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# PRG FIBER OPTIC SYSTEMS

USER MANUAL

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PRG Fiber Optic Systems User Manual

Version as of: September 12, 2014

PRG part number: 02.3010.0001 A

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# FOREWORD

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## Safety Notice

It is extremely important to read ALL safety information and instructions provided in this manual and any accompanying documentation before installing and operating the products described herein. Heed all cautions and warnings during installation and use of this product.

Safety symbols used throughout this manual are as follows:



**CAUTION** advising of potential damage to product.



**WARNING** advising of potential injury or death to persons.

## Revision History

This manual has been revised as follows:

Version	Release Date	Notes
BASIC	December 6, 2013	Initial Release
A	September 12, 2014	Expanded the "Cable Length and Number of Joins" section.



## INTRODUCTION

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### About This Manual

This manual provides information regarding the installation and operation of PRG Fiber Optic components.

### Additional Documentation

For extended service and maintenance of Fiber Optic components, refer to the following manual:

- + PRG Fiber Optic Systems Service Manual (02.3010.0010)

For more information about PRG systems, refer to the following manual:

- + PRG Lighting Systems Networking Guide (02.3004.1000.0)

### Customer Service

For technical assistance, contact the PRG International Service Center or contact your nearest PRG office. Contact information for all PRG office locations can be found on our website at: [www.prg.com](http://www.prg.com)

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For additional resources and documentation, please visit our website at: [www.prg.com](http://www.prg.com)

## COMPONENTS

### Cable Types

PRG manufactures fiber cables using the Neutrik® opticalCON ADVANCED connection system. opticalCON quad core armored fiber cable should be used for extreme duty applications, and in cases where four fibers increase operational efficiency. Dual core field fiber cable should be used for standard duty fiber applications.

Available terminated cables:

PRG Part No.	Ecode	Description
<b>Extreme Duty Quad:</b>		
25.0013.0050	394AF-	FIBER MM OPTICALCON QUAD ARMORED 50' 15M
25.0013.0075	394AH-	FIBER MM OPTICALCON QUAD ARMORED 75' 23M
25.0013.0100	394AJ-	FIBER MM OPTICALCON QUAD ARMORED 100' 30M
25.0013.0125	394AK-	FIBER MM OPTICALCON QUAD ARMORED 125' 38M
25.0013.0150	394AM-	FIBER MM OPTICALCON QUAD ARMORED 150' 45.5M
25.0013.0175	394AN-	FIBER MM OPTICALCON QUAD ARMORED 175' 53M
25.0013.0200	394AO-	FIBER MM OPTICALCON QUAD ARMORED 200' 60.5M
25.0013.0250	394AR-	FIBER MM OPTICALCON QUAD ARMORED 250' 76M
25.0013.0300	394AT-	FIBER MM OPTICALCON QUAD ARMORED 300' 91M
25.0013.0350	394AW-	FIBER MM OPTICALCON QUAD ARMORED 350' 106.5M
25.0013.0600	394AZ-	FIBER MM OPTICALCON QUAD ARMORED 600' 182.5M
25.0013.1000	394BA-	FIBER MM OPTICALCON QUAD ARMORED 1000' 305M
<b>Standard Duty Duo:</b>		
25.0014.0005	394B6-	FIBER MM OPTICALCON DUO FIELD 5' 1.5M
25.0014.0010	394B9-	FIBER MM OPTICALCON DUO FIELD 10' 3M
25.0014.0025	394BE-	FIBER MM OPTICALCON DUO FIELD 25' 7.5M
25.0014.0050	394BH-	FIBER MM OPTICALCON DUO FIELD 50' 15M
25.0014.0075	394BI-	FIBER MM OPTICALCON DUO FIELD 75' 22M
25.0014.0100	39425-	FIBER MM OPTICALCON DUO FIELD 100' 30M
25.0014.0125	394BK-	FIBER MM OPTICALCON DUO FIELD 125' 38M
25.0014.0150	394BM-	FIBER MM OPTICALCON DUO FIELD 150' 45.5M
25.0014.0175	394BP-	FIBER MM OPTICALCON DUO FIELD 175' 53M
25.0014.0200	39426-	FIBER MM OPTICALCON DUO FIELD 200' 60M
25.0014.0250	39427-	FIBER MM OPTICALCON DUO FIELD 250' 75M
25.0014.0300	39429-	FIBER MM OPTICALCON DUO FIELD 300' 91M
25.0014.0330	39430-	FIBER MM OPTICALCON DUO FIELD 330' X2 100M REEL
25.0014.0350	3942C-	FIBER MM OPTICALCON DUO FIELD 350' 106.5M
25.0014.0492	3942X-	FIBER MM OPTICALCON DUO FIELD 492' 150M
25.0014.0600	39433-	FIBER MM OPTICALCON DUO FIELD 600' 183M
25.0014.1000	39439-	FIBER MM OPTICALCON DUO FIELD 1000' 305M

**Note:** All fibers are Multi mode, 50/125 um, OM3.



## Breakout Components

opticalCON connectors should be used for all connections to be made during daily set-ups. Standard LC patch cords may be used to interconnect within enclosed racks where there is some level of protection and there is no need to make connections daily.

Available breakout panels, boxes, blank modules, and frame kits:

Item	PRG Part No.	Ecode	Description
1	21.9801.0004	3945X-	ASSY, BREAKOUT BOX OPTICALCON
2	21.9801.0003	3945A-	RACK PANEL OPTICALCON B/O QUAD TO DUO X2 1RU
3	55.6755.0003.0	522-200620	FRAME KIT FK-2
4	21.9801.0001	39454-	RACK PANEL UCP MODULE OPTICALCON QUAD X1
5	21.9801.0002	39455-	RACK PANEL UCP MODULE OPTICALCON DUO X2
6	55.6755.2001.0	522-200621	MODULE, BLANK UCPB1
7	25.9801.1000	39574-	FIBER MM SLIM LC-LC DUPLEX TO SIMPLEX X2 3' 1M
8	25.9801.1001	39584-	FIBER MM SLIM LC-SC DUPLEX OM2 3' 1M
9	25.9801.1002	39594-	FIBER MM SLIM LC-ST DUPLEX OM2 3' 1M
10	52.6104.0002.0	39451-	FIBER MM OPTICALCON DUO COUPLER IP65 BLK

Refer to **Figure 1** on the following page for component illustrations.

(Refer to the chart on the previous page for part numbers and descriptions.)

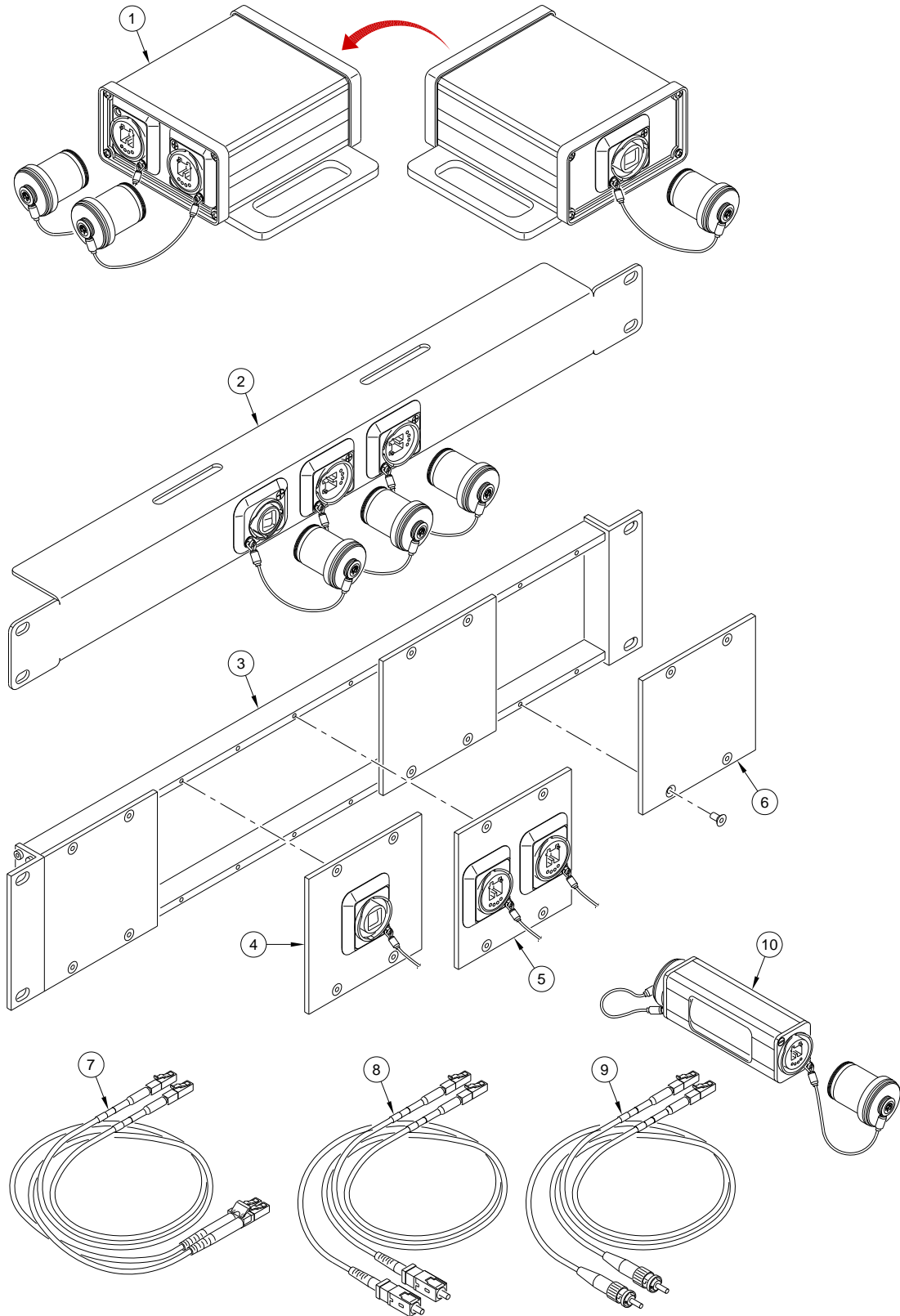


Figure 1: Breakout Components

## CONFIGURATION



**WARNING:** Laser radiation. Do not look directly into fiber optic cable connectors without eye protection!

### Cable Lengths and Number of Joins

The total length of fiber possible is dependent on network speed, wavelength of the data carrier, and the number of physical junctions in the cable.

A 1 Gb signal will not travel as far as a 100 Mb signal in the same type of fiber cable.

There is a difference in the wavelength of the data carrier used in the VIA12 (850nm) and Series 400 (1300 nm) Ethernet switches. This difference allows the S400 Switch to drive a 100 Mb signal further than the Via 12, but the VIA 12 can distribute a 1 Gb signal.

The following table lists the maximum total length allowable based on the number of cables, network speed and type of switch.

# of Cables	1	2	3	4	5	6
# of Couplers	0	1	2	3	4	5
VIA 12, 1 GbE (m)	970	970	833	500	167	
VIA 12, 1 GbE (ft)	3,182	3,182	2,733	1,640	547	
VIA 12, 100 Mb (m)	1,500	1,167	833	500	167	
VIA 12, 100 Mb (ft)	4,920	3,827	2,733	1,640	547	
S400, 10 port 100 Mb (m)	2,000	2,000	2,000	2,000	2,000	1,000
S400, 10 port 100 Mb (ft)	6,560	6,560	6,560	6,560	6,560	3,280



## Fiber Polarity

A crucial concept for proper fiber optic installation is that of *polarity*. The polarity of the fiber installation must connect the transmit ports to the receive ports of the fiber transceivers in order to transfer data.

The convention used for duplex fiber connections is as follows:

- + Rx is labeled A (or a)
- + Tx is labeled B (or b)

According to this polarity principle, **A** must connect to **B**, and **B** to **A** at every point in a connection path to ensure there is an overall "twist" end-to-end.

PRG cables will be wired with a twist, such that A>B, B>A (and a>b, b>a in a Quad connector). All cable couplers and breakouts will also follow this convention.

It is imperative that this polarity principle is followed when patching equipment within rack cases, and patching between opticalCON breakout panels using LC fiber patch cords. The convention for LC chassis connectors is for the Transmit, or B(b), connector to be on the left and the Receive, or A(a) connector to be on the right when viewed from the front with the keyways up.

PRG Part No.	Ecode	Description
52.8301.0001.0	A0556-	FIBER MM 1000BASE-SX SFP MINI-GBIC CISCO GLC-SX-MM

### Connection to Ethernet Switch

To connect fiber optic to the Pathport VIA 12 Ethernet Switch (model #6740), it is necessary to install Mini GBIC transceivers in the ports on the rear panel. The following drawing shows the preferred Mini GBIC Module Plug and the polarity of the LC connections:

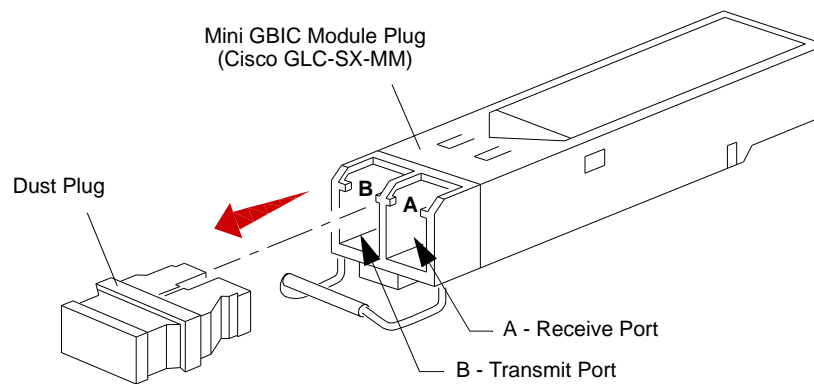


Figure 2: Mini GBIC Connector Orientation

## Connection Options

The following illustrations show example fiber optic connections.



**CAUTION:** Due to the narrow spacing between the connector pairs in the opticalCON Quad connector, a slimline type of LC connector must be used. The diameter of the strain relief on the LC connector cannot be greater than 5mm (about 3/16") as shown in the following illustration.

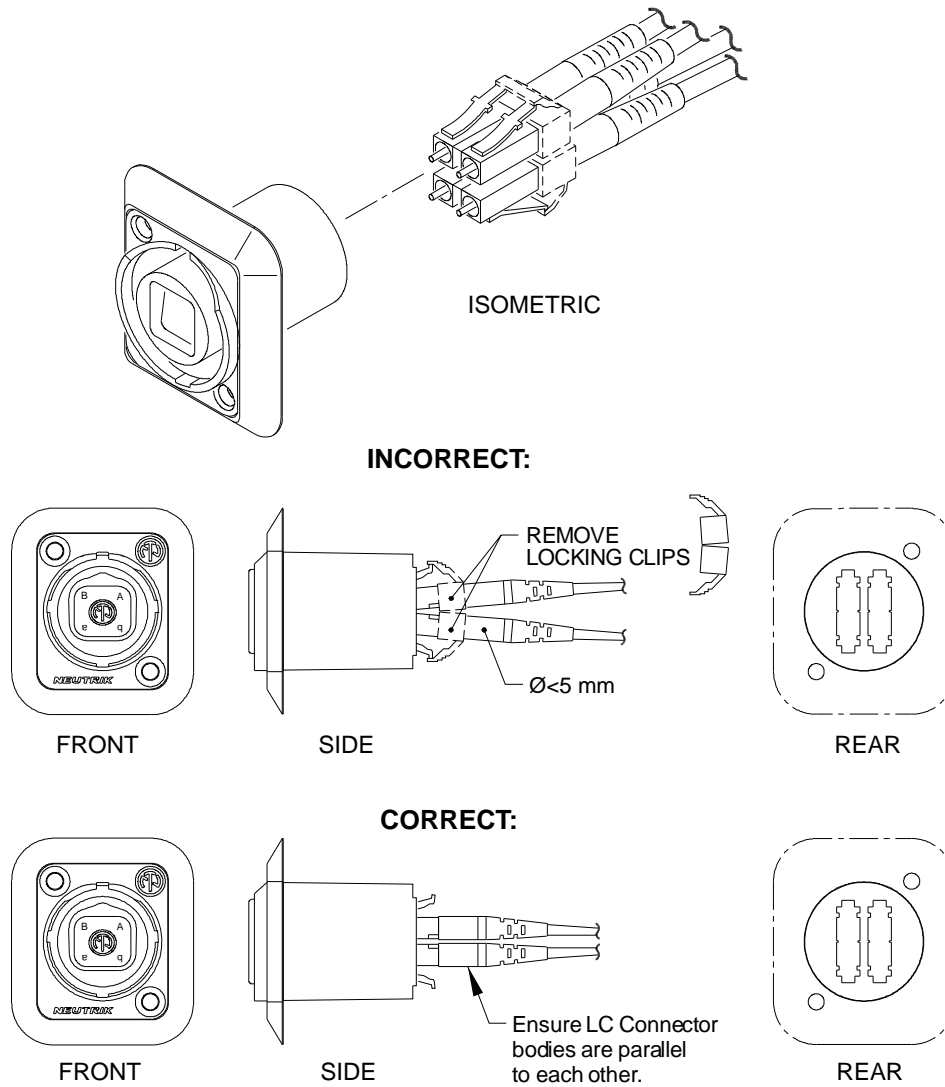


Figure 3: LC Connector Detail

The following illustration shows an example of front and rear opticalCON Duo connections.

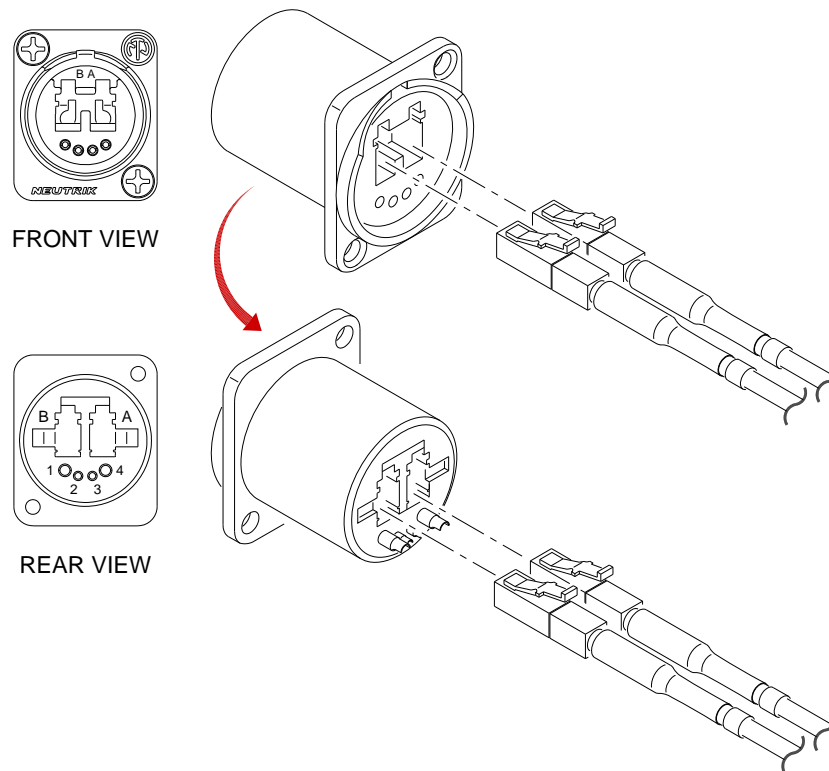


Figure 4: Example LC-LC Duplex Connections

## Quad Fiber to 2X Duo Options

Refer to "Breakout Components" on page 4 for part numbers of the equipment shown below.

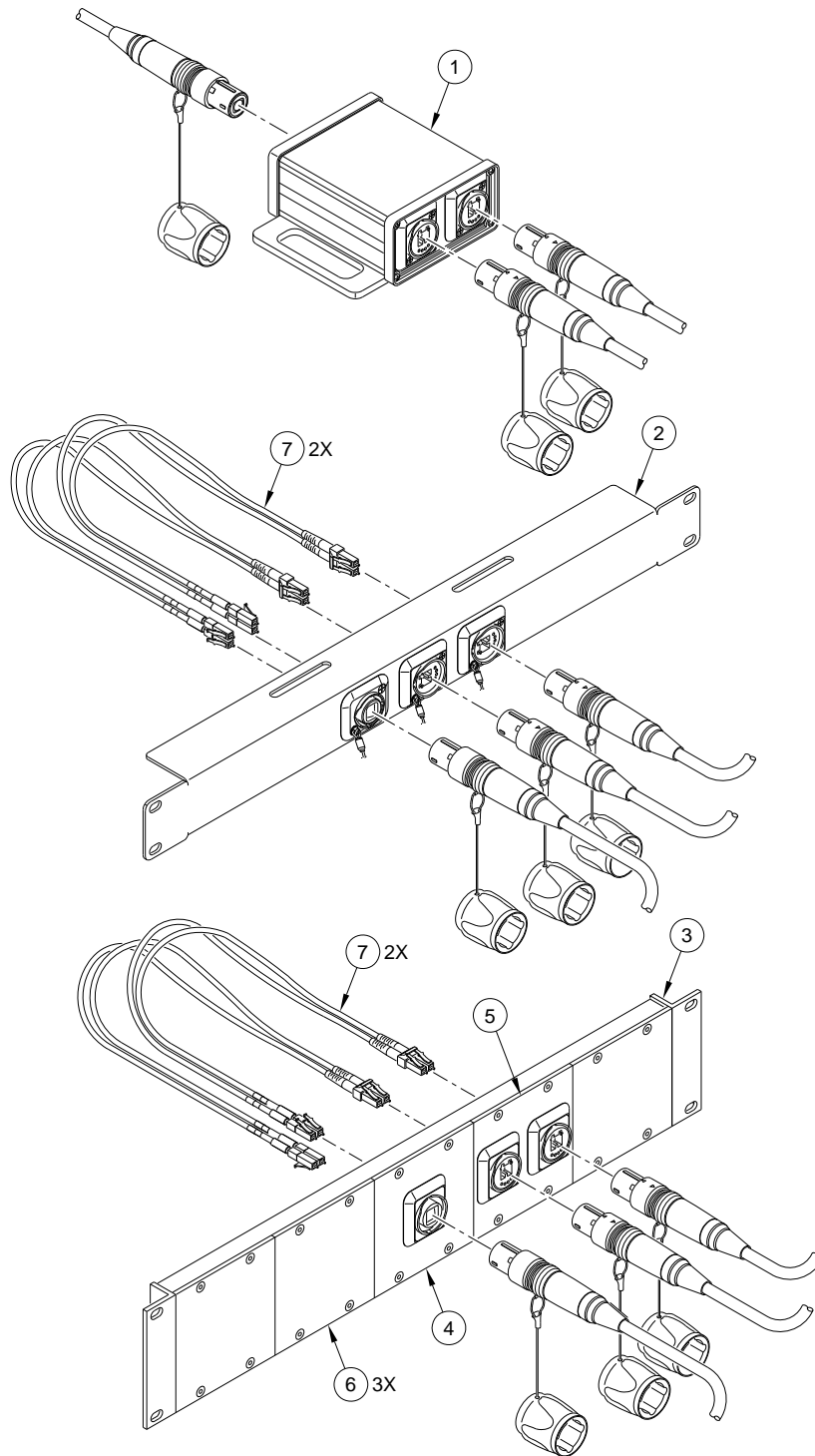


Figure 5: Example Quad Fiber to 2X Duo Connections

## Quad Fiber to Duo Fiber and LC-LC Options

Refer to "**Breakout Components**" on page 4 for part numbers of the equipment shown below.

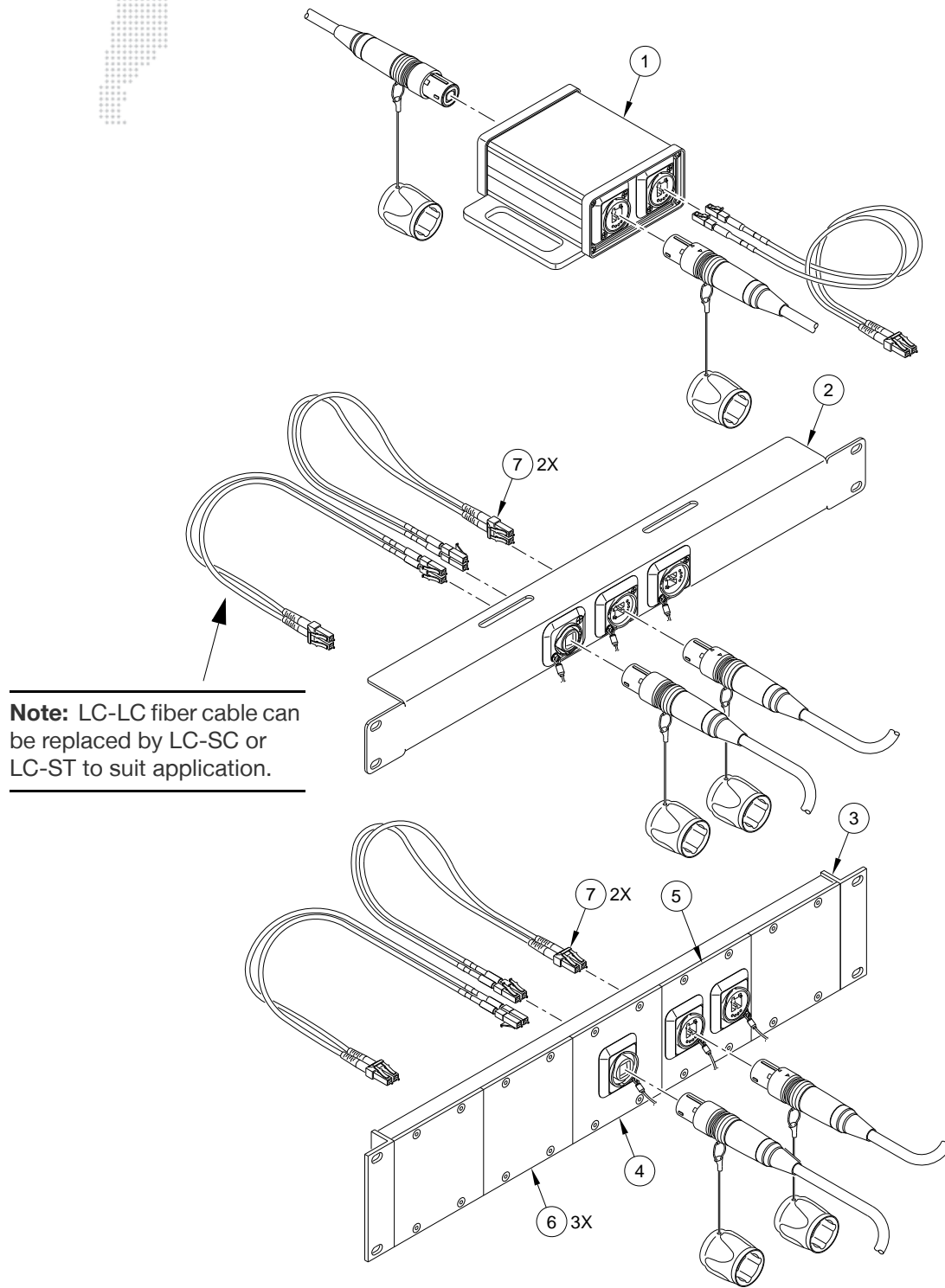


Figure 6: Example Quad Fiber to Duo Fiber and LC-LC Connections

## 2X LC-LC Duplex Via Quad Fiber Options

Refer to "**Breakout Components**" on page 4 for part numbers of the equipment shown below.

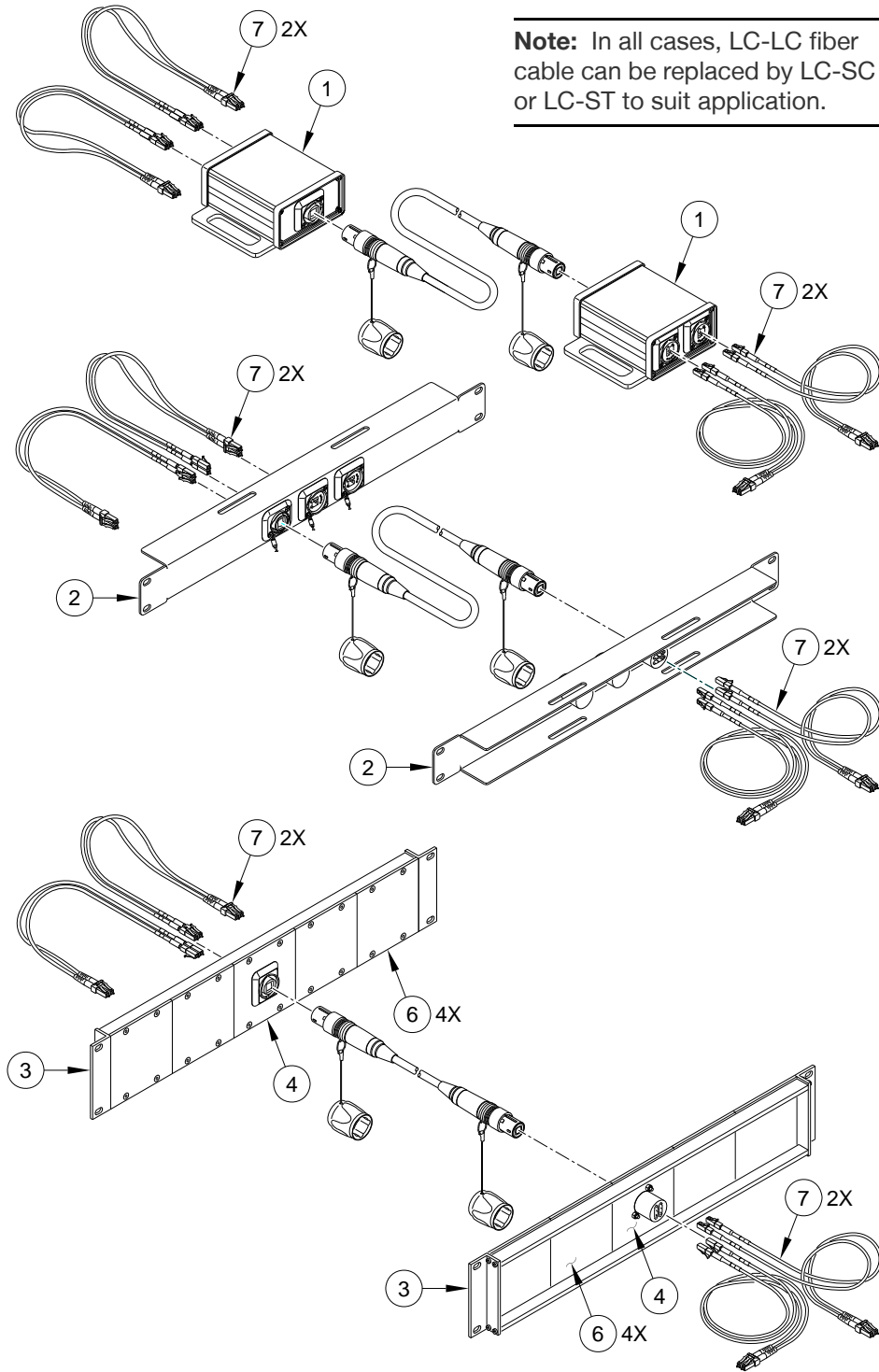


Figure 7: Example 2X LC-LC Duplex Via Quad Fiber Connections

### Quad Fiber to 2X ST Duplex Options

Refer to "Breakout Components" on page 4 for part numbers of the equipment shown below.

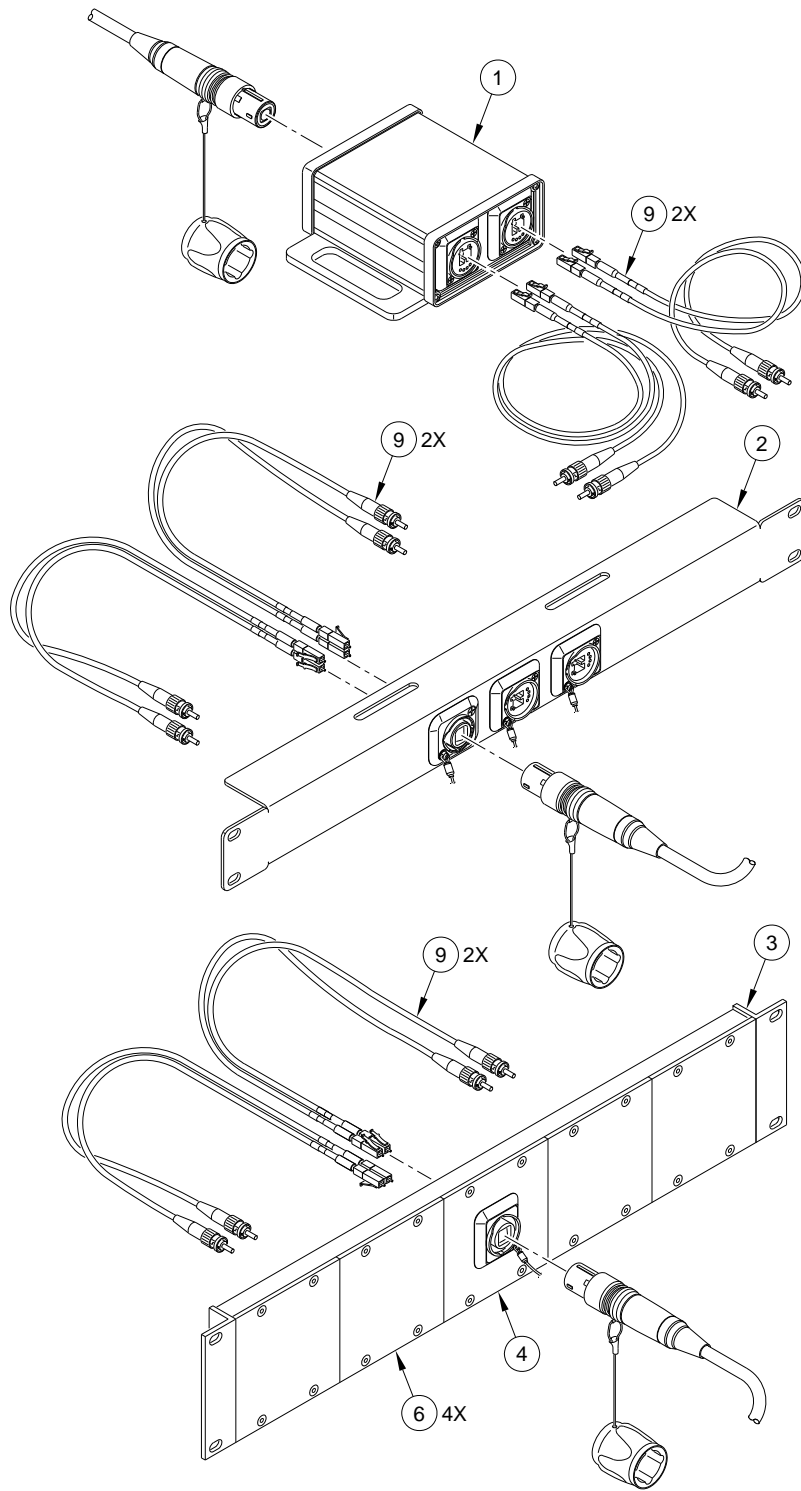


Figure 8: Example Quad Fiber to 2X ST Duplex Connections

## Quad Fiber to 2X SC Duplex Options

Refer to "Breakout Components" on page 4 for part numbers of the equipment shown below.

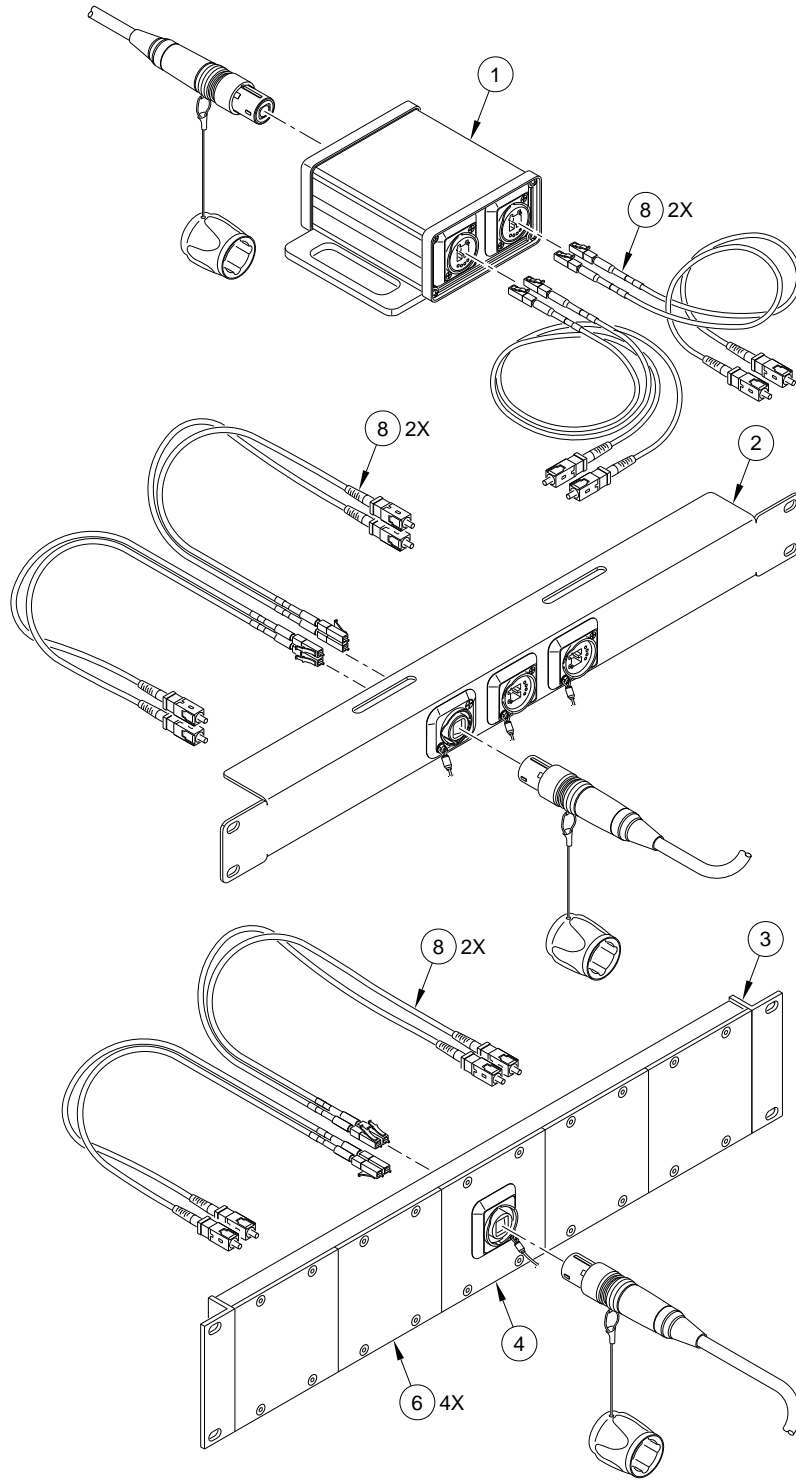


Figure 9: Example Quad Fiber to 2X SC Duplex Connections



## Duo Fiber to LC Duplex Options

Refer to "**Breakout Components**" on page 4 for part numbers of the equipment shown below.

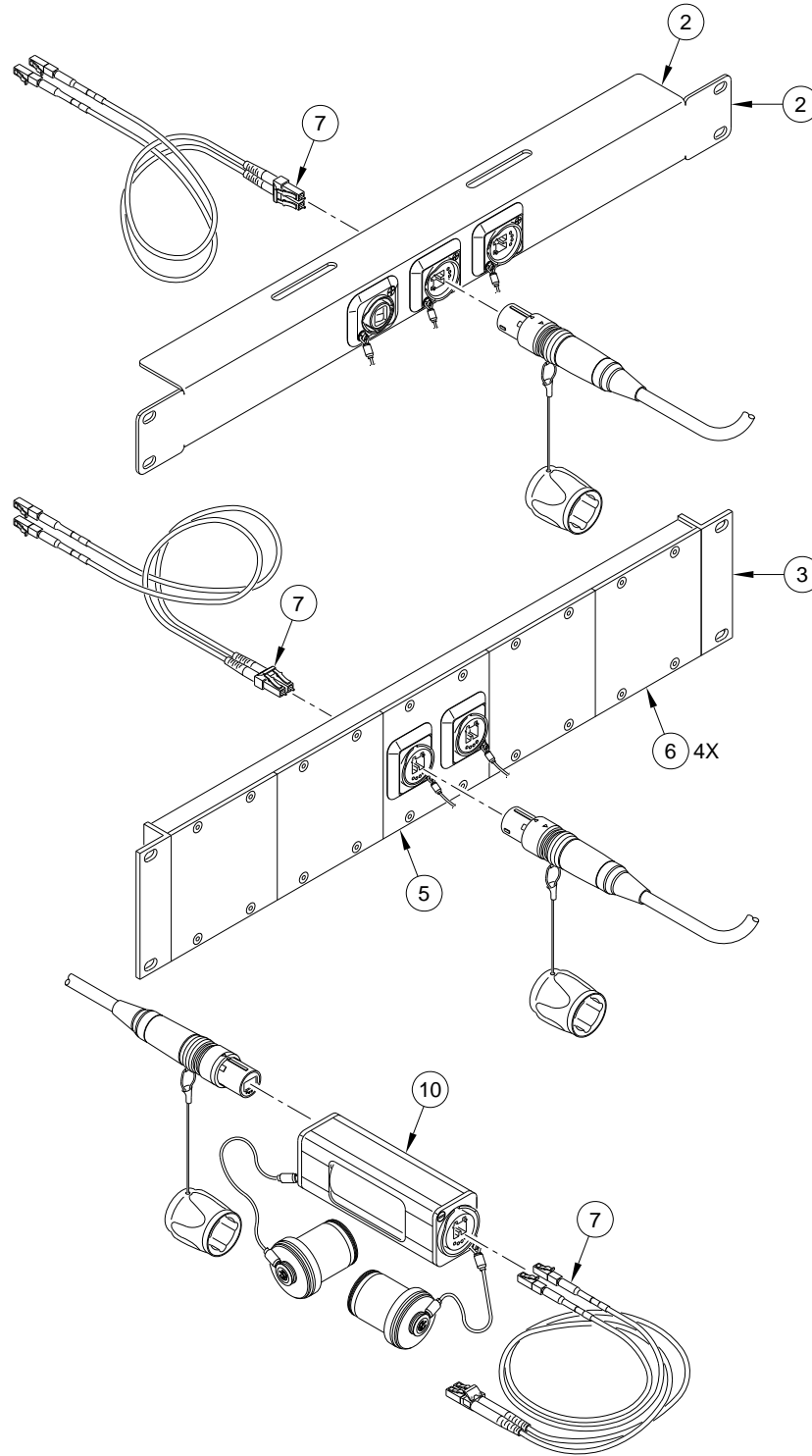


Figure 10: Example Duo Fiber to LC Duplex Connections

## Duo Fiber to SC Duplex Options

Refer to "Breakout Components" on page 4 for part numbers of the equipment shown below.

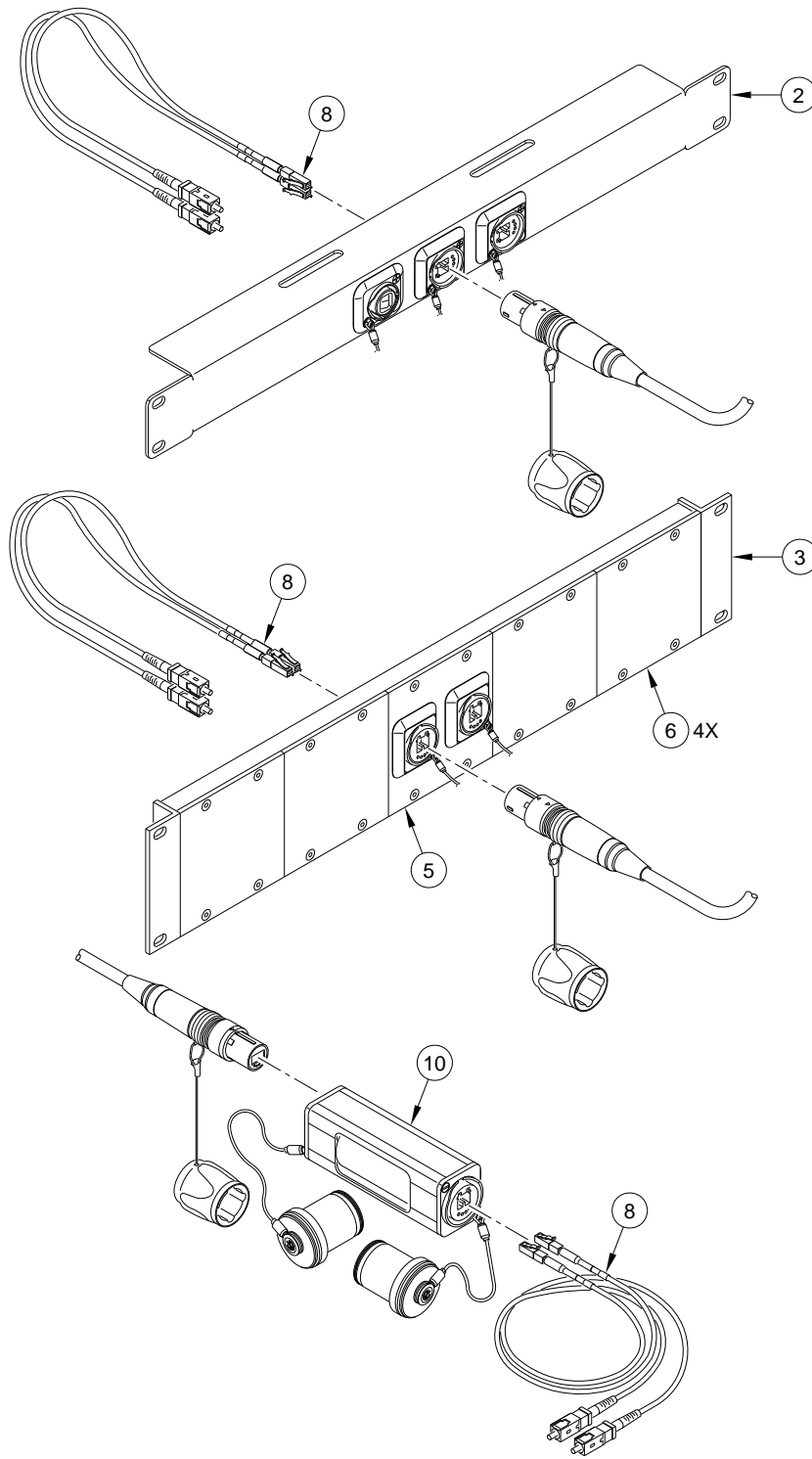


Figure 11: Example Duo Fiber to SC Duplex Connections

## Duo Fiber to ST Duplex Options

Refer to "**Breakout Components**" on page 4 for part numbers of the equipment shown below.

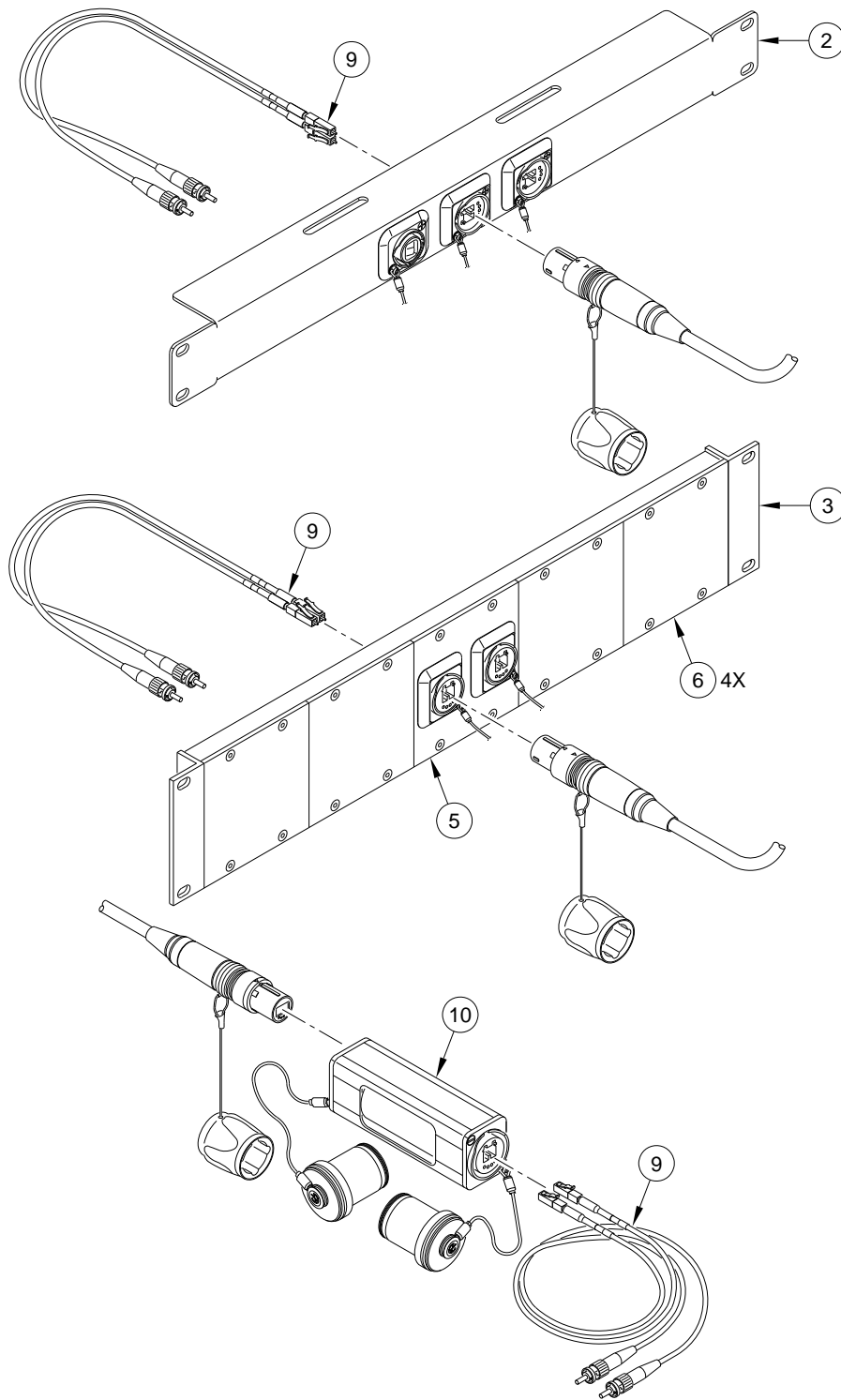


Figure 12: Example Duo Fiber to ST Duplex Options

## Suggested Layouts

The following illustrations show example fiber optic layouts.

LC patch cords of the correct type can be ordered at [orders@prg.com](mailto:orders@prg.com).

### Quad to Duo - for Equipment Fitted with opticalCON Duo

NOTE: The location of plates in the rack can be changed to suit the application.

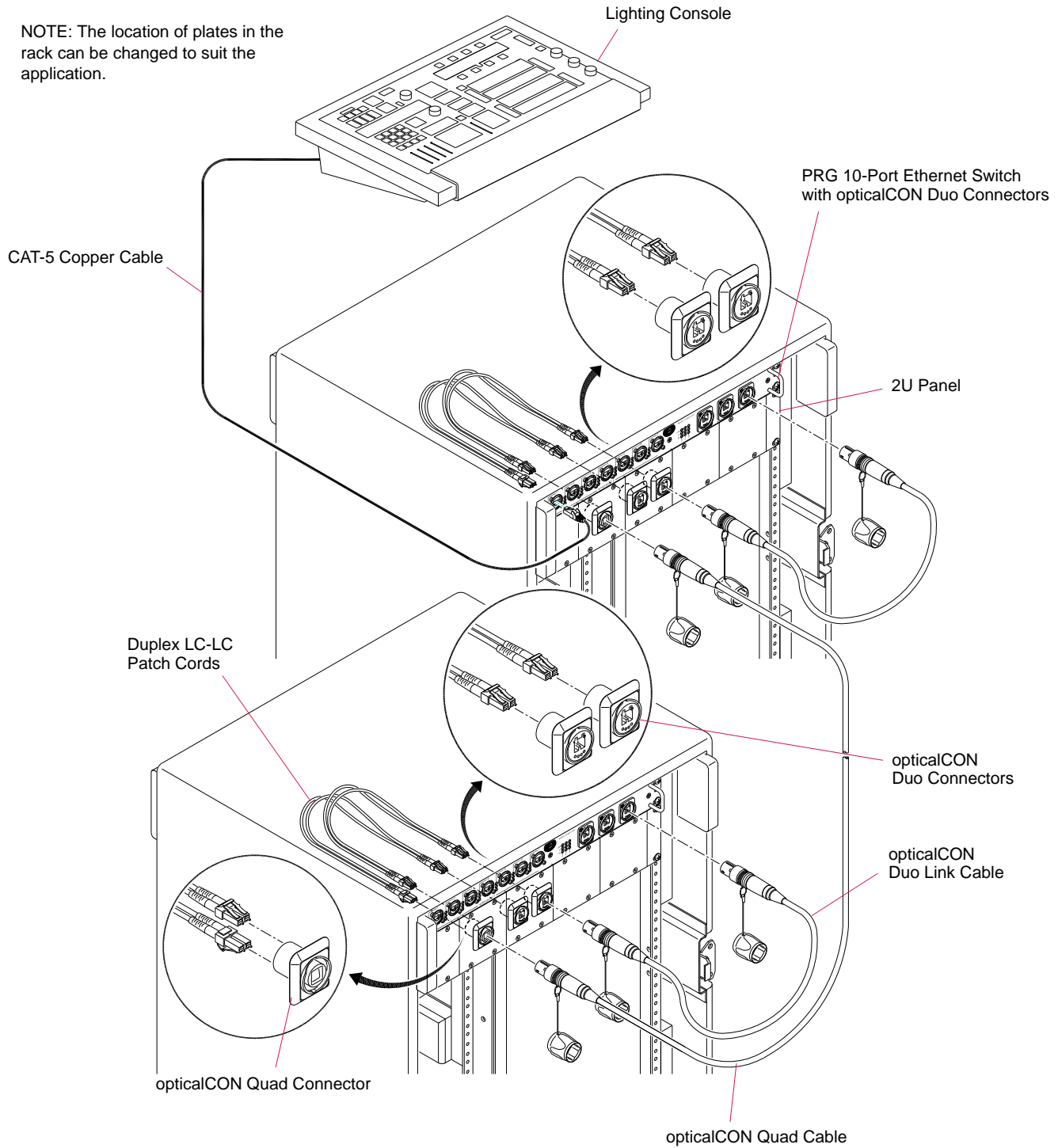


Figure 13: Example Quad to Duo Configuration 1

## Quad to Duo - for Jumping Between Racks

NOTE: The location of plates in the rack can be changed to suit the application.

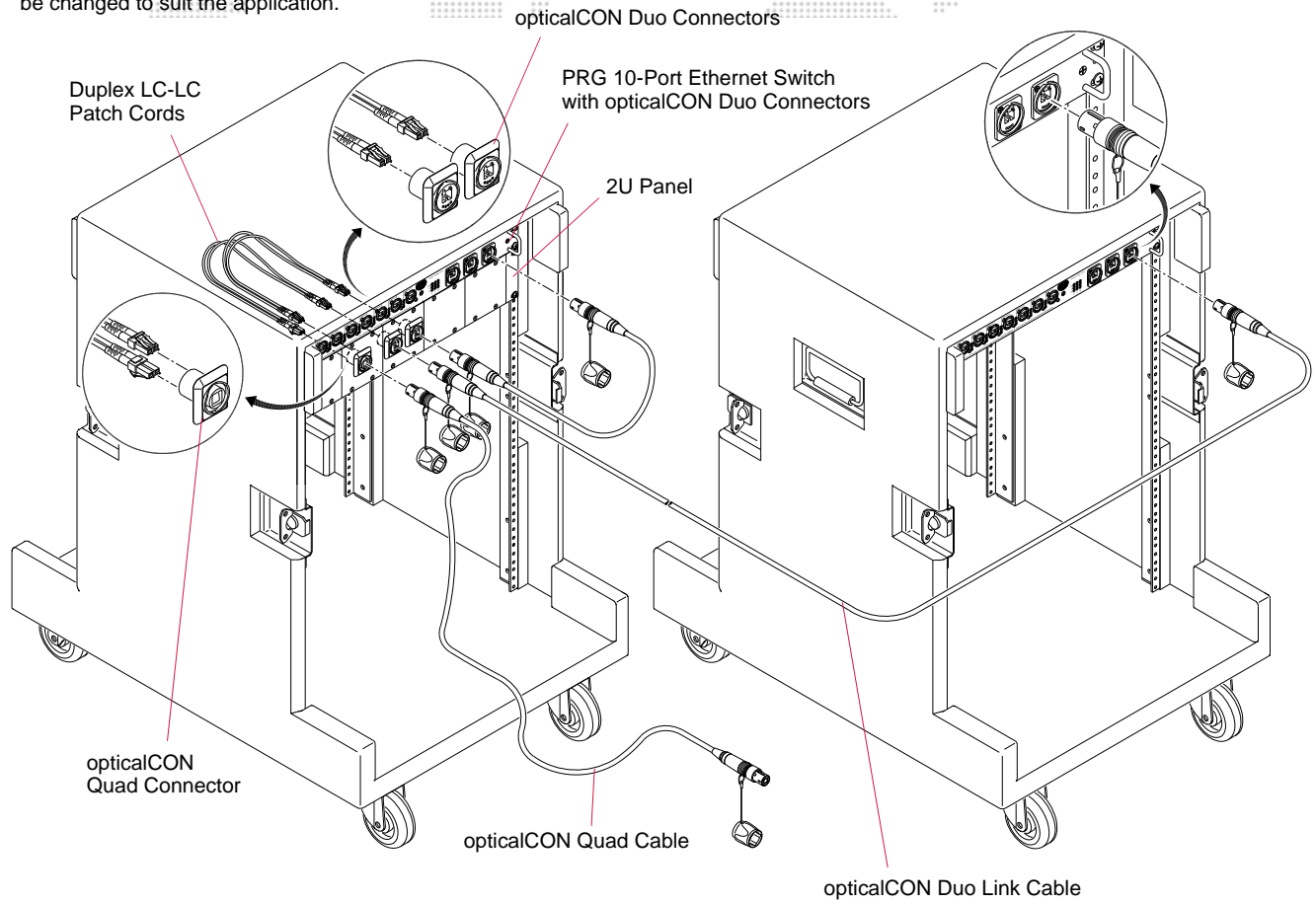
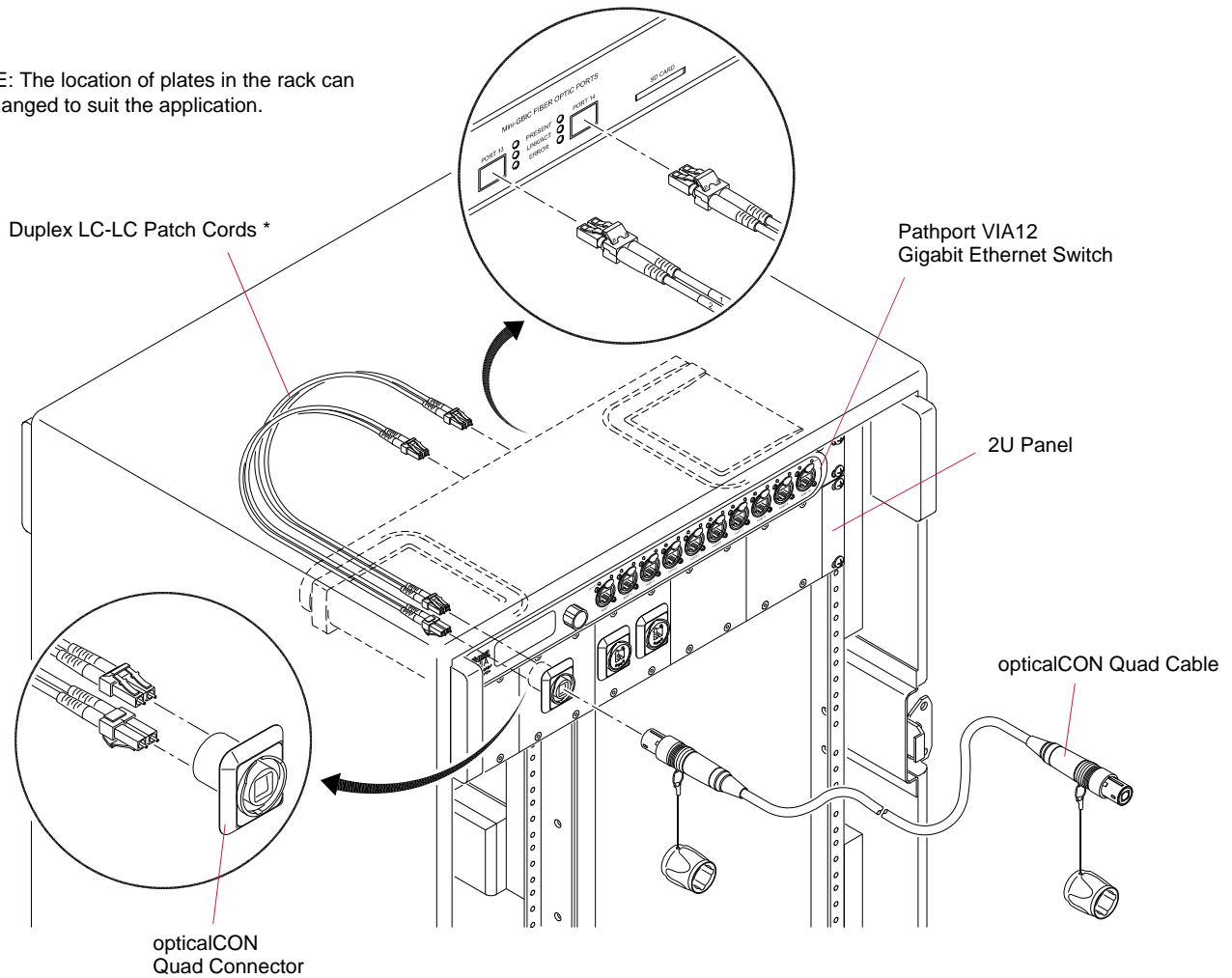


Figure 14: Example Quad to Duo Configuration 2

## Quad or Duo to LC/SC/ST Patch Cords, Internal and External

NOTE: The location of plates in the rack can be changed to suit the application.



\* The patch cords could also be LC-SC or LC-ST to suit equipment used.

Figure 15: Example Quad or Duo Configuration



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