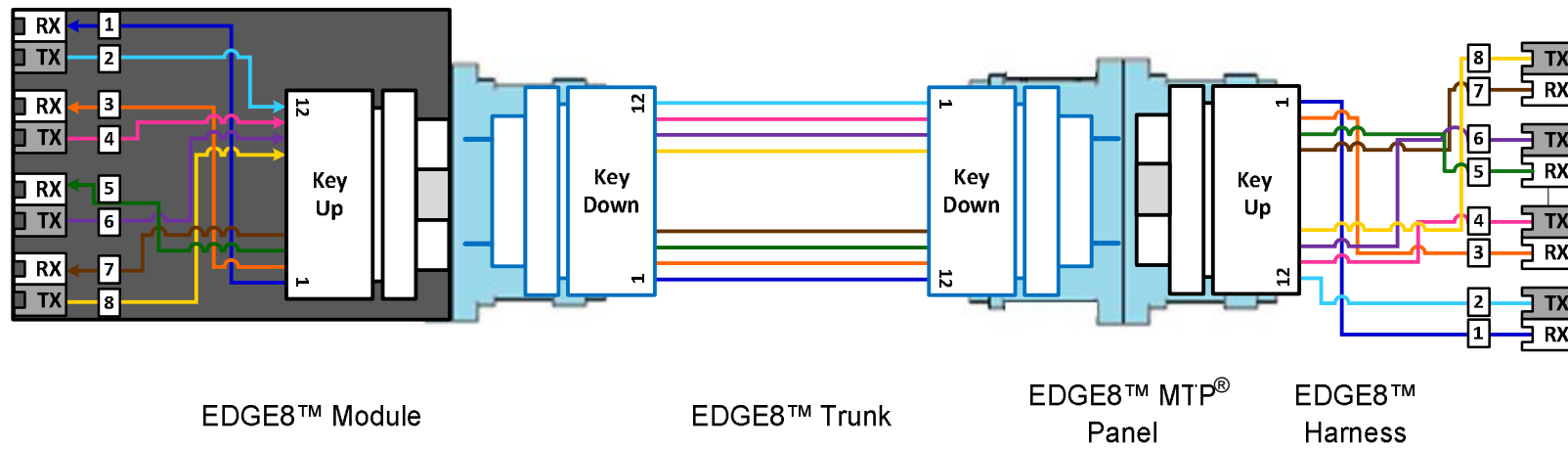


Figure 3: Universal Wiring Scheme – Harness on One End

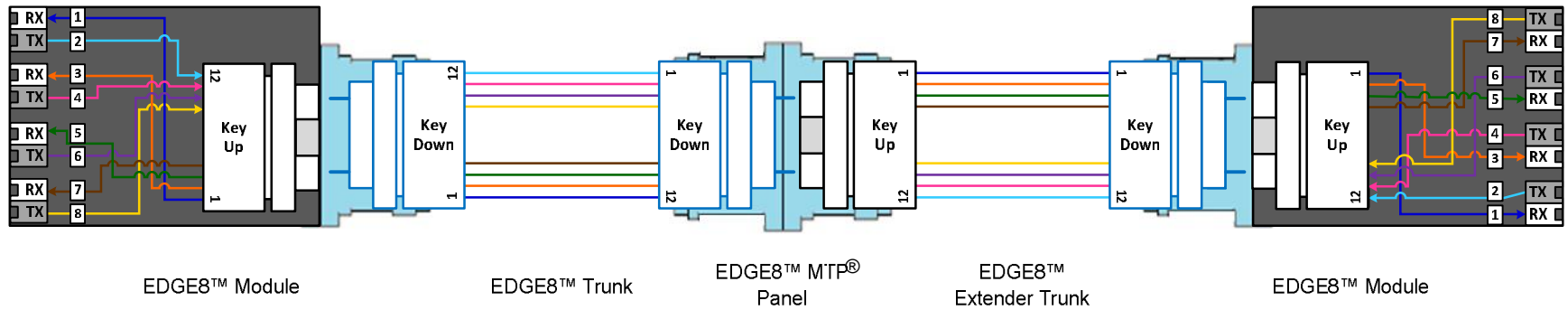


Figure 4: Universal Wiring Scheme – Module on Both Ends with Optional Extender Trunk

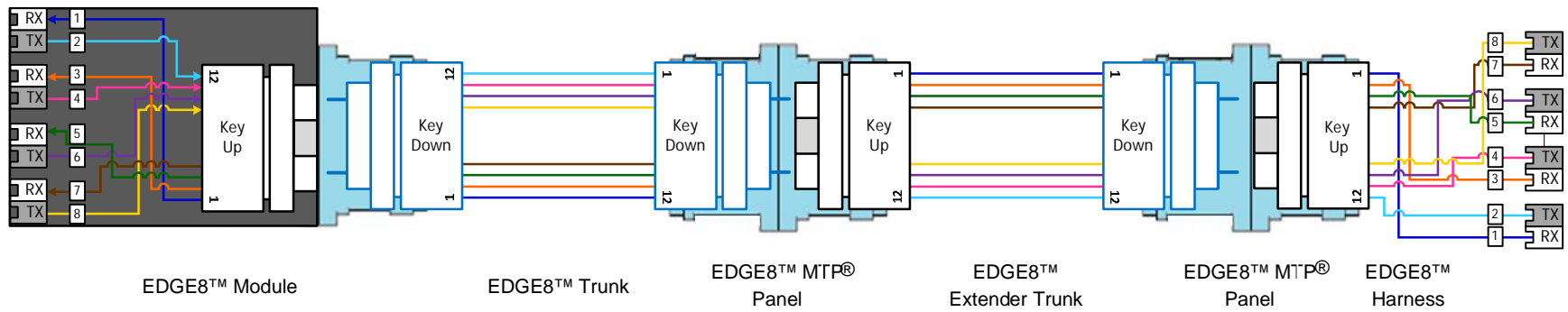


Figure 5: Universal Wiring Scheme – Harness on One End with Optional Extender Trunk