# Fiber Optic Products

RoHS
Ready

TE
connectivity

## Introduction

TE Connectivity is a globally recognized preeminent supplier of fiber optic connectors and interconnection devices. We offer an extensive variety of optical connectors, cable assemblies, fiber management systems, and optoelectronic active and passive components — connectivity solutions. With unparalleled, world-class technologies and high quality products, TE demonstrates its commitment to satisfying all types of customers. Our sales service and support is available globally via an extensive network of TE sales engineers, field program managers, and applications engineers.

**Disclaimer**

While TE has made every reasonable effort to ensure the accuracy of the information in this catalog, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this catalog are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.

© 2012, 2010, 2007, 2006 and 2004 Tyco Electronics Corporation. All Rights Reserved.

AMP, AMP NETCONNECT, AMPTRAC, ARMOR-LIGHT, CORELINK, DUALAN, FIBRBOSS, FIST, FOSC, FSD, LC SECURE, LIGHTCRIMP, LIGHTCRIMP PLUS, LIGHTRAY, LIGHTRAY MPX, LIGHTRAY OFX, MPO SECURE, MT-RJ SECURE, NETCONNECT, PARALIGHT, PARA-OPTIX, PRO BEAM, PRO-CRIMPER, TE Connectivity and the TE connectivity (logo) are trademarks of the TE Connectivity Ltd. family of companies.

Other logos, product and Company names mentioned herein may be trademarks of their respective owners.

### Additional Fiber Optic products available through TE:

Rugged Fiber Optic products can be found in **Catalog 1308940**
(Connectors for Aerospace, Defense and Marine)

Netconnect Fiber Optic products can be found in **Catalog 82164**
(AMP Netconnect Product Catalog)

### Restriction on the use of Hazardous Substances (RoHS)

At TE, we're ready to support your RoHS requirements. We've assessed more than 1.5 million end items/components for RoHS compliance, and issued new part numbers where any change was required to eliminate the restricted materials. Part numbers in this catalog are identified as:

**RoHS Compliant** — Part numbers in this catalog are RoHS Compliant, unless marked otherwise. These products comply with European Union Directive 2002/95/EC as amended 1 January 2006 that restricts the use of lead, mercury, cadmium, hexavalent chromium, PBB, and PBDE in certain electrical and electronic products sold into the EU as of 1 July 2006.

NOTE: For purposes of this Catalog, included within the definition of RoHS Compliant are products that are clearly "Out of Scope" of the RoHS Directive such as hand tools and other non-electrical accessories.

**Non-RoHS Compliant** — These part numbers are identified with a "♦" symbol. These products do not comply with the material restrictions of the European Union Directive 2002/95/EC.

NOTE: Information regarding RoHS compliance is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information provided by our suppliers. This information is subject to change. For latest compliance status, refer to our website referenced at right.

### Getting the Information You Need

Our comprehensive on-line RoHS Customer Support Center provides a forum to answer your questions and support your RoHS needs. A RoHS FAQ (Frequently Asked Questions) is available with links to more detailed information. You can also submit RoHS questions and receive a response within 24 hours during a normal work week. The Support Center also provides:

- Cross-Reference from Non-compliant to Compliant Products
- Ability to browse RoHS Compliant Products in our on-line catalog
- Downloadable Technical Data Customer Information Presentation
- More detailed information regarding the definitions used above
- So whatever your questions when it comes to RoHS, we have the answers at www.te.com/leadfree

RoHS Customer Support Center

| | | | | |
|---|---|---|---|---|
| Catalog 1307895 Revised 4-12 www.te.com | Dimensions are shown for reference purposes only. Specifications subject to change. | Dimensions are in millimeters and inches unless otherwise specified. USA: +1 (800) 522-6752 | Canada: +1 (905) 475-6222 Mexico/C. Am.: +52 (0) 55-1106-0800 Latin/S. Am.: +54 (0) 11-4733-2200 Germany: +49 (0) 6251-133-1999 | UK: +44 (0) 800-267666 France: +33 (0) 1-3420-8686 Netherlands: +31 (0) 73-6246-999 China: +86 (0) 400-820-6015 |

# WHAT'S NEW IN THIS ISSUE

## PARALIGHT Active Optical Assemblies . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Pages 8-11

**40Gb/s QDR QSFP+ Cable Assemblies**

- 100 meters + length
- Functions like a standard electrical cable
- Low latency – 15.84pc + cable
- 1/3 size and 1/10 weight of copper assemblies

**20Gb/s DDR QSFP and CX-4 Cable Assemblies**

- Reach 150 meters and greater
- Available in QSFP, CX-4, and hybrid (QSFP-CX-4) configurations

## Fiber to the Antenna Solutions . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Pages 71-96

- Designed for next generation WiMax and LTE Applications
- Robust designs for external antenna applications
- Broad range of solutions including traditional products and direct Tx mating solutions

**ODVA Compliant Connector — Economic Robust Design**

- All plastic
- IP-67 rated
- Rated for outdoor applications

**ODC – Traditional Fiber to the Antenna Applications**

- Robust all metal connector
- Significant product already deployed
- Available in Duplex or Quad

**Direct Attach**

- Mates directly through the box to the Tx
- Eliminates one cable assembly internal to the antenna box

## 10 Gigabit Products . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Pages 12-13
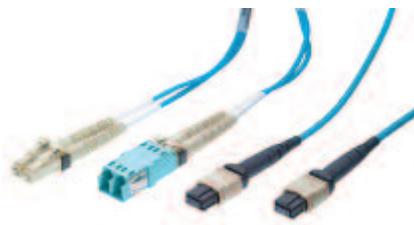
- Supports IEEE 802.ae 10BASE-SR and 10GBASE-LX4 to 300m
- Complies with OM-3 fiber specifications of 2nd edition ISO 11801
- Allows Gigabit Ethernet 1000BASE-SX to 1000m
- Supports 50/125um legacy LED and laser-based applications
- This section outlines all the parts needed for an end-to-end system with 10 Gigabit cable assemblies and connectors

## MPO on Round Cable . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Page 14

- Flexible round outer jacket for easier installation and cable routing
- Same standards compliant performance
- Fiber counts up to 24 for standard MPO, and up to 72 fibers using high density PARA-OPTIX assemblies

ODC is a product and trademark of HUBER+SUHNER AG.

ODVA is a trademark of ODVA, Inc.

## TABLE OF CONTENTS

## TABLE OF CONTENTS (Continued)

## Engineering Notes

Dimensions are shown for
reference purposes only.
Specifications subject
to change.

Dimensions are in millimeters
and inches unless otherwise
specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## Table of Contents

## PARALIGHT Active Optical Cable Assemblies

### Product Facts

- **4 transmit and 4 receive channels at 5 Gb/s and 10 Gb/s per channel**

- **Industry standard (SFF-8470) electrical connector (aka InfiniBand 4X, IB 4X, CX4*, Fibre Channel) and QSFP/ QSFP+ Connector**

- **Internally terminated optics — no optical connector to clean**

- **Differential data I/O per InfiniBand version 1.2.1**

- **Asynchronous, internally AC coupled inputs and outputs**

- **Passively cooled design — low thermal resistance heat path from chip to connector shell**

- **Small diameter cable (3.0 mm)**

- **Light weight**

- **Tight bend radius**

- **Following configurations also available. Contact your TE sales representative for details**
  - **SFP+ 10 Gb/s single lane**
  - **CXP 10 Gb/s twelve lane**

*CX4 available in 5 Gb/s only.

### Technical Document
**Product Specification**
108-2330

Fibre Channel is a trademark of the Fibre Channel Industry Association.

INFINIBAND is a trademark of the InfiniBand Trade Association.

XAUI is a trademark of the 10Gigabit Ethernet Alliance XAUI Interoperability Group.

TE's PARALIGHT active optical cable assemblies use state-of-the-art technology to provide cost effective high data through-put interconnects. The cables incorporate E/O and O/E conversion built into the connector shell to yield a dramatic improvement in PCB real estate utilization.

Using 850 nm VCSEL technology, the 5 Gb/s active cable assemblies will operate over a data rate of 2.5 to 5 Gb/s per lane with an aggregate data rate of 20 Gb/s in each direction. The 10 Gb/s active cable assemblies will operate over a data rate of 2.5 to 10 Gb/s per lane with an aggregate data rate of 40 Gb/s in each direction.

They are available in lengths up to 100 meters using 50 micron fiber. Longer lengths available upon request. The EOE circuitry is designed for use with 8B/10B encoded data streams, such as InfiniBand, Fibre Channel, and XAUI.

QSFP connector style supports connections for an I²C serial interface, which can be used to identify the product and performance capabilities.

### Applications

- **High Performance Computing Clusters**
- **Supercomputers**
- **High End Servers**
- **Mass Storage**
- **Metro Network Switch/Cross Connect**
- **High End Carrier Class Routers**
- **SDR, QDR and DDR InfiniBand Applications**
- **Other 2.5–10.0 Gb/s Applications (e.g. 10 Gb Fibre Channel or 10 Gig Ethernet XAUI on ports providing InfiniBand pinout 3.3 V power)**

### Mechanical/Environmental

- **Up to 100 meters — longer lengths available upon request**
- **25 mm bend radius**
- **Operating Case Temperature 0° C to 70° C**
- **Storage Temperature -40° C to 85° C**

### Materials

- **OFNR/CSA-FT-6 (plenum) cable**
- **OFN-LS (LSZH rated) cable**

8

Catalog 1307895
Revised 4-12

www.te.com

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in millimeters and inches unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## PARALIGHT Active Optical Cable Assemblies (Continued)

**Product Dimensions
IB 4X to QSFP/QSFP+**



**Front Panel Door Clearance**



I/O Plate

**75.00** Min.
[2.953]

**108.00** Min.
[4.252]

**Typical 5 Gb/s Eye Diagram
(PRBS2^7-1 with crosstalk)**



**Typical 10 Gb/s Eye Diagram
(PRBS2^7-1 with crosstalk)**

Catalog 1307895
Revised 4-12

www.te.com

Dimensions are shown for
reference purposes only.
Specifications subject
to change.

Dimensions are in millimeters
and inches unless otherwise
specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## PARALIGHT Active Optical Cable Assemblies (Continued)

**5 Gb/s Part Numbers**

| Length (meters) | Cable Type | 5 GB/S CX4*** Part Numbers | 5 GB/S CX4 to QSFP Part Numbers | 5 GB/S QSFP Part Numbers | 10 GB/S QSFP+ Part Numbers |
|---|---|---|---|---|---|
| 2 | OFNP** | 2064782-1 | 2064781-1 | 2064778-1 | 2064779-1 |
| | LSZH* | 2064815-1 | 2064814-1 | 2064812-1 | 2064813-1 |
| 3 | OFNP** | 2064782-2 | 2064781-2 | 2064778-2 | 2064779-2 |
| | LSZH* | 2064815-2 | 2064814-2 | 2064812-2 | 2064813-2 |
| 5 | OFNP** | 2064782-3 | 2064781-3 | 2064778-3 | 2064779-3 |
| | LSZH* | 2064815-3 | 2064814-3 | 2064812-3 | 2064813-3 |
| 10 | OFNP** | 2064782-4 | 2064781-4 | 2064778-4 | 2064779-4 |
| | LSZH* | 2064815-4 | 2064814-4 | 2064812-4 | 2064813-4 |
| 15 | OFNP** | 2064782-5 | 2064781-5 | 2064778-5 | 2064779-5 |
| | LSZH* | 2064815-5 | 2064814-5 | 2064812-5 | 2064813-5 |
| 20 | OFNP** | 2064782-6 | 2064781-6 | 2064778-6 | 2064779-6 |
| | LSZH* | 2064815-6 | 2064814-6 | 2064812-6 | 2064813-6 |
| 25 | OFNP** | 2064782-7 | 2064781-7 | 2064778-7 | 2064779-7 |
| | LSZH* | 2064815-7 | 2064814-7 | 2064812-7 | 2064813-7 |
| 30 | OFNP** | 2064782-8 | 2064781-8 | 2064778-8 | 2064779-8 |
| | LSZH* | 2064815-8 | 2064814-8 | 2064812-8 | 2064813-8 |
| 40 | OFNP** | 2064782-9 | 2064781-9 | 2064778-9 | 2064779-9 |
| | LSZH* | 2064815-9 | 2064814-9 | 2064812-9 | 2064813-9 |
| 50 | OFNP** | 1-2064782-0 | 1-2064781-0 | 1-2064778-0 | 1-2064779-0 |
| | LSZH* | 1-2064815-0 | 1-2064814-0 | 1-2064812-0 | 1-2064813-0 |
| 100 | OFNP** | 1-2064782-1 | 1-2064781-1 | 1-2064778-1 | 1-2064779-1 |
| | LSZH* | 1-2064815-1 | 1-2064814-1 | 1-2064812-1 | 1-2064813-1 |

*LSZH = Low Smoke Zero Halogen
**OFNP = Optical Fiber Nonconductive Plenum
***Also known as CX4 and SFF-8470
**Note:** Longer lengths available upon request.

**5 GB/S General Specifications**

| Symbol | Parameter | Min. | Typical | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| | Data Rate/Channel | 2.5 | — | 5 | Gb/s | 1 |
| Tc | Operating Case Temperature | 0 | — | 70 | °C | 2 |
| Vcc | Supply Voltage | 3.13 | 3.3 | 3.47 | V | |
| | Total Power Dissipation | — | 1.3 | 1.5 | W | 3 |
| | Fiber Core Diameter | — | 50 | — | µm | |

1. Test pattern PRBS 2E7-1
2. Per End
3. Central office environment per GR-468-CORE

**5 GB/S Transmitter Electrical Specifications**

| Symbol | Parameter | Min. | Typical | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| | Input Common Mode | 0 | — | Vcc | V | 1 |
| V_diff_IN | Differential data swing | 650 | — | 1600 | mVpp | |
| Rin | Differential Input Impedance | 80 | 100 | 120 | Ω | |

1. Internally AC coupled.

**5 GB/S Receiver Electrical Specifications**

| Symbol | Parameter | Min. | Typical | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| | Output Common Mode | — | — | — | V | 1 |
| V_diff_OUT | Differential data swing | 200 | 300 | 1200 | mVpp | |
| Rout | Differential Output Impedance | — | 100 | — | Ω | |
| TJ | Total Jitter (p-p) | — | — | .42 | UI | 2 |
| ΔT ch-ch | Skew | — | — | 200 | ps | |

1. Internally AC Coupled.
2. Total jitter is specified at a BER of $10^{-12}$ using PRBS $2^7$-1.

**Note:** All part numbers are RoHS compliant.

## PARALIGHT Active Optical Cable Assemblies (Continued)

**10 GB/S
General Specifications**

| Symbol | Parameter | Min. | Typical | Max. | Unit | Notes |
|--------|-----------|------|---------|------|------|-------|
| | Data Rate/Channel | 2.5 | — | 10.0 | Gb/s | 1 |
| Tc | Operating Case Temperature | 0 | — | 70 | °C | 2 |
| Vcc | Supply Voltage | 3.13 | 3.3 | 3.47 | V | |
| | Total Power Dissipation | — | 1.5 | 1.7 | W | 3 |
| | Fiber Core Diameter | — | 50 | — | μm | |

1. Test pattern PRBS 2E7-1
2. Per End
3. Central office environment per GR-468-CORE

**10 GB/S Transmitter
Electrical Specifications**

| Symbol | Parameter | Min. | Typical | Max. | Unit | Notes |
|--------|-----------|------|---------|------|------|-------|
| | Input Common Mode | 0 | — | Vcc | V | 1 |
| V_diff_IN | Differential data swing | 500 | — | 1600 | mVpp | |
| Rin | Differential Input Impedance | 80 | 100 | 120 | Ω | |

1. Internally AC coupled.

**10 GB/S Receiver Electrical
Specifications**

| Symbol | Parameter | Min. | Typical | Max. | Unit | Notes |
|--------|-----------|------|---------|------|------|-------|
| | Output Common Mode | — | — | — | V | 1 |
| V_diff_OUT | Differential data swing | 200 | 300 | 1200 | mVpp | |
| Rout | Differential Output Impedance | — | 100 | — | Ω | |
| TJ | Total Jitter (p-p) | — | — | .42 | UI | 2 |
| ΔT ch-ch | Skew | — | — | 200 | ps | |

1. Internally AC Coupled.
2. Total jitter is specified at a BER of $10^{-12}$ using PRBS $2^7-1$.

**Mechanical**

| Symbol | Parameter | Value | Unit | Notes |
|--------|-----------|-------|------|-------|
| | Off Axis Load | 22.2 | N | |
| | Retention Load | 89 | N | |
| | Durability | 250 | cycles | |

**Regulatory Information**

| Symbol | Parameter | Compliance |
|--------|-----------|------------|
| | Preliminary Eye Safety Classification[1] | 1M |
| | Electrostatic Discharge (ESD), human body | JESD22-A114D, Class 1 (1000 volts), human body model |

Optical energy contained within cable.
CAUTION: Do not cut optical cable. Viewing the cut fiber ends, especially with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) may pose an eye hazard.

This product is classified as a Class 1M Laser product in accordance with IEC 60825-1:1993+A1+A2 and complies with 21CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice N0. 50, dated 24-Jun-2007.

**Note:** The TUV Bauartmark does not apply to LSZH assemblies

INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS "(MAGNIFIERS)"
CLASS 1M LASER PRODUCT
840-850nm, 700uW

## 10 Gigabit Fiber Optic Products Overview

**MTP/MPO Round Cable Assemblies**

### QSFP Compatible MPO to MPO

| Fiber Type | Fiber Count | Length in meters | Part Number |
|---|---|---|---|
| 10 Gig / OM3 (50/125) | 8 | 1 | 1938323-1 |
| | | 5 | 1938323-5 |
| | | 10 | 1-1938323-0 |
| | | 20 | 2-1938323-0 |
| | | 50 | 5-1938323-0 |

### 12-Fiber Reversed Fiber Path MPO to MPO

| Fiber Type | Fiber Count | Length in meters | Part Number |
|---|---|---|---|
| 10 Gig / OM3 (50/125) | 12 | 1 | 1938324-1 |
| | | 5 | 1938324-5 |
| | | 10 | 1-1938324-0 |
| | | 20 | 2-1938324-0 |
| | | 50 | 5-1938324-0 |

**For custom configurations, contact your TE sales representative.**

**LC Cable Assemblies**

| Simplex / Duplex | Cable Type | Side A | Side B | Jacket Type | Part Number | Part Numbers/Lengths (m) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 2 | 3 | 5 | 10 | 15 |
| **LC Cable Assemblies** | | | | | | | | | | | |
| Duplex | 50/125 OM3 | LC | LC | 2 mm jacketed riser | X-2064862-X | 2064862-1 | 2064862-2 | 2064862-3 | 2064862-5 | 1-2064862-0 | 1-2064862-5 |
| | 10Gig Fiber | LC | SC | 2 mm jacketed riser | X-2064863-X | 2064863-1 | 2064863-2 | 2064863-3 | 2064863-5 | 1-2064863-0 | 1-2064863-5 |
| **SC Cable Assemblies** | | | | | | | | | | | |
| Simplex | 50/125 OM3 10Gig Fiber | SC | SC | 2 mm jacketed riser | X-2064883-X | 2064883-1 | 2064883-2 | 2064883-3 | 2064883-5 | 1-2064883-0 | 1-2064883-5 |
| Duplex | 50/125 OM3 10Gig Fiber | SC | SC | 2 mm jacketed riser | X-2064886-X | 2064886-1 | 2064886-2 | 2064886-3 | 2064886-5 | 1-2064886-0 | 1-2064886-5 |
| | 50/125 OM3 10Gig Fiber | SC | ST | 2 mm jacketed riser | X-2064889-X | 2064889-1 | 2064889-2 | 2064889-3 | 2064889-5 | 1-2064889-0 | 1-2064889-5 |
| **ST Cable Assemblies** | | | | | | | | | | | |
| Simplex | 50/125 OM3 10Gig Fiber | ST | ST | 2 mm jacketed riser | X-2064877-X | 2064877-1 | 2064877-2 | 2064877-3 | 2064877-5 | 1-2064877-0 | 1-2064877-5 |
| Duplex | 50/125 OM3 10Gig Fiber | ST | ST | 2 mm jacketed riser | X-2064880-X | 2064880-1 | 2064880-2 | 2064880-3 | 2064880-5 | 1-2064880-0 | 1-2064880-5 |
| **MT-RJ SECURE Cable Assemblies** | | | | | | | | | | | |
| Duplex | 50/125 OM3 10Gig Fiber | MT-RJ | MT-RJ | 1.8 mm jacketed riser | X-6588572-X | 6588572-1 | 6588572-2 | 6588572-3 | 6588572-5 | 1-6588572-0 | 1-6588572-5 |
| | 50/125 OM3 10Gig Fiber | MT-RJ | SC | 1.8 mm jacketed riser | X-6588573-X | 6588573-1 | 6588573-2 | 6588573-3 | 6588573-5 | 1-6588573-0 | 1-6588573-5 |

Additional lengths available.  See TE specification 1206850 for more details

**Note:** All part numbers are RoHS compliant.

## 10 Gigabit Fiber Optic Products Overview (Continued)

**LC and SC Connector Kits**

### LC Connector Kits — Standard Kits

| Description | Fiber Type | Housing Color | Boot Color | Used with | Assembly Pack Part Number |
|---|---|---|---|---|---|
| Simplex | Multimode | Beige | Beige | 900 µm Buffered | 2064938-1 |
| | | | | 1.6-2.0 mm Jacketed | 2064938-2 |
| | | | | 3.0 mm Jacketed | 2064938-3 |
| Duplex | Multimode | Beige | Beige | 900 µm Buffered | 2-2064938-1 |
| | | | | 1.6-2.0 mm Jacketed | 2-2064938-2 |
| | | | | 3.0 mm Jacketed | 2-2064938-3 |
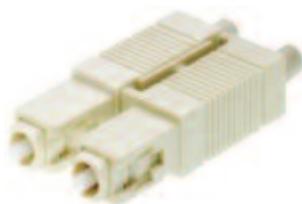
### SC Connector Kits — Standard Kits

| Description | Fiber Type | Housing Color | Boot Color | Used with | Assembly Pack Part Number |
|---|---|---|---|---|---|
| Simplex | Multimode | Beige | Beige | 900 µm Buffered | 2064939-1 |
| | | | | 2.0 mm Jacketed | 2064939-2 |
| | | | | 3.0 mm Jacketed | 2064939-3 |
| Duplex | Multimode | Beige | Beige | 2.0 mm Jacketed | 5504928-1 |
| | | | | 3.0 mm Jacketed | 5504657-1 |

**LC and SC Adapters**

### LC Duplex Adapter for SC Cutout — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Ceramic | Flanged | Aqua | 1-6457567-6 |
| | Flangeless | Aqua | 1-6457567-4 |
| Metal | Flanged | Aqua | 2-6457567-0 |
| | Flangeless | Aqua | 1-6457567-8 |

### Shuttered LC Duplex Adapter for SC Cutout — Plastic

| Alignment Sleeve Material | Description | Housing Color | Shutter Label Color | Part Number |
|---|---|---|---|---|
| Ceramic | Flanged | Aqua | Aqua | 1-2064658-6 |
| | Flangeless | Aqua | Aqua | 1-2064752-4 |

### LC Quad Adapter for SC Duplex Cutout — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Ceramic | Flanged | Aqua | 1-1695790-0 |
| | Flangeless | Aqua | 1-1695790-1 |
| Metal | Flanged | Aqua | 1695790-9 |

### SC Simplex Adapter — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Ceramic | Flanged | Aqua | 2-5502632-4 |
| | Flangeless | Aqua | 5504632-6 |
| Metal | Flanged | Aqua | 2-5502632-3 |

### SC Duplex Adapter — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Ceramic | Flanged | Aqua | 2-5502776-6 |
| Metal | Flanged | Aqua | 2-5502776-5 |

**Note:** All part numbers are RoHS compliant.

## MPO Cable Assemblies

**MTP/MPO Round Cable Assemblies**

**Suitable for Interface to Transceiver**

**Product Facts**

- Flexible round outer jacket for easier installation/ routing
- Available in fiber counts up to 24
- Fiber path reversed or straight

**Applications**

- Transceiver interface
- High density interconnect for optical switches, routers, PC cards

**Options**

- **Fiber Types**
  - Singlemode
  - Low Loss Singlemode
  - 50/125 µm OM4
  - 50/125 µm OM3
  - 50/125 µm OM2
  - 62.5/125 µm
  - Bend insensitive fiber G657A or G657B
- **Cable Ratings**
  - Riser rated, UL-OFNR
  - Plenum rated, UL-OFNP
  - Low Smoke, Zero Halogen rated, LSZH



L

MPO Connector, mm No Pins, 2 Plcs.

Fiber Optic Cable 3 mm Round
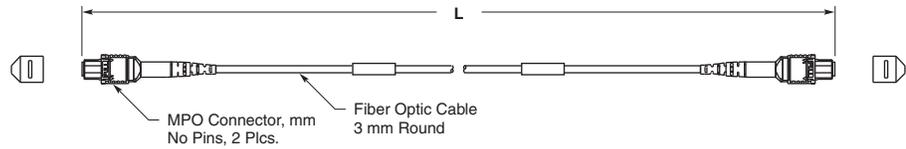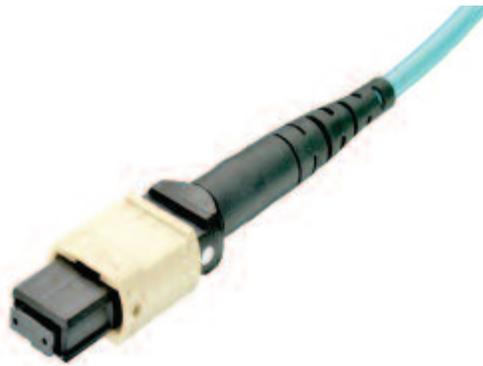
**QSFP Compatible MPO to MPO**

| Fiber Type | Fiber Count | Length in meters | Part Number |
|---|---|---|---|
| 10 Gig / OM3 (50/125) | 8 | 1 | 1938323-1 |
| | | 5 | 1938323-5 |
| | | 10 | 1-1938323-0 |
| | | 20 | 2-1938323-0 |
| | | 50 | 5-1938323-0 |
| OM2 50/125 | 8 | 1 | 1938208-1 |
| | | 5 | 1938208-5 |
| | | 10 | 1-1938208-0 |
| | | 20 | 2-1938208-0 |
| | | 50 | 5-1938208-0 |

**Reverse Fiber Path**

| MPO Left Fiber # | | MPO Right Fiber # |
|---|---|---|
| 1 | ←→ | 12 |
| 2 | ←→ | 11 |
| 3 | ←→ | 10 |
| 4 | ←→ | 9 |
| 5 | Not Connected | 8 |
| 6 | Not Connected | 7 |
| 7 | Not Connected | 6 |
| 8 | Not Connected | 5 |
| 9 | ←→ | 4 |
| 10 | ←→ | 3 |
| 11 | ←→ | 2 |
| 12 | ←→ | 1 |

**12-Fiber Reversed Fiber Path MPO to MPO**

| Fiber Type | Fiber Count | Length in meters | Part Number |
|---|---|---|---|
| 10 Gig / OM3 (50/125) | 12 | 1 | 1938324-1 |
| | | 5 | 1938324-5 |
| | | 10 | 1-1938324-0 |
| | | 20 | 2-1938324-0 |
| | | 50 | 5-1938324-0 |
| OM2 50/125 | 12 | 1 | 1938209-1 |
| | | 5 | 1938209-5 |
| | | 10 | 1-1938209-0 |
| | | 20 | 2-1938209-0 |
| | | 50 | 5-1938209-0 |

**Reverse Fiber Path**

| MPO Left Fiber # | | MPO Right Fiber # |
|---|---|---|
| 1 | ←→ | 12 |
| 2 | ←→ | 11 |
| 3 | ←→ | 10 |
| 4 | ←→ | 9 |
| 5 | ←→ | 8 |
| 6 | ←→ | 7 |
| 7 | ←→ | 6 |
| 8 | ←→ | 5 |
| 9 | ←→ | 4 |
| 10 | ←→ | 3 |
| 11 | ←→ | 2 |
| 12 | ←→ | 1 |

**For custom configurations, contact your TE sales representative.**

**Note:** All part numbers are RoHS compliant.

## MPO Cable Assemblies (Continued)

**MTP/MPO Breakout
Cable Assemblies**

**Suitable for
Telecommunication and
Data Communication
Equipment**

**Options include:**

- **Ribbon or Round Cable**

- **Fiber counts up to 24**

- **Fiber Types**
  - **Singlemode**
  - **Low Loss Singlemode**
  - **50/125 µm OM3**
  - **50/125 µm OM2**
  - **62.5/125 µm**
  - **Bend insensitive fiber
    G657A or G657B**

- **Cable Ratings**
  - **Riser rated, UL-OFNR**
  - **Plenum rated, UL-OFNP**
  - **Low Smoke, Zero
    Halogen rated, LSZH**

- **Connector Types**
  - **LC**
  - **SC**
  - **ST**
  - **FC**
  - **MU**
  - **MT-RJ SECURE Connector**

- **Different configurations
  available upon request**
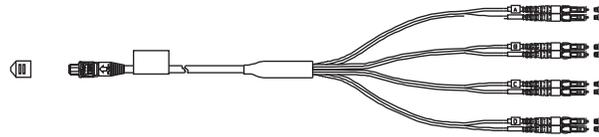
**MPO to LC Duplex
8 Fiber Straight Through on Ribbon Fiber**
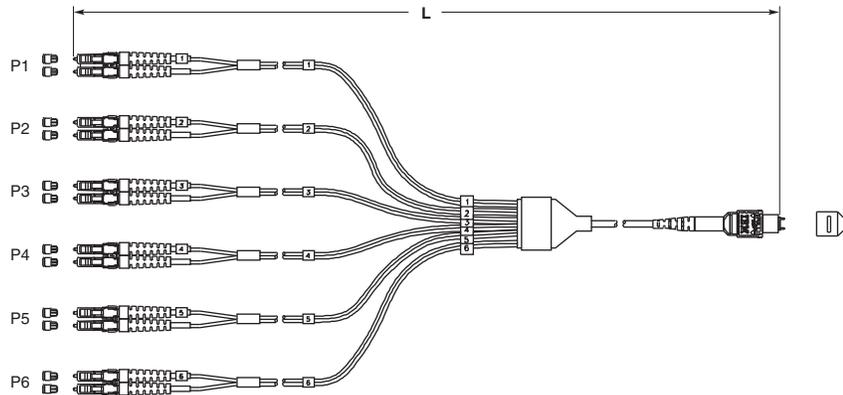
**MPO to LC Duplex
12 Fiber Straight Through on Round Cable**

## MPO Connectors and Adapters

### Product Facts

- **Tested to Telecordia GR-1435**
- **Push Pull Latching**
- **4, 8, 12, OR 24 fibers**
- **Color-coded housings differentiate singlemode and multimode:**
  - **Multimode — Beige**
  - **Singlemode — Green**
- **Manufactured to IEC Standards 61754-7 and TIA/EIA 604-5**
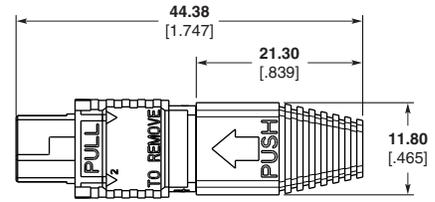
### Industry Standard

#### Performance Characteristics

**Singlemode**
**Insertion Loss (Typ.)** — 0.25 dB
**Insertion Loss (Max.)** — 0.75 dB
**Return Loss** — > 55 dB

**Multimode**
**Insertion Loss (Typ.)** — 0.2 dB
**Insertion Loss (Max.)** — 0.5 dB
**Return Loss** — > 20 dB



44.38 [1.747]
21.30 [.839]
11.80 [.465]

### MPO Connector Kit Selection — Plug Kits

| Fiber Type | Female (no pins) | Male (with pins) |
|---|---|---|
| Singlemode | 6457981-1 | 6457981-2 |
| Multimode | 6457983-1 | 6457983-2 |

**Note:** Ferrules and Mini-Boots are sold separately. See chart below for proper part numbers.



### MPO Ferrule Kit with Mini-Boot

| Fiber Type | 4 Position | 8 Position | 12 Position |
|---|---|---|---|
| Singlemode | 5492221-1 | 5492221-2 | 5492221-3 |
| Multimode | 5503839-1 | 5503839-2 | 5503839-3 |

### Crimping Tool with Dieset

| 1588698-1 |
|---|



### MPO Simplex Adapters

| Adapter Type | Part Number |
|---|---|
| Adapter w/flange | 1588172-1 |
| Adapter w/flange and clip | 1588172-2 |
| Adapter w/o flange | 1588172-3 |
| Adapter w/o flange and w/clip | 1588172-4 |

### MPO Quad 30°

| Adapter Type | Part Number |
|---|---|
| Adapter | 2064792-1 |

**Note:** All part numbers are RoHS compliant.

# PARA-OPTIX High Density Cable Assemblies

## Product Facts

- **Uses the latest generation MT-style ferrules**
- **Available in up to 72 fibers through a single MPO style connector**
- **Available in 24, 48, and 72 fiber**
- **Other fiber counts and lengths available**
- **Reduced space requirements**
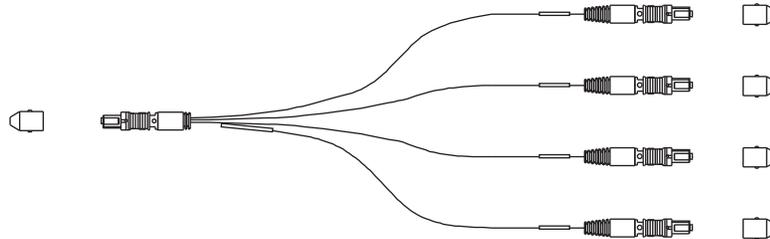- **Can provide cost benefit on a per-fiber basis**
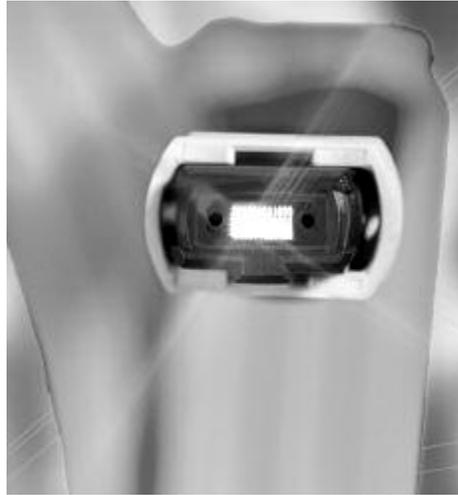
## Potential Applications

- **Jumpers and trunk cables for Data Centers**
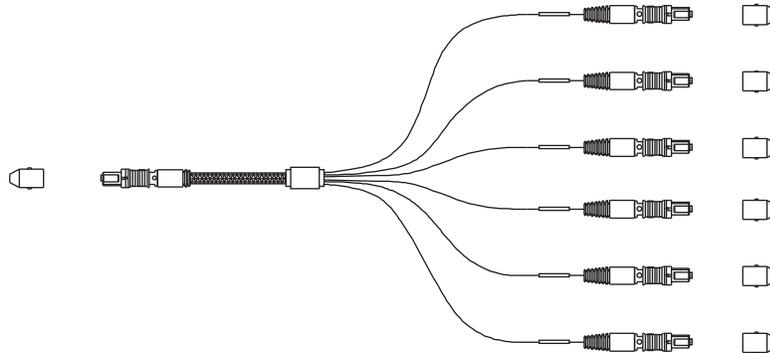- **Optical backplanes**
- **SAN Very Short Reach applications**

**Please contact your local Sales Representative or TE for detailed performance characteristics and specifications.**
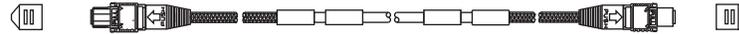
| Part Number | Description |
|---|---|
| 6588967-X | 24-fiber MPO-MPO, 50/125 Multimode |
| 6693069-X | 48-fiber MPO-MPO, 50-125 Multimode |
| 1919166-X | 72-fiber MPO-MPO, 50/125 Multimode |

| Part Number | Description |
|---|---|
| 6693068-X | 48-fiber MPO — (4), 12-fiber MPO, 50/125 bare ribbon |

| Part Number | Description |
|---|---|
| 6693067-X | 72-fiber MPO — (6), 12-fiber MPO, 50/125 bare ribbon |

**Note:** All part numbers are RoHS compliant.

**Note:** "X" above denotes length. Check latest version of TE's customer drawing or contact your local sales representative for specific lengths available.

# LIGHTRAY MPX Backplane Solutions

## Product Facts

- **LIGHTRAY MPX Interconnects offer a blindmate backplane solution**
- **A complete fiber optic system which is ideal for applications requiring customized solutions**
- **Features very small, high density LIGHTRAY MPX connectors**
- **Based on industry proven MT interconnection technology**
- **Can use both multimode (62.5/125 µm or 50/125 µm) and singlemode (9 µm) fiber, and is designed to meet Bellcore GR 1435**
- **Saves valuable board space on the PCB, backplane and I/O**
- **Suitable for blind mate (free floating) and bulkhead applications. Offers flexible fiber routing and management**
- **2.5 mm of daughter card axial travel is provided**
- **Misalignment pick-up tolerance are:**
  **± 2.0 mm horizontal**
  **± 2.5 mm vertical**
  **± 2 degree angular**
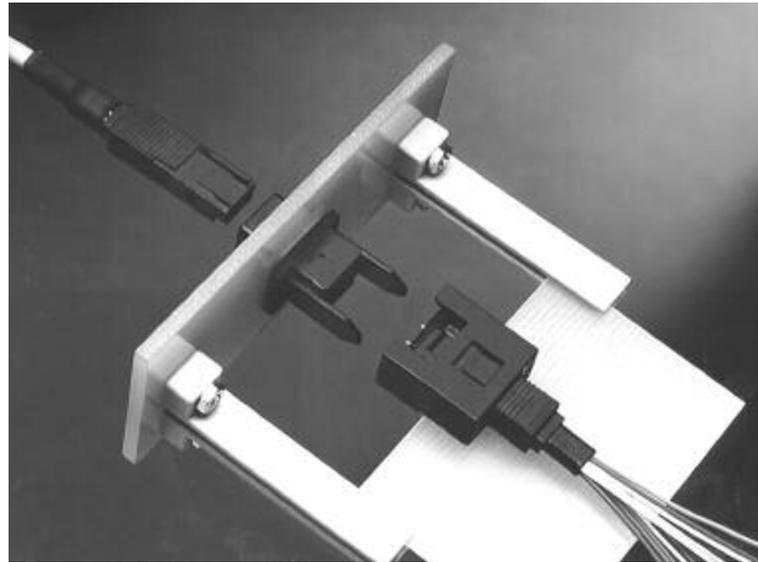


TE's LIGHTRAY MPX Interconnection System is designed for blind mate backplane and bulkhead dense fiber-to-fiber interconnect applications, including stand alone interconnections when used with bulkhead adapters.

The LIGHTRAY MPX Interconnection System offers maximum flexibility, making them ideal for customized requirements and solutions.

Based on the field-proven MT ferrule technology, the LIGHTRAY MPX Interconnection System features a miniature multi-fiber connector, which holds up to 24 fibers on 250 µm centers.

TE's LIGHTRAY MPX Interconnection System is multi-sourced and features fanout assemblies, mini trunk and trunk cable assemblies, pre-loaded enclosures, cable management systems, PC card connector housings and tooling, bulkhead adapters and transceiver modules and datalinks.
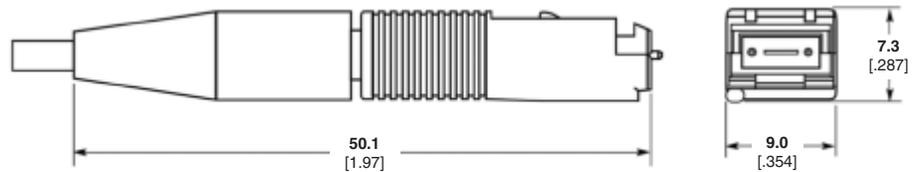


## LIGHTRAY MPX Connector



### Design Objectives

| Parameter | Value | | |
|---|---|---|---|
| | Multimode | Singlemode | Singlemode Low Loss |
| Insertion Loss, Mean (typical) | 0.20 dB | 0.25 dB | 0.20 dB |
| Insertion Loss, Max. | 0.50 dB | 0.75 dB | 0.30 dB / 0.5 dB* |
| Return Loss, Min. | 20 dB | 45 dB | 45 dB |
| Durability, | 0.3 dB CIT — 200 cycles | | |
| Straight Pull 2.2N | 0.3 dB change | | |
| Vibration, 10 to 55 Hz | 0.3 dB change | | |
| Temperature, Storage | -40° C to +85° C | | |
| Temperature Operating | -40° C to +85° C | | |
| Thermal Aging, 14 Days @ +85° C | 0.3 dB change | | |
| Humidity,14 days 95% Rh @ +60° C | 0.3 dB change | | |

* Low loss tested in-house to a maximum of 0.3 dB against a reference. 0.5 dB is maximum random mate loss.

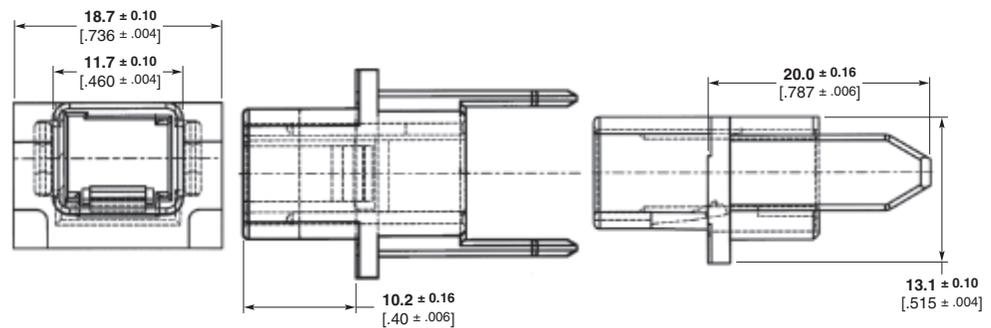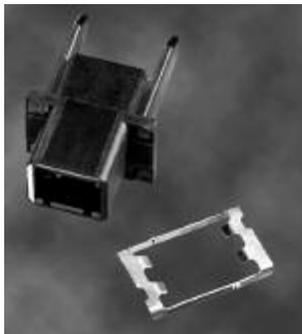## LIGHTRAY MPX Backplane Solutions (Continued)

**Bulkhead Coupling Adapter**

**Part Number 492305-1**

12.00 [.472]

23.00 [.906]  17.50 [.689]

Ø 2.35 [.093] 2 Plcs.

White Ink Stripe

3.00 [.118]

36.6 [1.44]
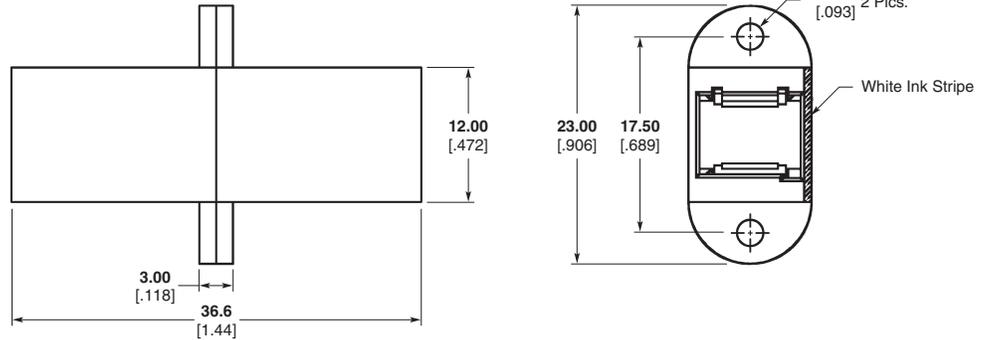
**Backplane Housings and Adapters**

**Backplane Housing — Simplex**

**Part Number 492739-1**

18.7 ± 0.10 [.736 ± .004]

11.7 ± 0.10 [.460 ± .004]

20.0 ± 0.16 [.787 ± .006]

10.2 ± 0.16 [.40 ± .006]

13.1 ± 0.10 [.515 ± .004]

**System Card Housing — Simplex**

**Part Number 492234-1**

**Top View**

**Side View**
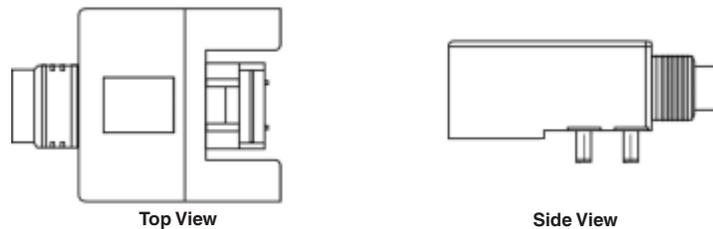
**Product Facts**

- Holds one standard or low loss LIGHTRAY MPX connector
- Simple press-fit mounting — no hardware needed
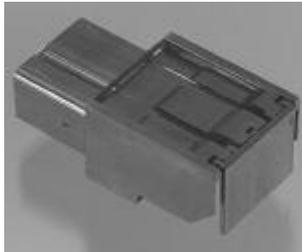- Unique latching provides positive retention when card is unmated
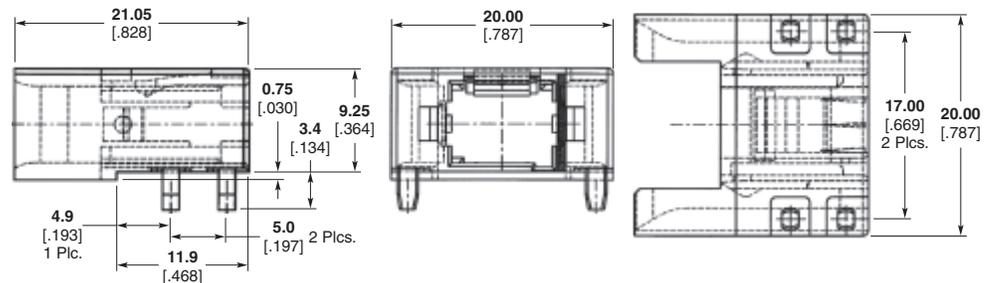
21.05 [.828]

0.75 [.030]

9.25 [.364]

3.4 [.134]

4.9 [.193] 1 Plc.

5.0 [.197] 2 Plcs.

11.9 [.468]

20.00 [.787]

17.00 [.669] 2 Plcs.

20.00 [.787]

**Note:** All part numbers are RoHS compliant.

## LIGHTRAY MPX Backplane Solutions (Continued)

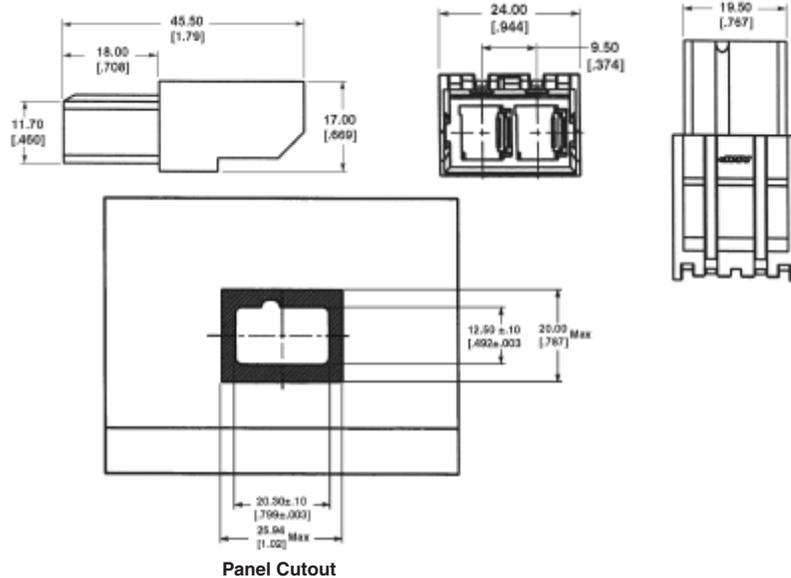**Backplane Housings and Adapters** (Continued)
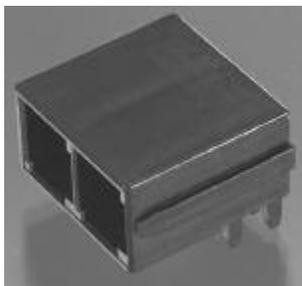
**Backplane Housing — Duplex**

**Product Facts**

■ Holds two standard or low loss LIGHTRAY MPX connectors

■ Optional self actuated laser safety shutter

■ Up to 48 fibers simultaneously mated and managed

■ Mates to part number 1374491-1

■ Used with clip part number 1278530-2

**Part Number 1374490-1 and 6374493-1 (with safety shutter)**
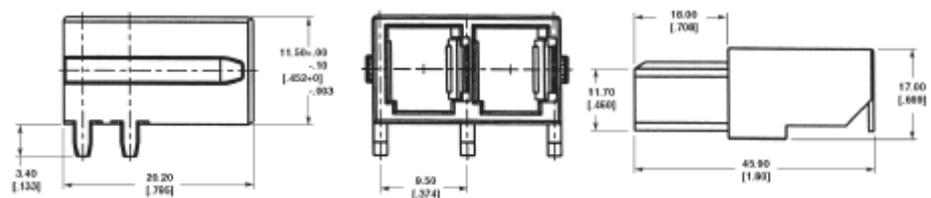
**Panel Cutout**

**System Card Housing — Duplex**

**Product Facts**

■ Holds two standard or low loss LIGHTRAY MPX connectors

■ Up to 48 fibers simultaneously mated and managed

**Part Number 1374491-1**

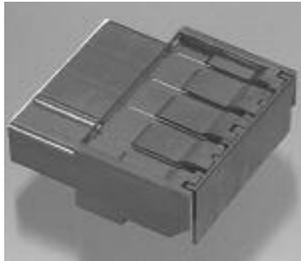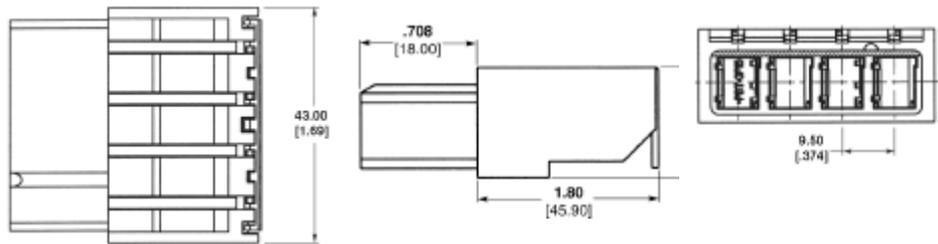**Note:** All part numbers are RoHS compliant.

## LIGHTRAY MPX Backplane Solutions (Continued)

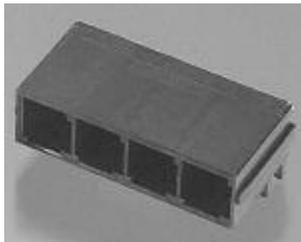### Backplane Housings and Adapters (Continued)
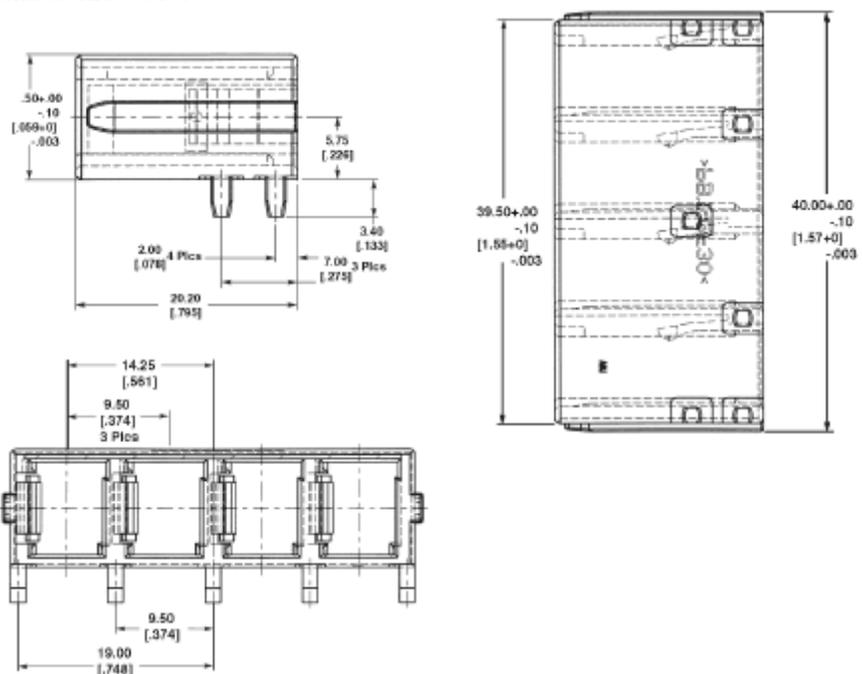
### Backplane Housing — Quad



**Product Facts**

■ Holds up to 4 standard or low loss LIGHTRAY MPX connectors

■ Self actuated laser-safe shutter

■ Up to 96 fibers simultaneously mated and managed

### Part Number 6278529-1



### System Card Housing — Quad



**Product Facts**

■ Holds 4 standard or low loss LIGHTRAY MPX connectors

■ Up to 96 fibers simultaneously mated and managed

### Part Number 1278391-1



**Note:** All part numbers are RoHS compliant.

21

Catalog 1307895
Revised 4-12

www.te.com

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in millimeters and inches unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## LIGHTRAY MPX Backplane Solutions (Continued)

**Fanout Assemblies**

**Product Facts**

- Multimode 62.5/125 µm and 50/125 µm
- Singlemode 9 µm, 8° angle interface
- Color coded buffered fiber or LSZH (Low Smoke Zero Halogen) sheathed cable with breakout kit
- Male LIGHTRAY MPX connectors (with guide pins)
- 4, 8, 12, 16 and 24 fibers
- Custom lengths available
- Connector labeling to guide insertion
- LC, SC, ST, FC or MT-RJ terminations available
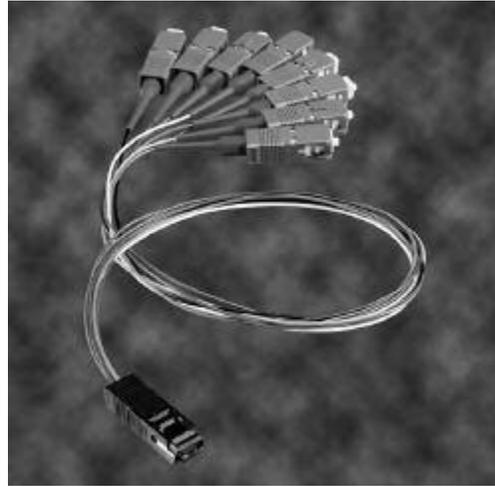
**Mini Trunk Assemblies**

**Product Facts**

- Multimode 62.5/125 µm and 50/125 µm
- Singlemode 9 µm, 8° angle interface
- 250 µm bare ribbon and LSZH (Low Smoke Zero Halogen) sheathed ribbon cable available
- Female LIGHTRAY MPX connectors (without guide pins)
- 4, 8, 12, 16 and 24 fibers
- Custom lengths available
- Connector labeling to guide insertion
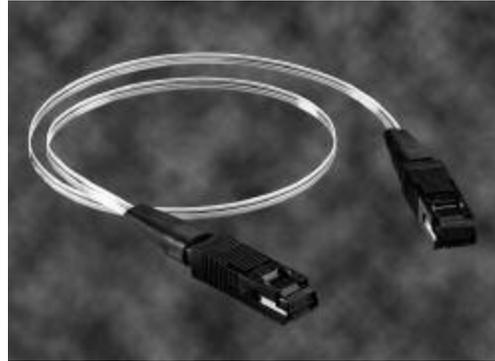
**Trunk Assemblies**

**Product Facts**

- Multimode 62.5/125 µm and 50/125 µm
- Singlemode 9 µm, 8° angle interface
- Available with female LIGHTRAY MPX connectors (without guide pins) and/or male LIGHTRAY MPX connectors (with guide pins)
- LC, SC, ST, FC or MT-RJ terminations available for hybrid configurations
- 4, 8 and 12 position ribbon fiber sub-units
- LSZH (Low Smoke Zero Halogen) sheathed cable (round construction)
- Internal/external cable
- Custom lengths available
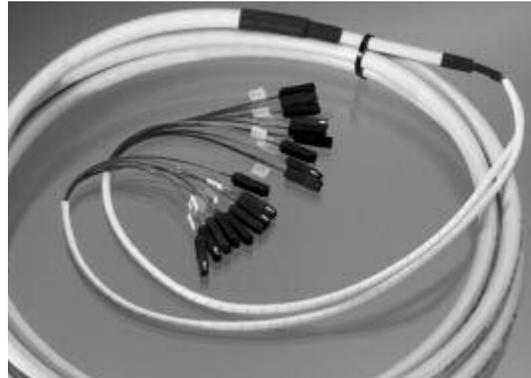
## LIGHTRAY MPX Backplane Solutions (Continued)



**Singlemode — Standard Loss LIGHTRAY MPX Pigtails**

### Singlemode — Standard Loss LIGHTRAY MPX Pigtails
Maximum Insertion Loss 1.0dB (1310nm)

| Description | Part Number |
|---|---|
| 4-fiber LIGHTRAY MPX (m) pigtail assy., 900 µm buffered fibers | 6457078-x |
| 8-fiber LIGHTRAY MPX (m) pigtail assy., bare ribbon | 6374392-x |
| 8-fiber LIGHTRAY MPX (f) pigtail assy., bare ribbon | 6374539-x |
| 8-fiber LIGHTRAY MPX (m) pigtail assy., 900 µm buffered fibers | 6374538-x |
| 8-fiber LIGHTRAY MPX (f) pigtail assy., 900 µm buffered fibers | 6374537-x |

**Singlemode — Low Loss LIGHTRAY MPX Pigtails**

### Singlemode — Low Loss LIGHTRAY MPX Pigtails
Maximum Insertion Loss 0.5dB (1310nm) Random Mate

| Description | Part Number |
|---|---|
| 8-fiber LIGHTRAY MPX (m) pigtail assy., bare ribbon | 6374448-x |
| 8-fiber LIGHTRAY MPX (f) pigtail assy., bare ribbon | 6374639-x |
| 8-fiber LIGHTRAY MPX (m) pigtail assy., 900 µm buffered fibers | 6457173-x |
| 8-fiber LIGHTRAY MPX (f) pigtail assy., 900 µm buffered fibers | 6457174-x |

**Note:** All assemblies are customer built to customer's length specifications. Dash number indicated length. Please contact TE for proper dash number.



**Singlemode — Standard Loss LIGHTRAY MPX to MPX Cable Assemblies Bare Ribbon**

### Singlemode — Standard Loss LIGHTRAY MPX to MPX Cable Assemblies Bare Ribbon
Maximum Insertion Loss 1.0dB (1310nm)

| Description | Part Number |
|---|---|
| 8-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon | 6457394-x |
| 8-fiber LIGHTRAY MPX (f) to LIGHTRAY MPX (f) assy., bare ribbon | 6374600-x |
| 12-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon | 6374743-x |

**Singlemode — Low Loss LIGHTRAY MPX to MPX Cable Assemblies**

### Singlemode — Low Loss LIGHTRAY MPX to MPX Cable Assemblies
Maximum Insertion Loss 0.5dB (1310nm) Random Mate

| Description | Part Number |
|---|---|
| 4-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon | 6457398-x |
| 8-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon | 6374738-x |

**Note:** All assemblies are customer built to customer's length specifications. Dash number indicated length. Please contact TE for proper dash number.

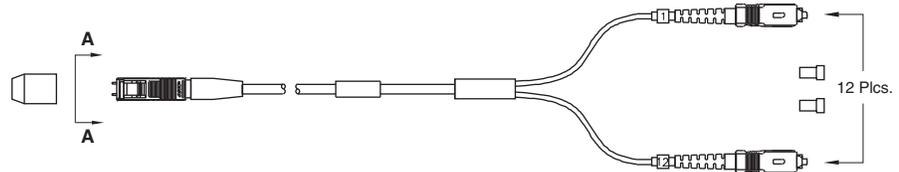**Note:** All part numbers are RoHS compliant.

## LIGHTRAY MPX Backplane Solutions (Continued)



**Singlemode — Standard Loss LIGHTRAY MPX to MPX Cable Assemblies Jacketed**

**Singlemode — Standard Loss LIGHTRAY MPX to MPX Cable Assemblies Jacketed**
**Maximum Insertion Loss 1.0dB (1310nm)**

| Description | Part Number |
|---|---|
| 8-fiber LIGHTRAY MPX (f) to LIGHTRAY MPX (f) assy., jacketed ribbon | 6374887-x |



12 Plcs.

**Singlemode — Standard Loss LIGHTRAY MPX to SC Cable Assemblies**

**Singlemode — Standard Loss LIGHTRAY MPX to SC Cable Assemblies**
**Maximum Insertion Loss 1.0dB (1310nm)**

| Description | Part Number |
|---|---|
| 12-fiber LIGHTRAY MPX (m) assy. To (12) SC, ruggedized | 5492515-x |

**Note:** All part numbers are RoHS compliant.

## LIGHTRAY MPX Backplane Solutions (Continued)

**Dust Covers**

| Description | | Part Number |
|---|---|---|
| **Simplex** | | |
| System Card | Board Side | 1278201-1 |
| | Backplane Side | 492578-1 |
| Backplane | Inside Cage | 492575-1 (no insert) |
| | | 5492576-1 (with insert) |
| | | 503967-5 (removal tool) |
| | Back of Cage | 5502871-1 |
| **Duplex** | | |
| System Card | Board Side | 5502871-1 |
| | Backplane Side | 1374674-1 |
| Backplane | Inside Cage | 6374671-1 |
| | Back of Rack | 5502871-1 |
| **Quad** | | |
| System Card | Board Side | 5502871-1 |
| | Backplane Side | 1374547-1 |
| Backplane | Inside Cage | 6374548-1 |
| | Back of Rack | 5502871-1 |
| **Bulkhead** | | 5502871-1 |
| **Cable** | | 492577-1 (without strap) |
| | | 492577-2 (with strap) |

**Cleaning Kit**

**Product Facts**

- **2 re-useable cleaning kit assemblies**
- **2 LIGHTRAY MPX bulkhead adapters**
- **2 LIGHTRAY MPX backplane housings**
- **1 pack of 24 cleaning tool inserts (can be ordered separately)**



| Description | Part Number |
|---|---|
| LIGHTRAY MPX Cleaning Kit | 1278498-1 |
| Cleaning Inserts (24/pack) | 1457019-3 |

**Connector Microscope Adapters**

**Product Facts**

- **Designed specifically for the LIGHTRAY MPX Connector**
- **Fits in standard TE's microscope Part Number 1754767-1**
- **200 x power**

| Description | Part Number* |
|---|---|
| Microscope Adapter | 1828834-1 |
| Microscope Adapter (angled) | 1828835-1 |

* Coupling adapter Part Number 1985041-1 required.

**Note:** All part numbers are RoHS compliant.

## Cleaners

### MTP/MPO IBC Cleaner
### Part Number 1918809-1

#### Product Facts

- **Cleans male or female MTP/MPO connectors**
- **Pre-washed cleaning cloth is lint and debris free**
- **Each cleaner is capable of more than 400 cleanings**
- **Can be used for bulkhead and unmated MTP/MPO cleaning**
- **Protective dust cover doubles as an adapter cap for cleaning unmated connectors**
- **FOCIS 5-Type MTP/MPO interface compliant**
- **Removes dust and oil contamination**
- **Ideal solution for cleaning parallel optics transceivers**

MTP is a trademark of US Conec Ltd.



The MTP/MPO IBC (In Bulkhead Cleaner) dry cloth cleaner offered by TE utilizes a densely woven micro-fiber cloth that cleans male (with pins) or female MTP/MPO connectors while in adapters, bulkheads, faceplates, or in unmated form with the unique adapter/dust cover. The unique cleaning cloth also reduces static charge making it one of the most advanced cleaning systems available for bulkhead optical connector cleaning.

#### Applications

For effective cleaning of:

- Male and female MTP/MPO connectors inside mating adapters
- Unmated male and female MTP/MPO connectors using included adapter

- Parallel optics transceivers
- Networking gear including switches and routers
- Factory or field connectors

#### Product Dimensions

**Length** — 184.2 mm [7.25 in.]
**Width** — 56.5 mm [2.22 in.]
**Thickness** — 22 mm [0.866 in.]
**Adapter Length** — 19.5 mm [0.759 in.]

---

### OPTIPOP R Reel Cleaner

#### Product Facts

- **Static attraction is minimized**
- **Ultra clean micro-fiber cloth captures debris and other contamination**
- **Robust cloth does not fray or leave fibrous material behind**
- **Reduces the number of field and test issues caused by contaminated end faces**
- **High-end cost effective cleaning solution**



**Reel Cleaner Refill (Six per Pack)**
**Part Number 1918806-1**

OPTIPOP is a trademark of NTT Advanced Technology Corporation.



The OPTIPOP R dry cloth cassette cleaners offered by TE utilize a densely woven micro-fiber cloth that cleans fiber optic connector tips while reducing static charge. This makes them one of the most advanced cleaning systems available for optical connector cleaning.

#### Applications

A variety of reel cleaner configurations allow for use on the major optical connector types including FC, SC, ST, LC, MU, ODVA conforming, MT-RJ SECURE connectors, and MPO.

#### Product Dimensions

**Length** — 127 mm [5.00 in.]
**Width** — 83 mm [3.26 in.]
**Thickness** — 48 mm [1.89 in.]
**Weight** — 150 g [0.33 lb.]

| Description | Part Number |
|---|---|
| MPO w/pins reel cleaner | 1918802-1 |
| One slot reel cleaner; 1.25 mm, 2.5 mm, MT No Pins | 1918803-1 |
| Reel cleaner refill (six per pack) | 1918806-1 |

**Note:** All part numbers are RoHS compliant.

## Simplex and Duplex Fiber Assemblies

### LC Cable Assemblies

| Simplex / Duplex | Cable Type | Side A | Side B | Jacket Type | Part Number | Part Numbers/Lengths (m) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 3 | 5 | 10 |
| Simplex | Singlemode | LC | LC | 900 micron | X-2064843-X | 2064843-1 | 2064843-3 | 2064843-5 | 1-2064843-0 |
| | | | | 2 mm jacketed riser | X-2064844-X | 2064844-1 | 2064844-3 | 2064844-5 | 1-2064844-0 |
| | | LC | SC | 900 micron | X-2064845-X | 2064845-1 | 2064845-3 | 2064845-5 | 1-2064845-0 |
| | | | | 2 mm jacketed riser | X-2064846-X | 2064846-1 | 2064846-3 | 2064846-5 | 1-2064846-0 |
| | | LC | FC | 2 mm jacketed riser | X-2064847-X | 2064847-1 | 2064847-3 | 2064847-5 | 1-2064847-0 |
| | | LC / APC | LC / APC | 2 mm jacketed riser | X-2064869-X | 2064869-1 | 2064869-3 | 2064869-5 | 1-2064869-0 |
| | | LC / APC | SC / APC | 2 mm jacketed riser | X-2064870-X | 2064870-1 | 2064870-3 | 2064870-5 | 1-2064870-0 |
| | | LC / APC | FC / APC | 2 mm jacketed riser | X-2064871-X | 2064871-1 | 2064871-3 | 2064871-5 | 1-2064871-0 |
| | 50/125 Multimode | LC | LC | 2 mm jacketed riser | X-2064848-X | 2064848-1 | 2064848-3 | 2064848-5 | 1-2064848-0 |
| | | LC | SC | 2 mm jacketed riser | X-2064849-X | 2064849-1 | 2064849-3 | 2064849-5 | 1-2064849-0 |
| | 62.5/125 Multimode | LC | LC | 900 micron | X-2064850-X | 2064850-1 | 2064850-3 | 2064850-5 | 1-2064850-0 |
| | | LC | LC | 2 mm jacketed riser | X-2064851-X | 2064851-1 | 2064851-3 | 2064851-5 | 1-2064851-0 |
| | | LC | SC | 2 mm jacketed riser | X-2064852-X | 2064852-1 | 2064852-3 | 2064852-5 | 1-2064852-0 |
| Duplex | Singlemode | LC | LC | 2 mm jacketed riser | X-2064853-X | 2064853-1 | 2064853-3 | 2064853-5 | 1-2064853-0 |
| | | LC | SC | 2 mm jacketed riser | X-2064854-X | 2064854-1 | 2064854-3 | 2064854-5 | 1-2064854-0 |
| | | LC | ST | 2 mm jacketed riser | X-2064856-X | 2064856-1 | 2064856-3 | 2064856-5 | 1-2064856-0 |
| | 50/125 Multimode | LC | LC | 2 mm jacketed riser | X-2064858-X | 2064858-1 | 2064858-3 | 2064858-5 | 1-2064858-0 |
| | | LC | SC | 2 mm jacketed riser | X-2064859-X | 2064859-1 | 2064859-3 | 2064859-5 | 1-2064859-0 |
| | | LC | ST | 2 mm jacketed riser | X-2064860-X | 2064860-1 | 2064860-3 | 2064860-5 | 1-2064860-0 |
| | | LC | MT-RJ | 1.8 mm jacketed riser | X-2064861-X | 2064861-1 | 2064861-3 | 2064861-5 | 1-2064861-0 |
| | 50/125 OM3 10Gig Fiber | LC | LC | 2 mm jacketed riser | X-2064862-X | 2064862-1 | 2064862-3 | 2064862-5 | 1-2064862-0 |
| | | LC | SC | 2 mm jacketed riser | X-2064863-X | 2064863-1 | 2064863-3 | 2064863-5 | 1-2064863-0 |
| | 62.5/125 Multimode | LC | LC | 2 mm jacketed riser | X-2064865-X | 2064865-1 | 2064865-3 | 2064865-5 | 1-2064865-0 |
| | | LC | SC | 2 mm jacketed riser | X-2064866-X | 2064866-1 | 2064866-3 | 2064866-5 | 1-2064866-0 |
| | | LC | ST | 2 mm jacketed riser | X-2064867-X | 2064867-1 | 2064867-3 | 2064867-5 | 1-2064867-0 |
| | | LC | MT-RJ | 1.8 mm jacketed riser | X-2064868-X | 2064868-1 | 2064868-3 | 2064868-5 | 1-2064868-0 |

Additional lengths available.  See TE specification 1206850 for more details.

### LC Loopback Cables

| Simplex / Duplex | Cable Type | Side A | Side B | Jacket Type | Part Number |
|---|---|---|---|---|---|
| LC Loopback Cables | Singlemode | LC | N/A | N/A | 2064872-1 |
| | 62.5/125 Multimode | LC | N/A | N/A | 2064873-1 |
| | 50/125 Multimode | LC | N/A | N/A | 2064874-1 |

### SC Loopback Cables

| Simplex / Duplex | Cable Type | Side A | Side B | Jacket Type | Part Number |
|---|---|---|---|---|---|
| SC Loopback Cables | Singlemode | SC | N/A | N/A | 5504883-1 |
| | 62.5/125 Multimode | SC | N/A | N/A | 5503141-2 |
| | 50/125 Multimode | SC | N/A | N/A | 5503141-1 |

**Note:** All part numbers are RoHS compliant.

## Engineering Notes

Dimensions are shown for
reference purposes only.
Specifications subject
to change.

Dimensions are in millimeters
and inches unless otherwise
specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## Table of Contents

**Connectors, Adapters, Tooling & Accessories**

**2**

## LC Connector Kits

### LC Connector Kits — Standard Kits

**Product Facts**

- **Singlemode Telcordia GR-326 Tested (Report 501-652)**
- **Multimode TIA/EIA 568B.3 tested**
- **Components packaged in 25 piece bags for easy access**
- **Same one-piece connector body for jumper and buffer**
- **Field installable duplex clip**
- **Compatible with anaerobic adhesives**
- **Mates with LC adapters (pages 34-35), LC Transceivers**

**Performance (typical)**
**Insertion Loss** — 0.2dB
**Reflectance** — -55dB
**Operating Temperature** — -40° C to +75° C

**Material**
**Ferrule** — Zirconia
**Housing** — UL 94 V-O rated thermoplastic

**Length —**
**Ferrule Tip to End of Boot**
**900 µm Buffered** — 31.5 mm
**2.0 mm Jacketed** — 52.0 mm
**3.0 mm Jacketed** — 51.0 mm

| Description | Fiber Type | Housing Color | Boot Color | Used with | Assembly Pack Part Number |
|---|---|---|---|---|---|
| Simplex | Singlemode | Blue | Blue | 900 µm Buffered | 2064937-1 |
| | | | | 1.6-2.0 mm Jacketed | 2064937-2 |
| | | | | 3.0 mm Jacketed | 2064937-3 |
| | Multimode | Beige | Beige | 900 µm Buffered | 2064938-1 |
| | | | | 1.6-2.0 mm Jacketed | 2064938-2 |
| | | | | 3.0 mm Jacketed | 2064938-3 |
| Duplex | Singlemode | Blue | Blue | 900 µm Buffered | 2-2064937-1 |
| | | | | 1.6-2.0 mm Jacketed | 2-2064937-2 |
| | | | | 3.0 mm Jacketed | 2-2064937-3 |
| | Multimode | Beige | Beige | 900 µm Buffered | 2-2064938-1 |
| | | | | 1.6-2.0 mm Jacketed | 2-2064938-2 |
| | | | | 3.0 mm Jacketed | 2-2064938-3 |

### LC Connector Kits — Short Boot Kits

**Product Facts**

- **Ferrule Tip to End of Boot Length: 42.5 mm**
- **27.45 mm adapter to end of boot**
- **GR-326 small form factor requirements**
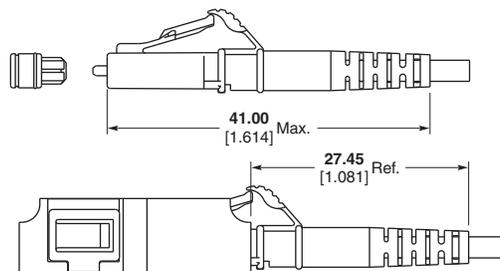
41.00 [1.614] Max.

27.45 [1.081] Ref.

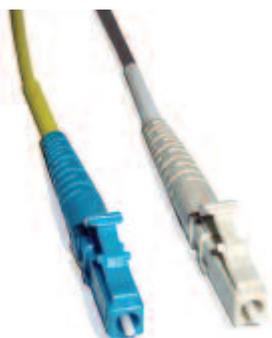| Description | Fiber Type | Housing Color | Boot Color | Used with | Installation Pack Part Number |
|---|---|---|---|---|---|
| Simplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 1918407-1 |
| | Multimode | Beige | Beige | 1.6-2.0 mm Jacketed | 1918405-1 |
| Duplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 1918406-1 |
| | Multimode | Beige | Beige | 1.6-2.0 mm Jacketed | 1918404-1 |

**Note:** All part numbers are RoHS compliant.

## LC Connector Kits (Continued)

### LC Connector Kits — Tight Jacketed Kits

**Product Facts**

- **Non pull-proof connector for use with tight jacketed fiber cable**
- **Allows jacket and buffer to move together to prevent micro-bends and fiber breakage**
- **LC Commercial Item Description (CID) interim approval by Naval Surface Warfare Center, Dahlgren Division**
- **Tested using MIL-PRF-85045/16 2.0 mm cable**

**Applications**

- **In flight networks**
- **Shipboard applications**
- **Aero market**

**Material**

**Ferrule** — Zirconia

**Housing** — UL 94 V-O rated thermoplastic

**Length — Ferrule Tip to End of Boot: 52.0 mm**

**Engineering Report**
502-1191

| Description | Fiber Type | Housing Color | Boot Color | Used with | Individual Pack Part Number | Bulk Pack Part Number |
|---|---|---|---|---|---|---|
| Simplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 6828095-1 | 6828095-2 |
| | | | | 2.4 mm Jacketed | 1918228-1 | 1918228-2 |
| | Multimode | Beige | Beige | 1.6-2.0 mm Jacketed | 6828094-1 | 6828094-2 |
| | | | | 2.4 mm Jacketed | 1918153-1 | 1918153-2 |
| Duplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 6828130-1 | 6828130-2 |
| | Multimode | Beige | Beige | 1.6-2.0 mm Jacketed | 6828129-1 | 6828129-2 |

### LC Connector Kits — Ultra Short LC

**Product Facts**

- **Ferrule tip to end of boot length 37.5 mm**
- **GR-326 small form factor requirements**
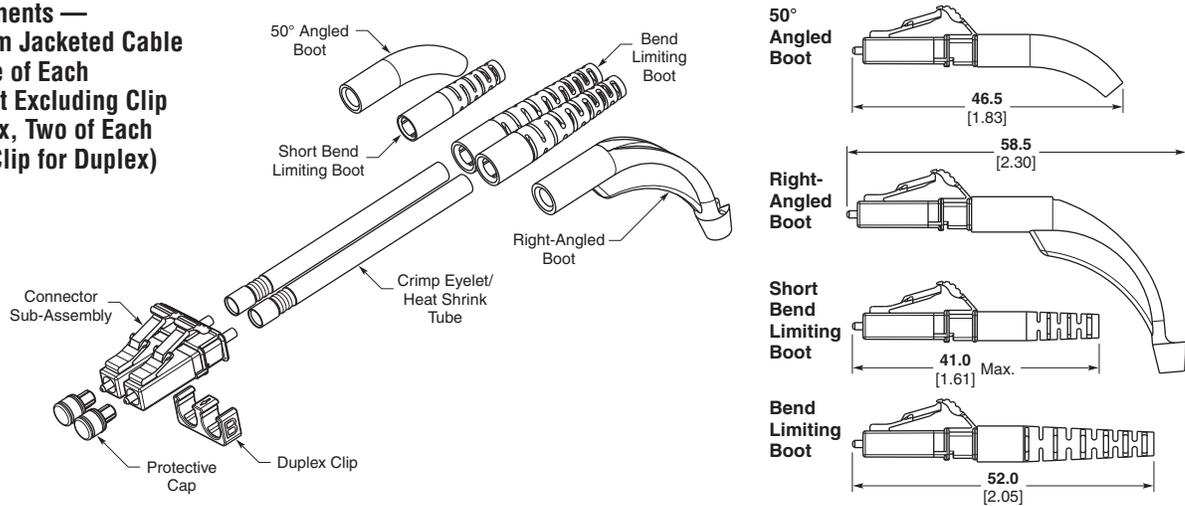- **Ideal for cabinets with limited space**
- **Call for details about duplex connectors**
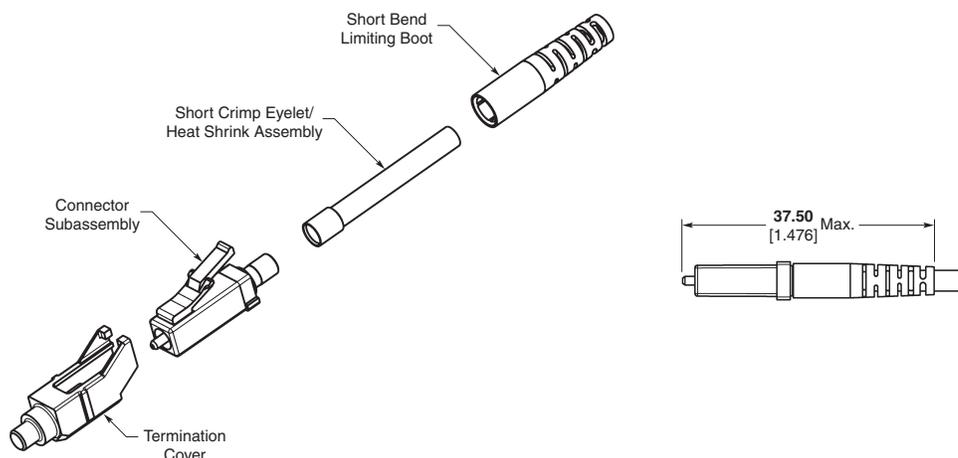
Short Bend Limiting Boot

Short Crimp Eyelet/ Heat Shrink Assembly

Connector Subassembly

Termination Cover

37.50 [1.476] Max.

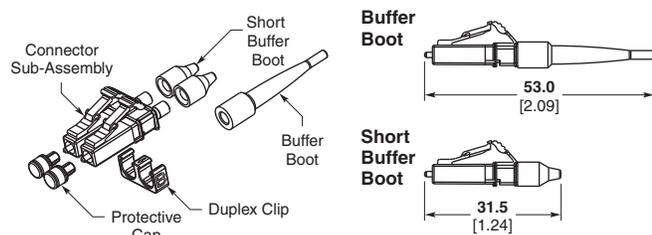| Description | Fiber Type | Housing Color | Boot Color | Used with | Installation Pack Part Number |
|---|---|---|---|---|---|
| Simplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 2064687-1 |

**Note:** All part numbers are RoHS compliant.

## LC Connector Components

**LC Components —
1.6-2.4 mm Jacketed Cable
(Order One of Each
Component Excluding Clip
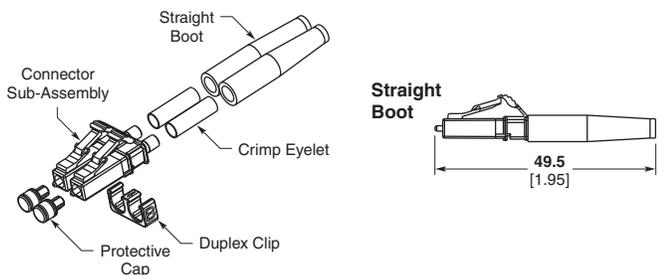for Simplex, Two of Each
Plus One Clip for Duplex)**



50° Angled Boot
Short Bend Limiting Boot
Bend Limiting Boot
Right-Angled Boot
Connector Sub-Assembly
Crimp Eyelet/ Heat Shrink Tube
Protective Cap
Duplex Clip

**50° Angled Boot**
46.5 [1.83]

**Right-Angled Boot**
58.5 [2.30]

**Short Bend Limiting Boot**
41.0 [1.61] Max.

**Bend Limiting Boot**
52.0 [2.05]

| Fiber Type | Simplex Connector Sub-Assembly & Protective Cap | Duplex Clip | Cable Size | Crimp Eyelet with Heat Shrink Tube | Boot Description | Boot Part Number (see chart page 33) |
|---|---|---|---|---|---|---|
| Singlemode (Blue Hsg.) | 1828456-1 | 1754371-4 | 1.6-2.0 mm | 1918918-2 | Short Bend Limiting | 1918403-x |
| | | | 1.6-2.0 mm | 6374150-2 | Bend Limiting | 1588153-x |
| | | | | | Right-Angled | 1374737-x |
| | | | | | 50 Degree Angled | 6457543-x |
| | | | 2.4 mm | 6588189-1 | Bend Limiting | 1588153-x |
| | | | | | Right-Angled | 1374737-x |
| | | | | | 50 Degree Angled | 6457543-x |
| Multimode (Beige Hsg.) | 1754625-1 | 1754371-5 | 1.6-2.0 mm | 1918918-1 | Short Bend Limiting | 1918403-x |
| | | | 1.6-2.0 mm | 6374150-1 | Bend Limiting | 1588153-x |
| | | | | | Right-Angled | 1374737-x |
| | | | | | 50 Degree Angled | 6457543-x |
| | | | 2.4 mm | 6588189-1 | Bend Limiting | 1588153-x |
| | | | | | Right-Angled | 1374737-x |
| | | | | | 50 Degree Angled | 6457543-x |



Connector Sub-Assembly
Short Buffer Boot
Buffer Boot
Protective Cap
Duplex Clip

**Buffer Boot**
53.0 [2.09]

**Short Buffer Boot**
31.5 [1.24]

**LC Components — 900 µm Buffered Fiber
(Order One of Each Component Excluding Clip for Simplex,
Two of Each Plus One Clip for Duplex)**

| Fiber Type | Simplex Connector Sub-Assembly & Protective Cap | Duplex Clip | Boot Description | Boot Part Number (see chart page 33) |
|---|---|---|---|---|
| Singlemode (Blue Hsg.) | 1828456-1 | 1754371-4 | Buffer | 1828184-x |
| | | | Short Buffer | 6588612-x |
| Multimode (Beige Hsg.) | 1754625-1 | 1754371-5 | Buffer | 1828184-x |
| | | | Short Buffer | 6588612-x |



Straight Boot
Connector Sub-Assembly
Crimp Eyelet
Protective Cap
Duplex Clip

**Straight Boot**
49.5 [1.95]

**LC Components — 3.0 mm Jacketed Cable
(Order One of Each Component Excluding Clip for Simplex,
Two of Each Plus One Clip for Duplex)**

| Fiber Type | Simplex Connector Sub-Assembly & Protective Cap | Duplex Clip | Crimp Eyelet | Boot Part Number (see chart page 33) |
|---|---|---|---|---|
| Singlemode (Blue Hsg.) | 1828456-1 | 1754371-4 | 5504118-3 | 502716-x |
| Multimode (Beige Hsg.) | 1754625-1 | 1754371-5 | 5504118-3 | 502716-x |

**Instruction Sheet:** 408-8675

**Note:** All part numbers are RoHS compliant.

## LC Connector Components (Continued)

**Connectors, Adapters, Tooling & Accessories**

**2**

### LC Components — 1.6 to 2.4 mm Boots

**21.00 [.827]**

**Short Bend Limiting Boot for 1.6 to 2.0 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 1918403 | -2 | -1 | — |

**37.00 [1.457]**

**Right-Angled Boot for 1.6 to 2.4 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 1374737 | -2 | -1 | -3 |

**30.50 [1.200]**
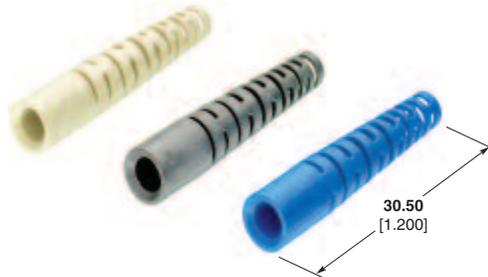
**Bend Limiting Boot for 1.6 to 2.4 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 1588153 | -5 | -2 | -3 |

**25.14 [.990]**

**50 Degree Angle Boot for 1.6 to 2.4 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 6457543 | -1 | -2 | -4 |

### LC Components — 900 μm Boots

**31.5 [1.240]**

**Buffer 900 μm Boot**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 1828184 | -4 | -1 | -2 |

**10.25 [.404]**

**Short Buffer 900 μm Boot**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 6588612 | -1 | -2 | -5 |

### LC Components — 3.0 mm Boots

**30.00 [1.181]**
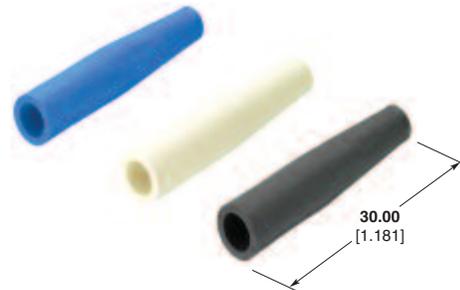
**Straight Boot for 3.0 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 502716 | -3 | -4 | -1 |

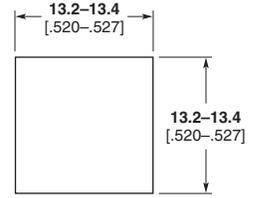**Note:** All part numbers are RoHS compliant.

# LC Adapters

### LC Duplex Adapter for SC Cutout — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Metal | Flanged | Beige | 6457567-8 |
| | | Black | 2-6457567-1 |
| | | Aqua | 2-6457567-0 |
| | | Blue | 1-6457567-3 |
| | Flangeless | Beige | 6457567-7 |
| | | Black | 1-6457567-9 |
| | | Aqua | 1-6457567-8 |
| Ceramic | Flanged | Beige | 6457567-5 |
| | | Black | 1-6457567-7 |
| | | Aqua | 1-6457567-6 |
| | | Blue | 6457567-4 |
| | | Green | 6457567-6 |
| | Flangeless | Beige | 6457567-2 |
| | | Black | 1-6457567-5 |
| | | Aqua | 1-6457567-4 |
| | | Blue | 6457567-1 |
| | | Green | 6457567-3 |

**13.0–13.5** [.512–.531]
**18.00** [.709]
**9.5–10.0** [.375–.393]
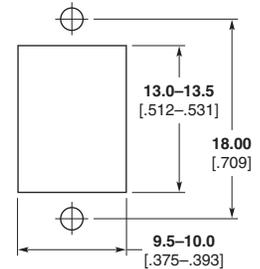
**Recommended Panel Cutout Max. Panel Thk. 1.70 [.067]**

### Shuttered LC Duplex Adapter for SC Cutout — Plastic

| Alignment Sleeve Material | Description | Housing Color | Shutter Label Color | Part Number |
|---|---|---|---|---|
| Ceramic | Flanged | Beige | Beige | 2064658-5 |
| | | Black | Beige | 1-2064658-7 |
| | | Aqua | Aqua | 1-2064658-6 |
| | | Blue | Blue | 2064658-4 |
| | | Green | Green | 2064658-6 |
| | Flangeless | Beige | Beige | 2064752-2 |
| | | Black | Beige | 1-2064752-3 |
| | | Aqua | Aqua | 1-2064752-4 |
| | | Blue | Blue | 2064752-1 |
| | | Green | Green | 2064752-3 |

**10.90** [.429] Ref.
**31.30** [1.232]
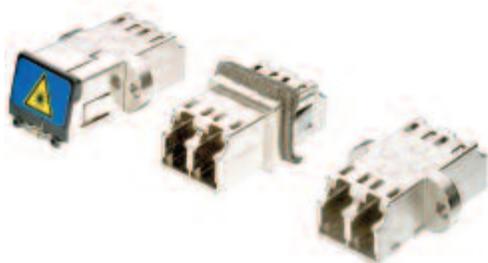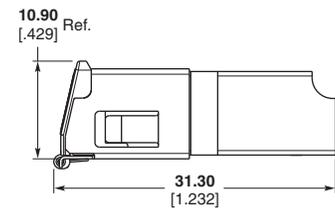
### LC Duplex Adapter for SC Cutout — Metal

| Alignment Sleeve Material | Description | Housing Color | Part Number |
|---|---|---|---|
| Ceramic | Flanged | Electroless Nickel | 1754683-1 |
| | Flangeless | | 1754682-1 |
| | Flanged with Shutter | | 2064685-1 |
| | Flangeless with EMI Shield | | 1754727-1 |

**13.0–13.5** [.512–.531]
**18.00** [.709]
**9.5–10.0** [.375–.393]
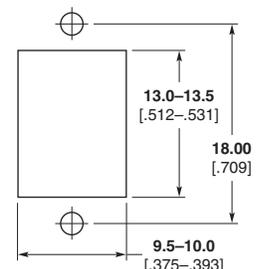
**Recommended Panel Cutout Max. Panel Thk. 1.70 [.067]**

**Note:** All part numbers are RoHS compliant.

## LC Adapters (Continued)
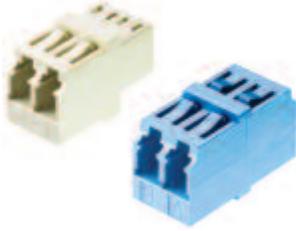
### LC Duplex Adapter for LC Cutout — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Metal | Duplex Sr-Jr | Beige | 1985150-4 |
| | | Blue | 1985150-3 |
| | Duplex Sr-Sr | Beige | 1985149-4 |
| | | Blue | 1985149-3 |
| Ceramic | Duplex Sr-Jr | Beige | 1985150-2 |
| | | Blue | 1985150-1 |
| | Duplex Sr-Sr | Beige | 1985149-2 |
| | | Blue | 1985149-1 |

**13.2–13.4 [.520–.527]**
**13.2–13.4 [.520–.527]**

**Recommended Panel Cutout**
**Panel Thk. 1.2/1.7 [.047/.067]**

### LC Simplex Adapter — Plastic

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Ceramic | Simplex Adapter | Beige | 1457062-2 |
| | | Blue | 1457062-1 |

**7.1–7.2 [.280–.283]**
**11.7–11.8 [.461–.465]**
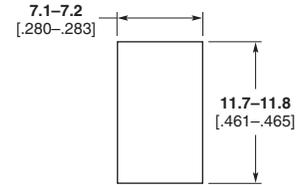
**Recommended Panel Cutout**
**Panel Thk. 1.2/1.7 [.047/.067]**
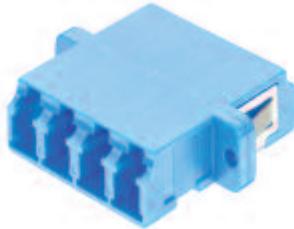
### LC Quad Adapter — Plastic Flanged

| Alignment Sleeve Material | Description | Housing Color | Part Numbers |
|---|---|---|---|
| Metal | Flanged | Beige | 1695790-5 |
| Ceramic | Flanged | Blue | 1695790-4 |

**Note:** All part numbers are RoHS compliant.

**26.3–26.8 [1.035–1.055]**
**30.7 ± 0.10 [1.209 ± .004]**

**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

**Connectors, Adapters, Tooling & Accessories**

**2**

**Note:** All part numbers are RoHS compliant.

# SC Connector Kits

## SC Connector Kits — Standard Kits

### Product Facts

- **Compliant with**
  - **JIS C-5973**
  - **Fibre Channel**
  - **TIA FOCIS-3**
- **One-piece connector body**
- **Compatible with anaerobic adhesives**
- **Instruction Sheet 408-8674**
- **Components packaged in 25 piece bags for easy access**
- **Field installable duplex clip (6348522-1) available**
- **Mates with SC adapters (pages 39-41), SC Transceivers**
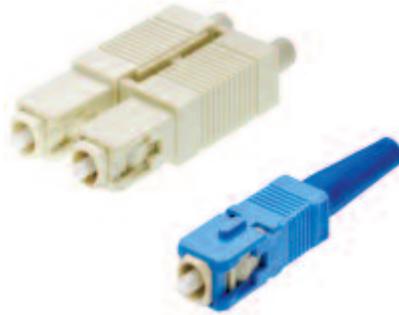
### Performance (typical)
**Insertion Loss** — 0.2dB
**Reflectance** — -55dB
**Operating Temperature** — -40° C to +75° C

### Material
**Ferrule** — Zirconia
**Housing and Connector Body** — UL 94 V-O rated thermoplastic

**Length —**
**Ferrule Tip to End of Boot**
**900 µm Buffered** — 54 mm
**2.0 mm Jacketed** — 50 mm
**3.0 mm Jacketed** — 50 mm

| Description | Fiber Type | Housing Color | Boot Color | Used with | Assembly Pack Part Number |
|---|---|---|---|---|---|
| Simplex | Singlemode | Blue | Blue | 900 µm Buffered | 2064939-1 |
| | | | | 2.0 mm Jacketed | 2064939-2 |
| | | | | 3.0 mm Jacketed | 2064939-3 |
| | Multimode | Beige | Beige | 900 µm Buffered | 2064940-1 |
| | | | | 2.0 mm Jacketed | 2064940-2 |
| | | | | 3.0 mm Jacketed | 2064940-3 |
| Duplex | Singlemode | Blue | Blue | 2.0 mm Jacketed | 5504936-2 |
| | | | | 3.0 mm Jacketed | 5504655-2 |
| | Multimode | Beige | Beige | 2.0 mm Jacketed | 5504927-1 |
| | | | | 3.0 mm Jacketed | 5504657-1 |

## SC Connector Kits — Tight Jacketed Kits

### Product Facts

- **Non pull-proof connector for use with tight jacketed fiber cable**
- **Allows jacket and buffer to move together to prevent micro-bends and fiber breakage**
- **SC Commercial Item Description (CID) interim approval by Naval Surface Warfare Center, Dahlgren Division**
- **Tested using MIL-PRF-85045/16 2.0 mm cable**

### Applications

- **In flight networks**
- **Shipboard applications**
- **Aero market**
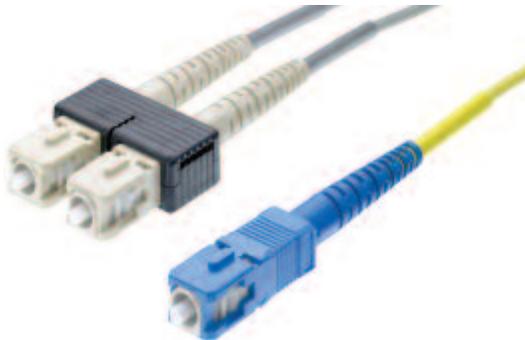
### Material
**Ferrule** — Zirconia
**Housing** — UL 94 V-O rated thermoplastic

**Length — Ferrule Tip to End of Boot: 57.0 mm**

**Engineering Report**
502-1191

| Description | Fiber Type | Housing Color | Boot Color | Used with | Individual Pack Part Number | Bulk Pack Part Number |
|---|---|---|---|---|---|---|
| Simplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 6828100-1 | 6828100-2 |
| | | | | 2.4 mm Jacketed | 1918227-1 | 1918227-2 |
| | Multimode | Beige | Beige | 1.6-2.0 mm Jacketed | 6828099-1 | 6828099-2 |
| | | | | 2.4 mm Jacketed | 1918154-1 | 1918154-2 |
| Duplex | Singlemode | Blue | Blue | 1.6-2.0 mm Jacketed | 1828573-1 | 1828573-2 |
| | Multimode | Beige | Beige | 1.6-2.0 mm Jacketed | 1828574-1 | 1828574-2 |

**Note:** All part numbers are RoHS compliant.

36

Catalog 1307895
Revised 4-12
www.te.com

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in millimeters and inches unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## SC Connector Components

**SC Components —
2.0 – 3.0 mm Jacketed
Cable (Order One of Each
Component Excluding Clip
for Simplex, Two of Each
for Duplex)**

Angled Boot

Straight Boot

Connector Sub-Assembly

Crimp Eyelet

Bend Limiting Boot

Protective Cap

**Straight Boot**

**50.0**
[1.97]

**Bend Limiting Boot**

**51.0**
[2.01]

**Angled Boot**

**58.0**
[2.28]
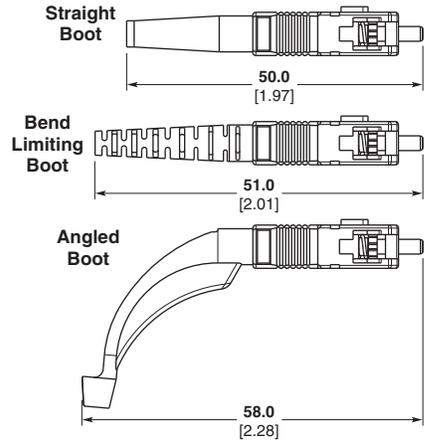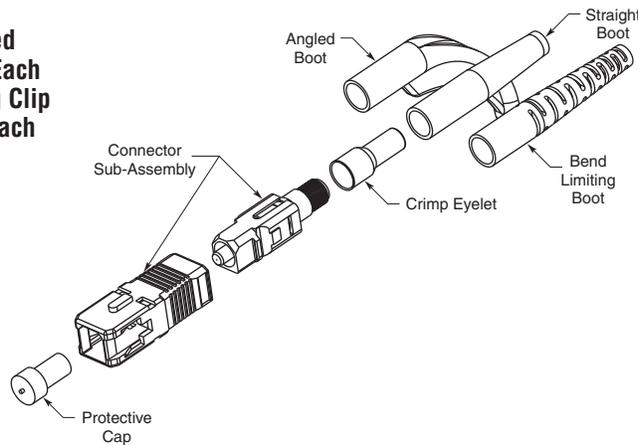
| Fiber Type | Simplex Connector Sub-Assembly & Protective Cap | Duplex Clip | Cable Size | Crimp Eyelet | Boot Description | Boot Part Number (see chart page 38) |
|---|---|---|---|---|---|---|
| Singlemode (Blue Outer Hsg.) | 5492123-7 | 6348522-1 | 2.0 mm | 503970-9 | Straight | 5503971-x |
| | | | 2.4 mm | 503970-6 | Straight | 5503971-x |
| | | | 3.0 mm | 503970-3 | Straight | 5503971-x |
| | | | | | Bend Limiting | 1588491-x |
| | | | | | Angled | 1278705-x |
| Multimode (Beige Outer Hsg.) | 5503948-7 | 6348522-1 | 2.0 mm | 503970-9 | Straight | 5503971-x |
| | | | 2.4 mm | 503970-6 | Straight | 5503971-x |
| | | | 3.0 mm | 503970-3 | Straight | 5503971-x |
| | | | | | Bend Limiting | 1588491-x |
| | | | | | Angled | 1278705-x |

Short Buffer Boot

Buffer Boot

Connector Sub-Assembly

**Short Buffer Boot**

**31.0**
[1.22]

Protective Cap

**Buffer Boot**

**54.0**
[2.13]

**SC Components — 900 µm Buffered Fiber
(Order One of Each Component Excluding Clip for Simplex,
Two of Each for Duplex)**

| Fiber Type | Simplex Connector Sub-Assembly & Protective Cap | Duplex Clip | Boot Description | Boot Part Number (see chart page 38) |
|---|---|---|---|---|
| Singlemode (Blue Outer Hsg.) | 5492123-7 | 6348522-1 | Short Buffer | 6278309-x |
| | | | Buffer | 6457493-x |
| Multimode (Beige Outer Hsg.) | 5503948-7 | 6348522-1 | Short Buffer | 6278309-x |
| | | | Buffer | 6457493-x |

**SC Components —
Duplex Clip**

**SC Duplex Clip (Black)
Part Number 6348522-1**

Use 2 pieces to create one
clip for duplexing simplex
housings

**Note:** All part numbers are RoHS compliant.

## SC Connector Components (Continued)

**SC Components —
2.0 to 3.0 mm Boots**

29.50
[1.161]
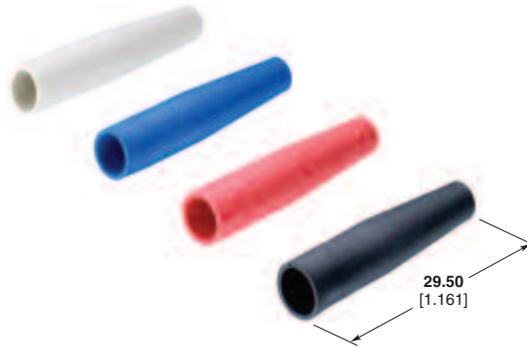
**Straight Boot for 2.0 to 3.0 mm Cable**

| Cable Size | Beige | Blue | Black | Red |
|---|---|---|---|---|
| 2.0 mm | 5503971-5 | 5503971-6 | 2-5503971-3 | 2-5503971-7 |
| 2.4 mm | 5503971-3 | 5503971-4 | 1-5503971-2 | 1-5503971-3 |
| 3.0 mm | 5503971-1 | 5503971-2 | 1-5503971-0 | 1-5503971-1 |

35.56
[1.400]

37.00
[1.457]

**Bend Limiting Boot for 3.0 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 1588491 | -5 | -2 | — |

**Angled Boot for 3.0 mm Cable**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 1278705 | -2 | -1 | -3 |

**SC Components —
900 µm Boots**

33.76
[1.329]

10.35
[.407]
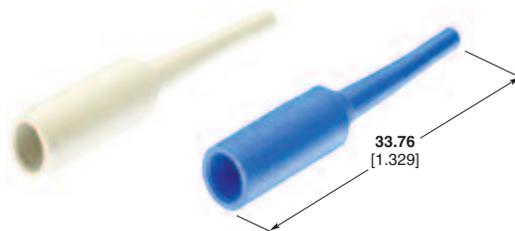
**Buffer 900 µm Boot**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 6457493 | -9 | -1 | -3 |
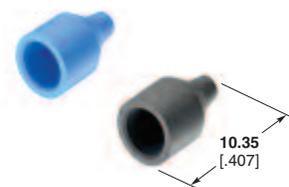
**Short Buffer 900 µm Boot**

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 6278309 | — | -2 | -1 |

**Note:** All part numbers are RoHS compliant.

# SC Adapters

## SC to SC Adapters


**SC Simplex Adapter — Plastic**
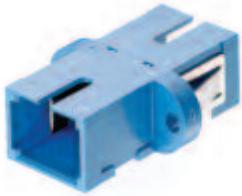

**Flangeless SC Simplex Adapter — Plastic**


**SC Simplex Adapter — Metal**


**Flangeless SC Simplex Adapter — Metal**


**SC Duplex Adapter — Plastic**

**Note:** All part numbers are RoHS compliant.

### SC Simplex Adapter — Plastic

| Alignment Sleeve Material/Application | Housing Color | Part Numbers |
|---|---|---|
| Metal/MM only | Beige | 5504614-1 |
| | Black | 5504614-4 |
| | Aqua | 5504614-3 |
| Metal | Beige | 5502632-9 |
| | Black | 5502632-7 |
| | Aqua | 2-5502632-3 |
| | Blue | 5502632-8 |
| Ceramic | Beige | 1-5502632-2 |
| | Black | 1-5502632-0 |
| | Aqua | 2-5502632-4 |
| | Blue | 1-5502632-1 |
| Ceramic/APC | Green | 1828028-2 |
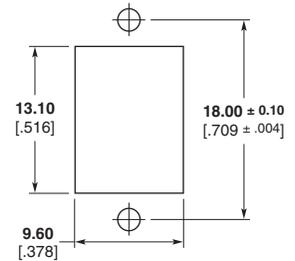
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

13.10 [.516]
18.00 ± 0.10 [.709 ± .004]
9.60 [.378]

### Flangeless SC Simplex Adapter — Plastic

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Black | 5504632-1 |
| | Blue | 5504632-3 |
| Ceramic | Black | 5504632-2 |
| | Aqua | 5504632-6 |
| | Blue | 5504632-4 |
| | Green | 5504632-5 |
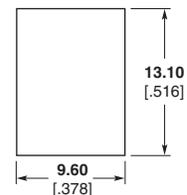
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

13.10 [.516]
9.60 [.378]

### SC Simplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278348-1 |
| Ceramic | Electroless Nickel | 6278348-3 |
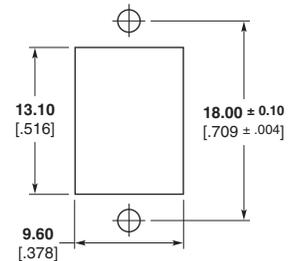
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

13.10 [.516]
18.00 ± 0.10 [.709 ± .004]
9.60 [.378]

### Flangeless SC Simplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278348-5 |
| Ceramic | Electroless Nickel | 6278348-7 |
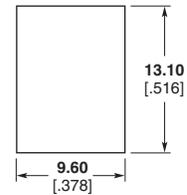
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

13.10 [.516]
9.60 [.378]

### SC Duplex Adapter — Plastic

| Alignment Sleeve Material/Application | Housing Color | Part Numbers |
|---|---|---|
| Metal/MM only | Beige | 5504640-1 |
| | Black | 5504640-4 |
| | Aqua | 5504640-6 |
| Metal | Beige | 5502776-9 |
| | Black | 5502776-7 |
| | Aqua | 2-5502776-5 |
| | Blue | 5502776-8 |
| Ceramic | Beige | 1-5502776-2 |
| | Black | 1-5502776-0 |
| | Aqua | 2-5502776-6 |
| | Blue | 1-5502776-1 |
| Ceramic/APC | Green | 2-5502776-3 |
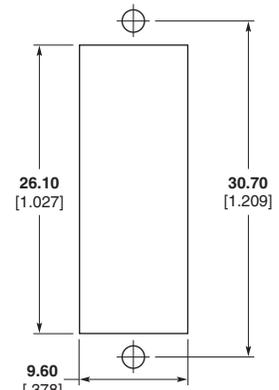
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

26.10 [1.027]
30.70 [1.209]
9.60 [.378]

**Connectors, Adapters, Tooling & Accessories**

**2**

## SC Adapters (Continued)

### SC to SC Adapters
(Continued)
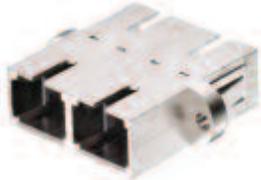
**SC Duplex Adapter**

**SC Duplex Adapter — Metal**

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278049-1 |
| Ceramic | Electroless Nickel | 6278049-3 |

**SC Duplex Metal Adapter w/ EMI Shielding**

**Shielded SC Duplex Adapter — Metal**

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6374223-1 |
| Ceramic | Electroless Nickel | 6374223-3 |

26.10 [1.027]  30.70 [1.209]  9.60 [.378]
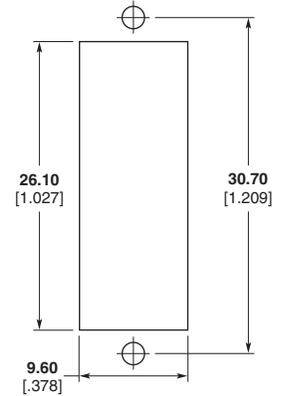
**Recommended Panel Cutout Max. Panel Thk. 1.7 [.067] For SC Duplex Adapter — Metal and Shielded SC Duplex Adapter — Metal**

### SC to ST Hybrid Adapters

**SC to ST Simplex Adapter — Plastic**

**SC to ST Simplex Adapter — Plastic**

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Beige | 5502780-3 |
| | Black | 5502780-1 |
| | Aqua | 2-5502780-0 |
| | Blue | 5502780-2 |
| Ceramic | Beige | 5502780-6 |
| | Black | 5502780-4 |
| | Aqua | 2-5502780-1 |
| | Blue | 5502780-5 |

13.10 [.516]  18.00 ± 0.10 [.709 ± .004]  9.60 [.378]
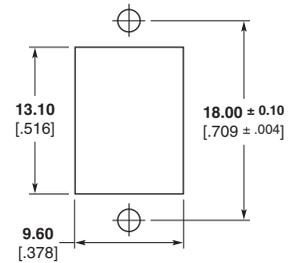
**Recommended Panel Cutout Max. Panel Thk. 1.7 [.067]**
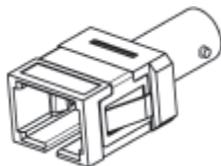
**Flangeless SC to ST Simplex Adapter — Plastic**

**Flangeless SC to ST Simplex Adapter — Plastic**

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Black | 5504634-1 |
| Ceramic | Black | 5504634-2 |

13.10 [.516]  9.60 [.378]
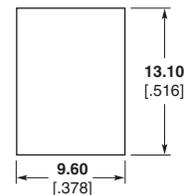
**Recommended Panel Cutout Max. Panel Thk. 1.7 [.067]**

**SC to ST Simplex Adapter — Metal**

**SC to ST Simplex Adapter — Metal**

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278350-1 |
| Ceramic | Electroless Nickel | 6278350-3 |
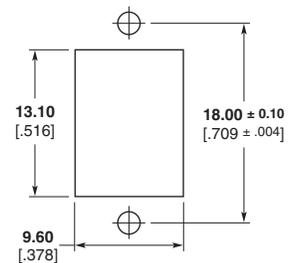
13.10 [.516]  18.00 ± 0.10 [.709 ± .004]  9.60 [.378]

**Recommended Panel Cutout Max. Panel Thk. 1.7 [.067]**

**Note:** All part numbers are RoHS compliant.
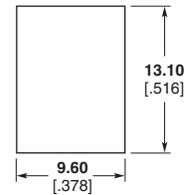
## SC Adapters (Continued)

### SC to ST Hybrid Adapters
(Continued)

**Flangeless SC to ST Simplex Adapter — Metal**

#### Flangeless SC to ST Simplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278350-5 |
| Ceramic | Electroless Nickel | 6278350-7 |

13.10 [.516]

9.60 [.378]

**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

**SC to ST Duplex Adapter — Plastic**

#### SC to ST Duplex Adapter — Plastic

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal (MM Only) | Beige | 5504663-4 |
| | Black | 5504663-6 |
| | Aqua | 5504663-5 |
| Metal | Beige | 5503137-3 |
| | Black | 5503137-1 |
| | Aqua | 2-5503137-1 |
| | Blue | 5503137-2 |
| Ceramic | Beige | 5503137-6 |
| | Black | 5503137-4 |
| | Aqua | 1-5503137-9 |
| | Blue | 5503137-5 |

26.10 [1.027]    30.70 [1.209]

9.60 [.378]
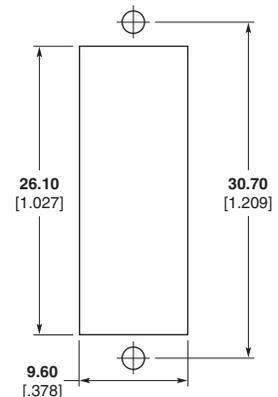
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

**SC to ST Duplex Adapter — Metal**

#### SC to ST Duplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278051-1 |
| Ceramic | Electroless Nickel | 6278051-3 |

### Slide-on Retractable Cover for SC Simplex or Duplex Applications

These retractable doors slip onto the end of existing TE adapters and can be mounted after the adapter has already been installed.

**Part Number 1693539-1** — Blue Simplex SC

**Part Number 1693539-2** — Beige Simplex SC

**Part Number 1693540-1** — Blue Duplex SC

**Part Number 1693540-2** — Beige Duplex SC

**Note:** All part numbers are RoHS compliant.

# ST Connector Kits

## ST Connector Kits — Ceramic Ferrules

### Singlemode Ceramic
**Insertion Loss** — 0.3dB
**Reflectance** — -40dB
**Operating Temperature** — -20° C to +75° C
**Durability** — 200 Cycles

### Multimode Ceramic
**Insertion Loss** — 0.3dB
**Operating Temperature** — -20° C to +75° C
**Durability** — 500 Cycles

**Length —**
**Ferrule Tip to End of Boot**
**900 µm Buffered** — 56.4 mm
**3.0 mm Jacketed** — 47.25 mm
**3.0 mm Right-Angle** — 58.0 mm

**Instruction Sheet**
408-9971

| Fiber Type | Body | Coupling Nut | Boot Color | Used with | Individual Pack Part Number |
|---|---|---|---|---|---|
| Singlemode | Nickel-plated Brass | Zinc | Yellow (900 µm) | 900 µm Buffered 250 µm Buffered | 5503613-2 |
| | | | Yellow (3.0 mm) | 900 µm Buffered 250 µm Buffered 3.0 mm Cable | 5502580-2 |
| Multimode | Polymer | Polymer | Black (3.0 mm) | 900 µm Buffered 3.0 mm Cable | 503571-1 |
| | Nickel-plated Brass | Zinc | Black (900 µm) Black (3.0 mm) | 900 µm Buffered 3.0 mm Cable | 5492458-1 |
| | | | Black (Right-Angle) | 900 µm Buffered 3.0 mm Cable | 5502674-1 |

## ST Connector Kits — Polymer Ferrule

### Multimode Polymer Composite
**Insertion Loss** — 0.3dB
**Operating Temperature** — -20° C to +75° C
**Durability** — 500 Cycles

**Instruction Sheet**
408-9971

**47.25** [1.860] Max.

**56.40** [2.220] Max.

| Fiber Type | Body | Coupling Nut | Boot Color | Used with | Individual Pack Part Number |
|---|---|---|---|---|---|
| Multimode | Polymer | Polymer | Black (900 µm) Black (3.0 mm) | 900 µm Buffered 250 µm Buffered 3.0 mm Cable | 5503415-1 |

## ST Connector Kits — Stainless Steel Ferrule

**75.60** [2.976] Max.
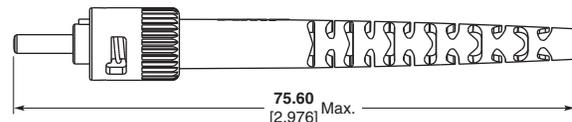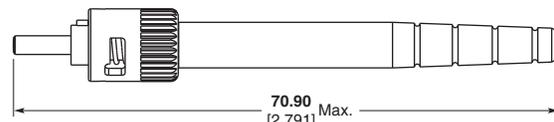
**Bend Limiting Boot**

### Multimode Stainless Steel
**Insertion Loss** — 0.3dB
**Operating Temperature** — -30° C to +70° C
**Durability** — 500 Cycles
**Instruction Sheet**
408-4151

**70.90** [2.791] Max.

**Long Boot**

| Fiber Type | Body | Coupling Nut | Ferrule Designation | Boot Color | Used with | Part Number |
|---|---|---|---|---|---|---|
| Multimode | Nickel-plated Brass | Zinc | 125 | Black (Bend Limiting) | 3.0 mm Cable | 5504008-3 |
| | | | 125 | Black (Long) | 4.3 mm Cable | 5504008-4 |
| | | | 140 | Black (Bend Limiting) | 3.0 mm Cable | 5504008-7 |
| | | | 231 | Black (Bend Limiting) | 3.0 mm Cable | 1-5504008-4 |
| | | | 240 | Black (Bend Limiting) | 3.0 mm Cable | 1-5504008-3 |
| | | | 280 | Black (Bend Limiting) | 3.0 mm Cable | 4-5504008-6 |

**Note:** All part numbers are RoHS compliant.

# ST Connector Components

**ST Components — 2.0 to 3.0 mm Boots**

**25.40** [1.000]

**54.30** [2.138]
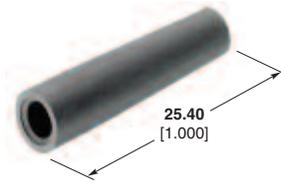
### Straight Boot for 2.0 to 3.0 mm Cable

| Cable Size | Beige | Blue | Black |
|---|---|---|---|
| 2.0 mm | 503219-4 | 503219-5 | 503219-1 |
| 3.0 mm | 501457-4 | 501457-5 | 501457-1 |

### Bend Limiting Boot for 3.0 mm Cable

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 502128 | -4 | -7 | -1 |

**37.70** [1.484]

**33.80** [1.331]

### Right Angled Boot for 3.0 mm Cable

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 5502667 | -3 | -2 | -1 |

### Buffer 900 µm Boot

| Base Part Number | Beige | Blue | Black |
|---|---|---|---|
| 5503628 | -19 | -8 | -1 |

## ST Coupling Receptacles

| Alignment Sleeve Material | Part Number |
|---|---|
| Polymer Composite (Multimode) | 501381-1 |
| Metal (Multimode) | 504021-1 |
| Ceramic (Singlemode) | 502750-1 |

**7.88** [.310] Min.

**Ø 9.68** [.381] Min.

**Suggested Panel Cutout**
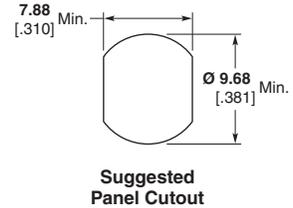
## ST Active Device Mounts — Multimode

**Product Facts**

- Designed to accept multimode TO-18, TO-46 and TO-52 active devices
- Nickel plated, die cast zinc
- Mount to PCB or through panel
- Includes positioning ring

| Description | Packaging | Height | Part Number |
|---|---|---|---|
| Standard height | Single | .410 | 5501474-1 |
| Low profile | Single | .280 | 5502585-2 |
| Low profile | Single (100) | .314 | 5504022-2 |
| Low profile | Bulk (50) | .314 | 5504022-3 |

**Note:** All part numbers are RoHS compliant.

## FC Connector Kits

**FC Connector Kits —
Ceramic Ferrules**



**Singlemode Ceramic**
**Insertion Loss** — 0.2dB
**Reflectance** — -59dB
**Durability** — 200 Cycles

**Length —**
**Ferrule Tip to End of Boot**
**900 µm buffered** — 35.0 mm
**2.0 mm jacketed** — 51.0 mm
**3.0 mm jacketed** — 51.0 mm

**Instruction Sheet**
408-8674

### FC Connector Kits — Standard Kits

| Fiber Type | Boot Color | Used with | Part Number |
|---|---|---|---|
| Singlemode | Blue | 900 µm Buffered | 6754264-2 |
| | | 2.0 mm Jacketed | 5504915-2 |
| | | 3.0 mm Jacketed | 5504649-1 |

## FC Adapters

**FC to FC Adapters**



**FC Square Flange Adapter**

### FC Simplex Square Flange Adapter — Metal

| Alignment Sleeve Material | Panel Cut-out | Keyway Slot (Nom.) | Part Numbers |
|---|---|---|---|
| Metal | Square Flange | Std. 2.33 mm | 5501506-2 |
| Ceramic | Square Flange | Std. 2.33 mm | 5501506-1 |



Ø 1.85 [.073] 2 Plcs.
4.75 [.187] 2 Plcs.
4.75 [.187] 2 Plcs.
Ø 9.53 [.375]
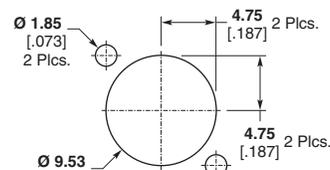
**Recommended Panel Cutout**
**Max. Panel Thk. 1.70 [.067]**



**FC 8 mm/9 mm Dia. Round**

### FC Simplex 8 mm/9 mm Dia. Round (D-Hole) Adapter — Metal

| Alignment Sleeve Material | Panel Cut-out | Keyway Slot (Nom.) | Part Numbers |
|---|---|---|---|
| Metal (Copper) | D-Hole | Std. 2.33 mm | 5504407-1 |
| Ceramic | D-Hole | Std. 2.33 mm | 5504407-3 |
| Ceramic/APC | D-Hole | 2.05 mm Type R | 5504407-8 |
| Ceramic/APC | D-Hole | Prec. 2.02 mm | 5504407-7 |



3.73/3.63 [.147/.143]
Ø 9.30/9.10 [.366/.358]
Standard Slot
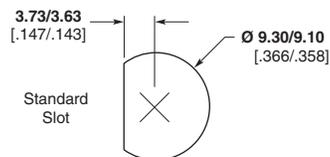
**Recommended Panel Cutout**
**Max. Panel Thk. 1.65 [.065]**



**FC 8 mm Dia. Round (Double D)**

### FC Simplex 8 mm Dia. Round (Double D-Hole) Adapter — Metal

| Alignment Sleeve Material | Panel Cut-out | Keyway Slot (Nom.) | Part Numbers |
|---|---|---|---|
| Metal | Double D-Hole | Std. 2.33 mm | 5504013-1 |



8.00 [.315]
Ø 9.80 [.386]
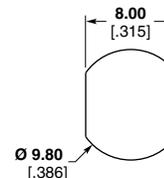
**Recommended Panel Cutout**
**Max. Panel Thk. 1.65 [.065]**

**Note:** All part numbers are RoHS compliant.
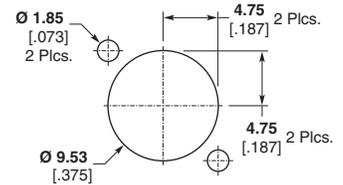
## FC Adapters (Continued)

### FC to ST Hybrid Adapters

**FC to ST Simplex Adapter — Metal**

#### Hybrid FC to ST Simplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 5503640-1 |
| Ceramic | Electroless Nickel | 5503640-2 |

Ø 1.85 [.073] 2 Plcs.
Ø 9.53 [.375]
4.75 [.187] 2 Plcs.
4.75 [.187] 2 Plcs.

**Recommended Panel Cutout**
**Max. Panel Thk. 1.70 [.067]**

### FC to SC Hybrid Adapters

**SC to FC Simplex Adapter — Plastic**

#### SC to FC Simplex Adapter — Plastic

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Black | 5502781-1 |
| Ceramic | Black | 5502781-4 |

13.10 [.516]
18.00 ± 0.10 [.709 ± .004]
9.60 [.378]
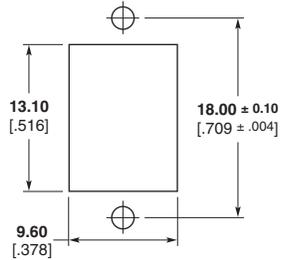
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

**SC to FC Simplex Adapter — Metal**

#### SC to FC Simplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278349-1 |
| Ceramic | Electroless Nickel | 6278349-3 |

13.10 [.516]
18.00 ± 0.10 [.709 ± .004]
9.60 [.378]
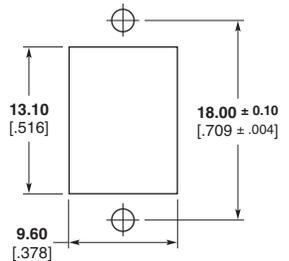
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

**Flangeless SC to FC Simplex Adapter — Metal**

#### Flangeless Simplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278349-5 |
| Ceramic | Electroless Nickel | 6278349-7 |

13.10 [.516]
9.60 [.378]
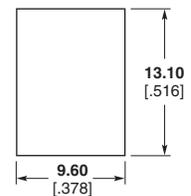
**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**
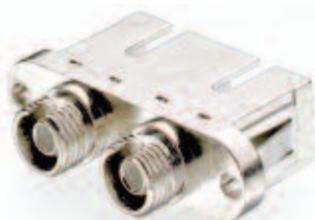
**SC to FC Duplex Adapter — Metal**

#### SC to FC Duplex Adapter — Metal

| Alignment Sleeve Material | Housing Color | Part Numbers |
|---|---|---|
| Metal | Electroless Nickel | 6278050-1 |
| Ceramic | Electroless Nickel | 6278050-3 |

26.10 [1.027]
30.70 [1.209]
9.60 [.378]

**Recommended Panel Cutout**
**Max. Panel Thk. 1.7 [.067]**

**Note:** All part numbers are RoHS compliant.

Connectors, Adapters,
Tooling & Accessories

**2**

45

Catalog 1307895
Revised 4-12
www.te.com

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in millimeters and inches unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## ESCON Connector Components

### ESCON Connector Plug

**Product Facts**

- **Multimode**
- **IBM Approved**
- **Simple field assembly**

**Performance Characteristics**
**Assembly Loss** — 0.2 dB Typical
**Durability** — 200 cycles

**Instruction Sheet**
408-9808
http://www.te.com/documents

| Description 125 µm | Part Number Black |
|---|---|
| DUALAN Cable | 5492181-1 |
| DUALAN Cable | 5492181-2* |

\* Bulk packed, 50 per package
Termination Kit: 503746-6.

## FSMA Products — Multimode

**Product Facts**

- **Industry compatible with 905 (FSMA-I) and 906 (FSMA-II) style connectors**
- **Terminates fiber sizes from 125 through 1000 microns in diameter**
- **Design parameters conform to NATO and IEC interface standards**

**Documentation**
**Product Specification**
108-45106
**Instruction Sheet**
408-9863
FSMA 905 & 906
**Test Report**
501-359
http://www.te.com/documents

**Performance Characteristics**
**Insertion Loss** — 1.3 dB Typical
**Temperature Range** —
-55° C to +105° C
**Durability** — 200 cycles

**Length —**
**Ferrule Tip to End of Boot**
**Part Number 5504566** — 70 mm
**Part Number 5504014** — 70 mm
**Part Number 5504567** — 66 mm

### FSMA Connectors

| Ferrule Material | Connector Body Material | Fiber Diameter (µm) | Nominal Jacket O.D. | | |
|---|---|---|---|---|---|
| | | | 3.1 mm | | 4.3 mm |
| | | | 905 | 906 | 905 |
| Stainless Steel | Nickel-Plated Brass | 125 | 5504566-1 | 5504014-1 | 5504567-1 |
| | | 140 | 5504566-2 | 1-5504014-0 | 5504567-2 |
| | | 231 | 5504566-7 | — | — |
| | | 336 | 1-5504566-4 | — | — |
| | | 1000 | 3-5504566-0 | — | — |
| | | 1050 | 3-5504566-1 | — | 2-5504567-9 |

### Adapter
**Product Facts**

- **Precision mating adapter for all FSMA connectors**
- **In-line splice or panel mount design**

### FSMA Adapters

| Description | Part Number |
|---|---|
| Hex Flange, Stainless Steel | 501049-1 |
| Hex Flange, Stainless Steel, Counterbore, Sealed | 501050-1 |
| Fixed Flange, Nickel-Plated Brass | 5504026-1 |
| In-Line, Stainless Steel | 504028-1 |
| In-Line, Stainless Steel, Counterbore, Short | 504031-1 |

### Active Device Mount
**Product Facts**

- **Designed to house TO-18, TO-46, and TO-52 devices**
- **Constructed of nickel plated die cast zinc alloy or stainless steel**
- **Mounts to PC board or through panel**

### FSMA Active Device Mounts

| Description | Part Number |
|---|---|
| PC Mount Receptacle, Die Cast | 5502136-1 |
| PC Mount Receptacle, Die Cast, Bulk Packaged | 5502136-2 |
| PC Mount Receptacle, Stainless Steel | 501055-1 |

ESCON is a trademark of IBM Corporation.

IBM is a trademark of International Business Machine Corporation.

**Note:** All part numbers are RoHS compliant.

## MTRJ Connectors

**MT-RJ Plugs**

**Product Facts**

- Designed to meet TIA/EIA 568-B.3
- Each MT-RJ connector houses two fibers
- Half the size of duplex SC and ST Connectors
- Options available include:
  - Multimode or singlemode
  - Mini DUALAN or Mini Zipcord cable
  - With or without guide pins
  - MT-RJ SECURE Connector Kits
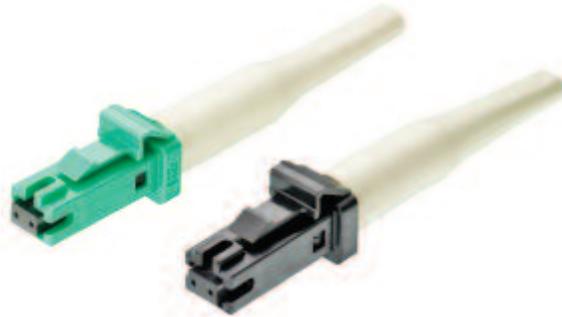
**Performance Characteristics**

**Insertion Loss** — Typical (dB) 0.2 dB

**Operating Temperature** — -10° C to 60° C

**Durability** — 500 Cycles

**Instruction Sheet**

408-4540

http://www.te.com/documents

### Standard MT-RJ Connectors

| Fiber Type | Cable Type | Pins | Part Number |
|---|---|---|---|
| Singlemode | 3.0 mm DUALAN | Without Guide Pins | 6278399-1 |
| | 3.0 mm DUALAN | With Guide Pins | 6278399-2 |
| | 1.8 mm Mini Zipcord | Without Guide Pins | 6278751-1 |
| | 1.8 mm Mini Zipcord | With Guide Pins | 6278751-2 |
| Multimode | 3.0 mm DUALAN | Without Guide Pins | 6278398-1 |
| | 3.0 mm DUALAN | With Guide Pins | 6278398-2 |
| | 1.8 mm Mini Zipcord | Without Guide Pins | 6278750-1 |
| | 1.8 mm Mini Zipcord | With Guide Pins | 6278750-2 |

### MT-RJ SECURE Connectors

| Fiber Type | Cable Type | Pins | Color | Part Number |
|---|---|---|---|---|
| Multimode | 1.8 mm Mini Zipcord | Without Guide Pins | Red | 1918356-1 |
| | | | Yellow | 1918356-2 |
| | | | Green | 1918356-3 |
| | | | Blue | 1918356-4 |
| | | | Rose | 1918356-5 |
| | | | Aqua | 1918356-6 |
| | | | Brown | 1918356-7 |
| | | | Violet | 1918356-8 |
| | | | Orange | 1918356-9 |
| | | | Slate | 1-1918356-0 |

**MT-RJ to MT-RJ Adapter**

**MT-RJ to MT-RJ Simplex Adapter**
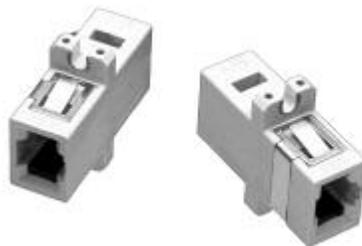
Simplex Part Number
1278017-1 (light almond)

13.20 ± 0.30
[.520 ± 0.12]

18.00 + 0.04 − 0.00
[.709 + .016 − .000]

9.70 ± 0.30
[.382 ± 0.12]
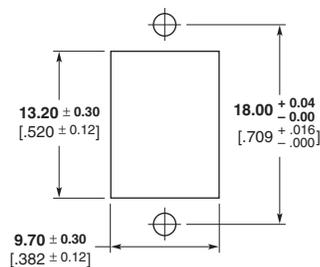
Recommended Panel Cutout
Max. Panel Thk. 1.7 [.067]

**MT-RJ to MT-RJ Duplex Adapter**

Duplex Part Number
6374906-1 (Almond)

26.40
[1.039]

30.70
[1.209]

9.90
[.390]
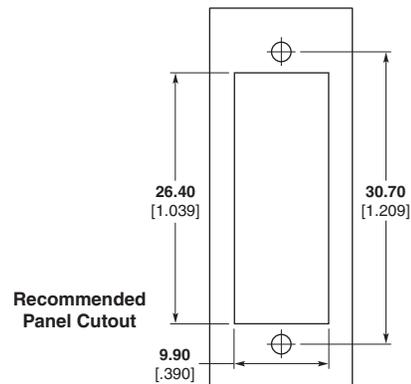
Recommended
Panel Cutout

**Note:** All part numbers are RoHS compliant.

Connectors, Adapters, Tooling & Accessories

2

## LIGHTCRIMP PLUS No Epoxy, No Polish LC, SC and ST Connectors

### Product Facts

- **Multimode connector kits come with accessories needed to terminate to 250 µm fiber, 900 µm tight-buffered fiber, and 900 µm easy-strip**
  - **SC and ST kits also terminate 3 mm cables**
- **Singlemode connector kits terminate to 250 µm fiber, 900 µm tight-buffered fiber, 900 µm easy-strip and buffer tube splitter kits**
- **Easy installation:**
  - **No epoxy, no polishing**
  - **No bench tool required**
  - **Strip, cleave and crimp**
- **Easy identification:**
  - **Singlemode is blue**
  - **Laser Optimized (10 Gig) is aqua — 10 Gb/s applications**
  - **62.5/125 µm is beige**
  - **50/125 µm is black**
- **Match fiber type of cable to fiber type of LIGHTCRIMP PLUS Connector**
- **Mates with standard couplers, adapters and adapter plates**
- **Tested to and meets TIA/EIA 568-B.3**
- **Termination tool kits on page 49**

### Performance Characteristics

**Insertion Loss** — Typical (dB)
0.2 dB Singlemode; 0.3 dB Multimode

**Temperature Range** —
-10° C to 60° C, tested to -40° C to 75° C

**Durability** — 500 cycles

**Simplex LC Connector Kits — LIGHTCRIMP PLUS No Epoxy, No Polish Connector**

| Fiber Type | Housing Color | Boot Color | Used with | Part Number |
|---|---|---|---|---|
| Singlemode | Blue | Blue | 900 µm & 250 µm Fibers | 6754482-1 |
| 50/125 µm Multimode | Beige | Black | 900 µm & 250 µm Fibers | 6754483-2 |
| Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | Beige | Aqua | 900 µm & 250 µm Fibers | 6754483-4 |
| 62.5/125 µm Multimode | Beige | Beige | 900 µm & 250 µm Fibers | 6754483-1 |
| Duplex LC Clip | Black | — | To convert Simplex kits for Duplex application | 1754371-1 |
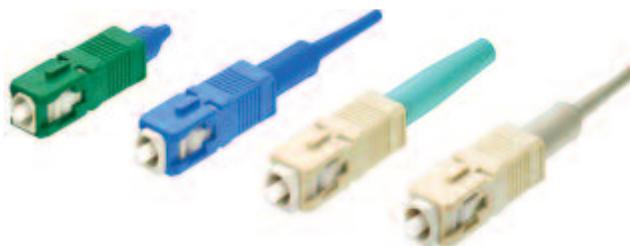
**Simplex SC Connector Kits — LIGHTCRIMP PLUS No Epoxy, No Polish Connector**

| Fiber Type | Housing Color | Boot Color | Used with | Part Number |
|---|---|---|---|---|
| Singlemode Digital APC | Green | Blue | 900 µm & 250 µm Fibers | 2064184-1 |
| Singlemode | Blue | Blue | 900 µm & 250 µm Fibers, 3 mm Cable | 6693276-1 |
| 50/125 µm Multimode | Beige | Black | 900 µm & 250 µm Fibers, 3 mm Cable | 6278079-2 |
| Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | Beige | Aqua | 900 µm & 250 µm Fibers, 3 mm Cable | 6588291-2 |
| 62.5/125 µm Multimode | Beige | Beige | 900 µm & 250 µm Fibers, 3 mm Cable | 5492643-1 |
| Duplex SC Clip (use 2) | Black | — | To convert Simplex kits for Duplex application | 6348522-1 |

**ST Connector Kits — LIGHTCRIMP PLUS No Epoxy, No Polish Connector**

| Fiber Type | Housing Color | Boot Color | Used with | Part Number |
|---|---|---|---|---|
| 50/125 µm Multimode | Metallic | Black | 900 µm & 250 µm Fibers, 3 mm Cable | 6278082-1 |
| Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | Metallilc | Aqua | 900 µm & 250 µm Fibers, 3 mm Cable | 6278082-2 |
| 62.5/125 µm Multimode | Metallic | Beige | 900 µm & 250 µm Fibers, 3 mm Cable | 5492642-2 |

**Note:** All part numbers are RoHS compliant.

## Tooling

**LIGHTCRIMP PLUS Termination Tool Kits**

### Product Facts

- **Includes all tools needed for installing the listed type LIGHTCRIMP PLUS no epoxy/no polish connectors, MT-RJ and MT-RJ SECURE Jacks**

- **LIGHTCRIMP PLUS Connector Termination Video CD-Rom also available separately, Part Number 1374503-1**

- **Convenient carrying case**

| Description | Part Number | |
|---|---|---|
| Universal LIGHTCRIMP PLUS No epoxy/No polish Tool Kit (SC, LC, ST and MT-RJ Jack) | 1278118-4 | 1278118-5[1] |
| LIGHTCRIMP PLUS LC Connector Termination Tool Kit | 1754845-1 | 1754845-2[1] |
| LIGHTCRIMP PLUS SC Connector Termination Tool Kit | 1278022-1 | 1278022-2[1] |
| LIGHTCRIMP PLUS ST Connector Termination Tool Kit | 492697-1 | 492697-2[1] |

[1] Includes Precision Cleaver and Microscope.

**LIGHTCRIMP PLUS Cable Holders**

### Product Facts

- **Used in LIGHTCRIMP PLUS connector terminations (included in LIGHTCRIMP PLUS Tool Kits)**
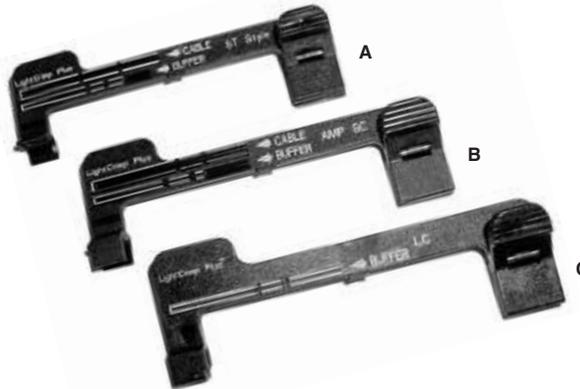
| Description | Figure | Part Number |
|---|---|---|
| ST | A | 492703-1 |
| SC | B | 1278023-1 |
| LC | C | 1754138-1 |
| LC and SC | — | 2064540-1 |

**LIGHTCRIMP Cleave Tool**

**Part Number 503705-1**

### Product Facts

- **Used in both SC and ST LIGHTCRIMP Connector terminations**

- **Included in the Deluxe and LIGHTCRIMP Tool Kits**

**Note:** All part numbers are RoHS compliant.

49

Catalog 1307895
Revised 4-12
www.te.com

Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in millimeters and inches unless otherwise specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

## Tooling (Continued)

**Hand Held Precision Cleaver**

**Part Number 1871696-1**

**Product Facts**

- Operator independent = no craft sensitivity = consistent cleave every time
- Hand held operation
- 10,000 cleave blade life
- 4, 6, 8, 10, and 18 millimeter cleave lengths
- Product specific markings for LIGHTCRIMP PLUS and MT-RJ jack connectors, CORELINK splice, and fusion splicing
- Cleaved surface angle < 1.5°
- No lip, no fracture, and no roll-off
- Padded belt case for convenience and storage
- Neck lanyard included
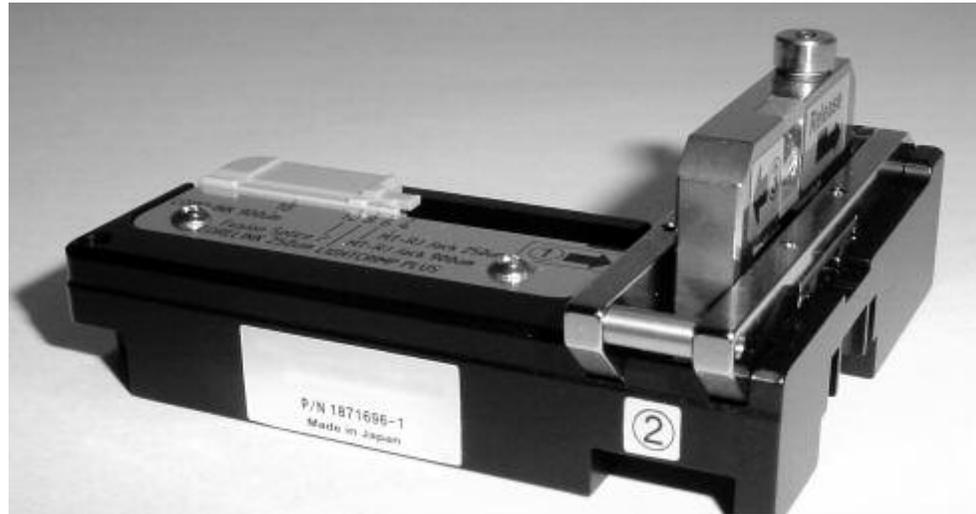


TE's hand held precision fiber cleaver provides precision quality cleaves with the feel and robustness of a full scale precision cleaver in a hand held size at an exceptionally competitive price. The detailed scale markings indicate proper cleave lengths for popular TE field installable fiber optic connectors and mechanical splices in addition to the standard numerical markings for other applications including fusion splicing. The included belt pouch and neck lanyard ensure that the cleaver is always within reach.

**Applications**

Affordable precision cleaving solution for:

- Field installable mechanical splice connectors
- Fusion splicing
- Mechanical splicing
- Bare fiber adapters

**Product Dimensions**
**Length** — 74 mm [2.913 in.]
**Width** — 65.5 mm [2.578 in.]
**Thickness** — 33.5 mm [1.318 in.]
**Weight** — 136 g [0.30 lb.]

**Note:** All part numbers are RoHS compliant.

## Tooling (Continued)

### Epoxy/Polish Connector Termination Tool Kits

**Product Facts**
- **Includes all tools necessary to install the listed epoxy/polish connectors**
  - **For LC terminations, also order Part Number 1754603-1**
- **Tool kits include:**
  - **Pro-Crimper II Hand Tool and crimping dies**
  - **Polishing bushings**
  - **Polishing film (also sold separately)**
  - **Cable and fiber strippers**
  - **Scissors**
  - **Scribe tool**
- **Includes polishing films to install » 60 epoxy/polish connectors**
  - **Epoxy is sold separately (see page 52)**
- **Does not include curing oven or microscope**
- **Convenient carrying case**

| Description | Part Number |
|---|---|
| SC and FC | 503746-7 |
| ST | 503746-1 |
| FSMA | 503746-2 |
| FSD | 503746-6 |

### Sapphire-Tipped Scribe Tool and Accessories

**Product Facts**
- **Long-lasting sapphire blade**
- **Pen-type casing**
- **Used to install all Epoxy/Polish Connectors**
- **Included in Epoxy/Polish Tool Kits**

| Description | Part Number |
|---|---|
| Sapphire-tipped Scribe Tool | 504064-1 |
| Replacement Blades | 504290-1 |

**Note:** All part numbers are RoHS compliant.

## Tooling (Continued)

### Epoxy/Polish LC Termination Accessories

**Product Facts**

- **Supplement epoxy/polish tool kits on page 51 with these components to terminate LC Epoxy/Polish Connectors**

- **Different polishing films are required for LC polishing**

| Description | Part Number |
|---|---|
| LC Polishing Puck — Metal | 1754074-1 |
| LC Cable Preparation Template | 1588756-1 |
| LC Hand Tool and Die Set | 1588176-1 |
| LC 1.25 mm Ferrule Microscope Adapter | 1278997-1 |
| LC Oven Block Assembly | 1457628-1 |
| LC Adaptive Kit — Anaerobic Epoxy Style | 1754603-1 |
| LC Adaptive Kit — Heat Cure | 1754462-1 |

---

### EPO-TEK 353ND Epoxy
### Part Number 504035-1

**Product Facts**

- **For use with SC and LC Connectors**
- **Pre-measured two-part packets for consistent results**
- **Long pot life once mixed**
- **Heat-cured epoxy**
- **Supplied in 4-gram packets**
- **Cures in 15 minutes at 115° C**

---

### TRA-CON Epoxies
### Part Number 1918652-1

**Product Facts**

- **For use with SC, LC, and ST Connectors**
- **Pre-measured two-part packets for consistent results**
- **Can be heat-cured or cured at ambient temperature**
- **Supplied in 2-gram packets**
- **Each packet terminates » 250 connectors**
- **25 packets per pack**
- **Pot life = 30 minutes**
- **Cures in:**
  - **24 hours @ 25° C**
  - **2 hours @ 65° C**
  - **10 minutes @ 110° C**

---

### HYSOL Epoxy-Tubes
### Part Number 502418-1

**Product Facts**

- **For use with SC, LC, ST, FSD, FC, and FSMA Connectors**
- **Two-part epoxy in two tubes**
- **Heat-cured epoxy**
- **Terminates » 400 connectors**
- **One set of two (2) tubes per part number**
- **Pot life = 30 minutes**
- **Cures in 30 minutes at 100° C**

---

### Epoxy Applicator Syringe
### Part Number 501473-3

**Product Facts**

- **3 cc capacity**

EPO-TEK is a trademark of EPOXY TECHNOLOGY INC.

HYSOL is a trademark of HENKEL CORPORATION.

TRA-CON is a trademark of Tra-Con, Inc.

**Note:** All part numbers are RoHS compliant.

## Tooling (Continued)

### Hand Held Microscope
### Product Facts

- **High quality glass optics**
  - **200X magnification**
- **Optimal visual examination of terminated ends**
  - **500 µm field of view**
- **Dual illumination**
  - **Coaxial for inspecting polish quality**
  - **Oblique for general conditions**
- **Pre-centered, threaded adapter mount provides easy focusing and changing of connectors**
- **Field and laboratory examination for multimode and singlemode fibers**
- **Portable**
- **Integral infrared filter for safety**
  - **Do NOT use any microscope to view active fiber signals**
- **Disposable, Type LR44 batteries**
- **Long-life LED (approximately 100,000 hours of operation)**
- **Each Kit includes:**
  - **10-power objective microscope with an impact resistant ergonomic rubber shell and high quality glass optics**
  - **20-power eyepiece**
  - **Padded carrying case with an integrated belt loop and internal adapter storage pocket**
  - **Neck lanyard with safety breakaway feature**
  - **Universal 2.5 mm ferrule adapter (for SC, ST and FC)**
- **Other adapters available are:**
  - **Universal 1.25 mm (adapts LC and MU)**
  - **MT-RJ**
  - **MPO**
  - **MPO APC**
  - **LIGHTRAY MPX Connector**
  - **LIGHTRAY MPX APC Connector**



TE's hand held microscope incorporates high quality glass optics and dual illumination lighting for unsurpassed 200X magnification. With a 500 µm Field of View (FOV) and both coaxial and oblique illuminations, this microscope will meet the proposed TIA/IEC hand held microscope specification for a polish quality scope (coaxial) and general conditions scope (oblique) in one compact unit.

The built in IR-laser attenuation filter will provide protection from accidental exposure to active fibers, although intentional and prolonged viewing of active fibers is not recommended. The ergonomic, impact resistant shell provides a rugged feel, and the included padded belt case and neck lanyard ensure that the microscope is always within reach.

### Applications

Affordable inspection device for:

- Polish inspection
- General conditions (debris) inspection
- Cleave quality inspection
- Verifying core size

### Product Dimensions
**Length** — 186.9 mm [7.359 in.]
**Width** — 51.6 mm [2.030 in.]
**Height** — 31.5 mm [1.240 in.]
**Weight** — 317.5 g [0.70 lb.]

| Description | | | Part Number |
|---|---|---|---|
| Hand Held Microscope | | | 1754767-1 |
| Adapters | 1.25 mm Universal | LC and MU | 1754765-1 |
| | 2.5 mm Universal | SC, ST and FC | 1754766-1 |
| | SC APC | | 1828833-1 |
| | MT-RJ | | 1754768-1 |
| | MPO | | 1828836-1 |
| | MPO APC | | 1828837-1 |
| | LIGHTRAY MPX Connectors | | 1828834-1 |
| | LIGHTRAY MPX APC Connectors | | 1828835-1 |
| | FSMA | | 1985040-1* |

\* Coupling adapter Part Number 1985041-1 required.

**DANGER: Active fibers should never be viewed through a microscope.**

**Note:** All part numbers are RoHS compliant.

## Tooling (Continued)

### MTP/MPO IBC Cleaner
### Part Number 1918809-1

**Product Facts**

- **Cleans male or female MTP/MPO connectors**
- **Pre-washed cleaning cloth is lint and debris free**
- **Each cleaner is capable of more than 400 cleanings**
- **Can be used for bulkhead and unmated MTP/MPO cleaning**
- **Protective dust cover doubles as an adapter cap for cleaning unmated connectors**
- **FOCIS 5-Type MTP/MPO interface compliant**
- **Removes dust and oil contamination**
- **Ideal solution for cleaning parallel optics transceivers**

MTP is a trademark of US Conec Ltd.



The MTP/MPO IBC (In Bulkhead Cleaner) dry cloth cleaner offered by TE utilizes a densely woven micro-fiber cloth that cleans male (with pins) or female MTP/MPO connectors while in adapters, bulkheads, faceplates, or in unmated form with the unique adapter/dust cover. The unique cleaning cloth also reduces static charge making it one of the most advanced cleaning systems available for bulkhead optical connector cleaning.

**Applications**

For effective cleaning of:

- Male and female MTP/MPO connectors inside mating adapters
- Unmated male and female MTP/MPO connectors using included adapter

- Parallel optics transceivers
- Networking gear including switches and routers
- Factory or field connectors

**Product Dimensions**

**Length** — 184.2 mm [7.25 in.]
**Width** — 56.5 mm [2.22 in.]
**Thickness** — 22 mm [0.866 in.]
**Adapter Length** — 19.5 mm [0.759 in.]

---

### OPTIPOP R Reel Cleaner

**Product Facts**

- **Static attraction is minimized**
- **Ultra clean micro-fiber cloth captures debris and other contamination**
- **Robust cloth does not fray or leave fibrous material behind**
- **Reduces the number of field and test issues caused by contaminated end faces**
- **High-end cost effective cleaning solution**



**Reel Cleaner Refill (Six per Pack)
Part Number 1918806-1**

OPTIPOP is a trademark of NTT Advanced Technology Corporation.



The OPTIPOP R dry cloth cassette cleaners offered by TE utilize a densely woven micro-fiber cloth that cleans fiber optic connector tips while reducing static charge. This makes them one of the most advanced cleaning systems available for optical connector cleaning.

**Applications**

A variety of reel cleaner configurations allow for use on the major optical connector types including FC, SC, ST, LC, MU, ODVA conforming, MT-RJ, and MPO.

**Product Dimensions**

**Length** — 127 mm [5.00 in.]
**Width** — 83 mm [3.26 in.]
**Thickness** — 48 mm [1.89 in.]
**Weight** — 150 g [0.33 lb.]

| Description | Part Number |
| --- | --- |
| MPO w/pins reel cleaner | 1918802-1 |
| One slot reel cleaner; 1.25 mm, 2.5 mm, MT No Pins | 1918803-1 |
| MT-RJ connector w/pins reel cleaner | 1918804-1 |
| Two slot reel cleaner; 1.25 mm and 2.5 mm | 1918805-1 |
| Reel cleaner refill (six per pack) | 1918806-1 |

**Note:** All part numbers are RoHS compliant.

## Tooling (Continued)

### OPTIPOP C Card Cleaner

### Product Facts

- **Static attraction is minimized**
- **Ultra clean micro-fiber cloth captures debris and other contamination**
- **Robust cloth does not fray or leave fibrous material behind**
- **Reduces the number of field and test issues caused by contaminated end faces**
- **Compact size**

OPTIPOP is a trademark of NTT Advanced Technology Corporation.
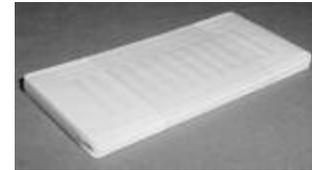
**Card Cleaner Refill (Ten per Pack) Part Number 1918811-1**

The compact OPTIPOP C dry cloth card cleaner offered by TE utilizes a densely woven micro-fiber cloth that cleans fiber optic connector tips while reducing static charge. This makes it one of the most advanced cleaning systems available for optical connector cleaning.

### Applications

The card cleaner can be used on major optical connector types including FC compliant, SC, ST, LC, MU, LC, ODVA, MT-RJ*, and MPO*.

*Without guide pins installed.

### Product Dimensions

**Length** — 120 mm [4.72 in.]
**Width** — 57 mm [2.24 in.]
**Thickness** — 16 mm [0.63 in.]
**Weight** — 60 g [0.13 lb.]

| Description | Part Number |
|---|---|
| Fiber connector card cleaner | 1918810-1 |
| Card cleaner refill (ten per pack) | 1918811-1 |

### NEOCLEAN Stick Cleaner

### Product Facts

- **Perforated handle for customizing length and angle**
- **Ultra clean micro-fiber cloth captures debris and other contamination while minimizing static attraction**
- **Robust cloth does not fray or leave fibrous material behind**
- **Reduces the number of field and test issues caused by contaminated end faces**
- **Convenient packaging**

NEOCLEAN is a trademark of NTT Advanced Technology Corporation.

2.5 mm

1.25 mm
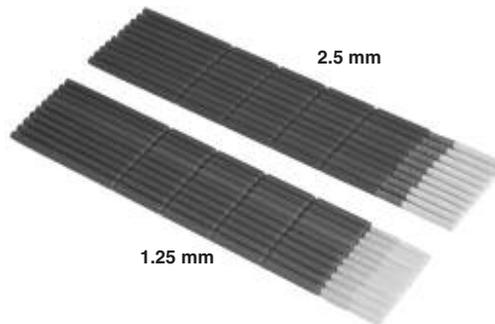
The NEOCLEAN dry cloth stick cleaners offered by TE utilize a densely woven micro-fiber cloth that cleans fiber optic connector tips while reducing static charge. This makes them one of the most advanced cleaning systems available for bulkhead optical connector cleaning.

### Applications

The stick cleaners can be used on major single fiber optical connector types inside bulkhead adapters including FC compliant, SC, ST, LC, MU, LC ODVA, and MT-RJ Jacks in addition to transceivers and lenses.

### Product Dimensions

### Part Number 1918807-1 2.5 mm Stick Cleaner

**Overall Length** — 151.2 mm [5.95 in.]
**Tip Diameter** — 1.25 mm [0.049 in.]
**Handle Diameter** — 2.65 mm [0.104 in.]
**Tip Length** — 12.6 mm [0.496 in.]
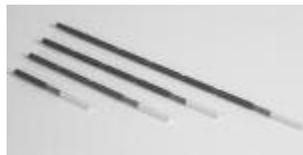
### Part Number 1918808-1 1.25 mm Stick Cleaner

**Overall Length** — 151.2 mm [5.95 in.]
**Tip Diameter** — 2.5 mm [0.098 in.]
**Handle Diameter** — 2.65 mm [0.104 in.]
**Tip Length** — 20.0 mm [0.787 in.]

**Note:** All part numbers are RoHS compliant.

## Tooling (Continued)

**Hand Tools**

**PRO-CRIMPER III Hand Tool
Part Number 2064431-1**

**Instruction Sheet**
408-4020
http://www.te.com/documents

### PRO-CRIMPER III Hand Tool

| Connector | Cable Jacket Diameter (mm) | Part Number | |
|---|---|---|---|
| | | **Hand Tool w/ Die Set** | **Die Set Only** |
| FSMA | 3.0 | 58551-1 | 58552-1 (hex die) |
| ST Ceramic | 3.0 | 58433-4 | 58424-1 |
| ST Stainless Steel | 3.0 | 58433-4 | 58424-1 |
| ST Polymer Composite | 3.0 | 58433-4 | 58424-1 |
| ST Ceramic Used with Loose Tube | 3.8 | — | 503890-1 |
| ST Stainless Steel (504XXX series only) | 3.0 | 58551-1 | 58552-1 |
| SC/FC (Polymer crimp body) | 3.0 | 503911-1 | 503910-1 |
| | 2.4 & 3.0 | 492026-1 | 492025-1 |
| SC/FC (Metal crimp body) | 3.0 | — | 492131-1 |
| LIGHTCRIMP Plus and LIGHTCRIMP ST | 3.0 | 492623-1 | 492622-1 |
| LIGHTCRIMP Plus and LIGHTCRIMP SC | 3.0 | 492782-1 | 492783-1 |
| LIGHTCRIMP Plus LC | 1.6 – 2.0 | 1754137-1 | 1754136-1 |
| MT-RJ SECURE Connector | 1.8 | 1278632-1 | 1278627-1 |
| LC | 3.0, 2-4, 1.6-2.0 | 1588176-1 | 1588175-1 |

### Polishing Bushing, Curing Sleeves and Strip Card Kits

| Connector | Cable Jacket Diameter (mm) | Part Number | | |
|---|---|---|---|---|
| | | **Polishing Bushing** | **Curing Sleeves/Pieces** | **Strip Card Kit** |
| **FSMA** | 3.0 | 228025-1 | 502249-1 (12 pcs.) | 501818-1 |
| **ST** | | | | |
| Ceramic, Stainless Steel | 3.0 | 503337-1 (Metal) 503304-1 (Black Polymer) | 502259-1 (12 pcs.) | 501818-1 |
| Polymer Composite | 3.0 | 503304-2 (Beige Polymer) | 502259-1 (12 pcs.) | 501818-1 |
| **FC** | 3.0 | 504862-1 | 502862-2 (6 pcs.) | 1754636-1 |
| **SC** | 3.0 | 502631-1 (Black Polymer) | 502656-1 (1 pc.) | 1754636-1 |
| **LC** | | 1754074-1 (Metal) | 1457630-X[1] (12 pcs.) | 1588756-1 |

[1] -1 LC 900 µm
 -2 LC jacketed cable

**Note:** All part numbers are RoHS compliant.

## Table of Contents

**Fiber Management & Capabilities**

**3**

## Fiber Management Systems

**Fiber Enclosures**

**Optical Flex Circuits & Shuffles**

**Cable Assemblies**

**Optical Backplanes**

**Fiber Management Trays/Modules**

TE is recognized globally as a leader in Fiber Optics Interconnects.  We also offer a complete line of integrated Packaged Solutions to meet most complex design challenges.  Working directly with us, our designers can offer solutions that help reduce your time to market, simplify your manufacturing, and work with you so that your design requirements are met. We offer complete solutions to a variety of fiber management challenges.

**The products in this Fiber Management and Packaged Solutions section are custom designed products, specific to our customers' applications. Please contact your local TE Sales Representative for design assistance.**

## LIGHTRAY OFX Optical Fiber Circuit Assemblies

### Product Facts

- Singlemode and multimode product range
- Available in a range of symmetrical and asymmetrical designs
- Can be designed with a choice of protective film substrates (including VO rated materials)
- Pre-terminated with LIGHTRAY MPX Connector or any other industry standard connector
- Operates over a broad temperature range
- Fiber optic equivalent of a copper circuit
- Allows fiber "crossovers" without performance penalty
- Very low insertion loss
- Flat or cylindrical design

### Benefits

- Easy routing and management of thousands of fibers on a single substrate
- Fully optical cross connect
- Lightweight
- Saves valuable space
- Significantly contributes to skew compensation
- Easy to install
- Offers flexibility in systems design
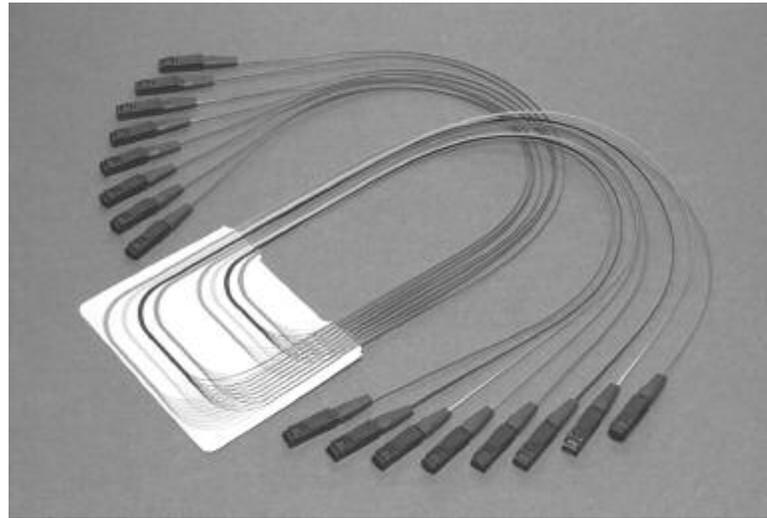


TE's LIGHTRAY OFX optical fiber circuit offers an innovative and flexible solution to precision fiber management in high fiber count applications.

Designed using the latest fiber optic technology, the LIGHTRAY OFX optical circuit consists of a number of optical fibers, which are encapsulated in thin protective film substrates. As well as saving valuable space in equipment and equipment racks, the LIGHTRAY OFX circuit also provides optimum optical performance.

Optical fiber "crossovers" allow the optical fibers to be routed in both regular and irregular designs. Fibers are routed on 250 µm center lines allowing LIGHTRAY MPX connectors to be terminated on the fiber tails.

### Key Applications

High Fiber Count Applications in Optical Transmission and Switching Equipment, in Equipment Racks or on the Printed Circuit Board.

- Provides a complete optical backplane, interconnecting multiple daughtercards
- Complex rack harnesses
- Simplified intra-rack fiber management and cabling
- Serves as a complete optical cross connect (64 x 64 or 128 x 128) in less than 500 x 500 mm of valuable space
- Can be used for the interconnection of optoelectronic devices on the printed circuit board

### Optical Performance (singlemode)

**Maximum Insertion Loss\* (connector loss)** — <0.1 dB max; <0.05 dB typical

**Polarization Depending Loss** — <0.1 dB

### Mechanical Characteristics

**Vibration (per IEC 61300-2-1)** — 10-55Hz

**Fiber Retention (per IEC 61300-2-4)** — 44 N max.

### Environmental Characteristics

**Operating Temperature** — -40°C to + 85°C

**Storage Temperature** — -40°C to + 85°C

**Humidity** — 95%

\* final loss depending on connector types
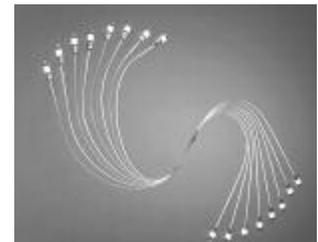
## On Card Fiber Management

**Product Facts**

- ■ **Multimode or Singlemode**
- ■ **Custom design**
- ■ **94-V0 rated materials**

**Benefits**

- ■ **Easy management of on-board fibers**
- ■ **Fiber protection and routing (allowing use of 250 micron fiber for added density)**
- ■ **Pre-loaded and tested trays to facilitate manufacturing**
- ■ **"Mezzanine" trays allow components to be mounted underneath the fiber tray — minimizing board real estate**
- ■ **Splice management**
- ■ **Maintaining minimum bend radius**
- ■ **Eliminating long term performance degradation through "sag"**
- ■ **Skew control**

**Before**

**After**
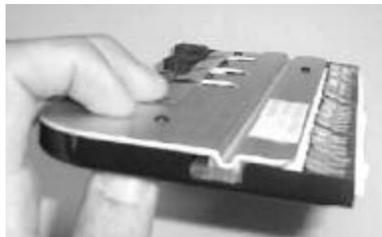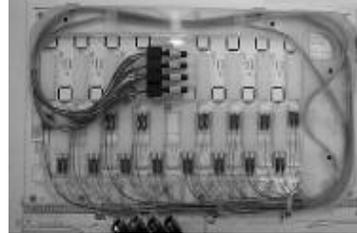
**Thin modules designed to fit on your system card.**
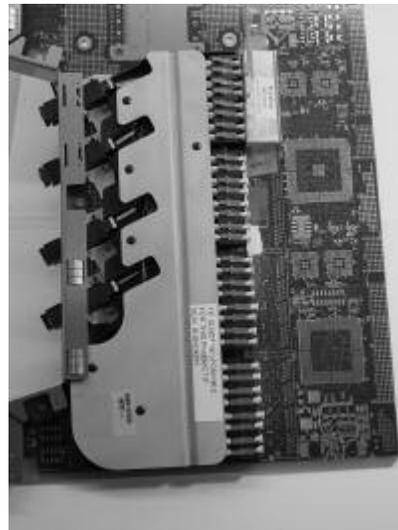
**Plug and play — drop the module on your board and plug the connectors.**

**Non-planar circuits**
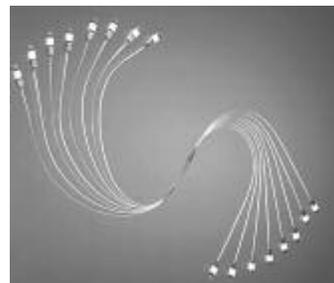
## Enclosures and Customer Interface Panels



Fiber Management

Airflow Through Enclosure

Swing Out Trays for Ease of Access
• Pre-configured with Part Numbers Assigned
• Modular — Customer can add or change

Flexible Input Cable Guide

Fiber Management Features

Tool for Disconnecting Connectors That Are Closely Spaced

Flip Down Cover Has Schematic Silkscreened Inside
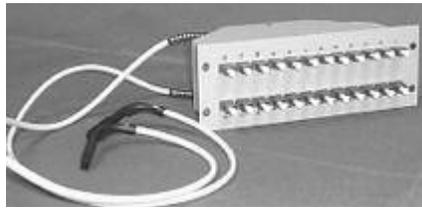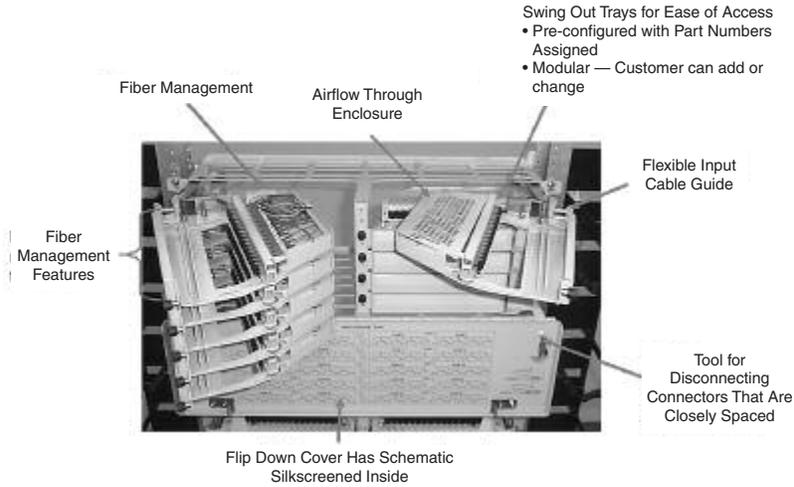


**Tray is Preloaded and Tested**

MTP or MPX

SFF (LC, MU, MT-RJ)

As customer interface panels and enclosures increase in fiber count and density, issues of fiber management, repairability, and scalability become increasingly complex.  We offer complete solutions matched to the customers' individual program needs:

■ High density, ease of access, flexibility

■ Pre-loaded and tested cables

■ Modular design approach for flexibility in I/O's needed, cable dress, and connector styles

■ Accommodate airflow needs

■ EMI Solutions

**Fiber Management & Capabilities**

**3**

## Laser Process for Fibershape Products

**Fibershape Products by
Laser Processing**

**Product Facts**

- **Complete range of cleave angles**
- **Ultra high precision measured @ core region (< ±0.5 degrees)**
- **Capable of providing domed end finish**
- **Angle cleaving of ribbons (incl. sawtooth)**
- **Angled cleaves in 0, 8, 45 and other custom degrees**
- **Ultra precise length control of cleaved endface versus ref. plane**
- **Capable of cleaving close to fiber coating**
- **High volume industrial solution for the opto-electronic industry**
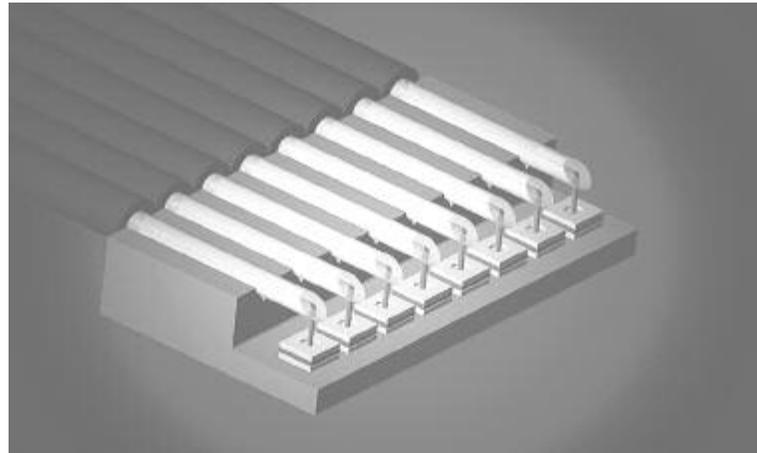


**90 Degree VCSEL Array Interface**

TE laser process, which uses the power of a laser beam to prepare fiber endfaces for termination in connector assemblies and optical devices, provides a state-of-the-art solution for opto electronic device pigtailing including:

- Planar OEICs
- Array Devices
- Discrete Laser/LED/Receiver package
- Detachable pigtails

This ultra high precision process enables very compact designs and perpendicular fiber coupling.

**Please contact your local sales representative or TE for more in-depth product information.**
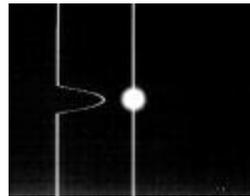


**Near Field Scan @ 1310 nm**
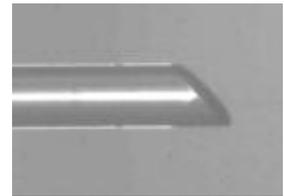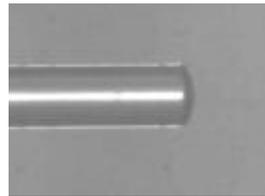


**Straight and Angled Cleave**
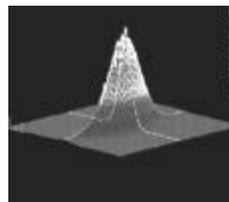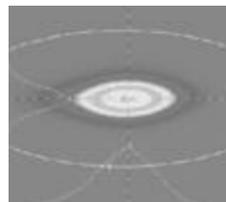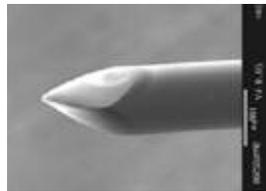




**Wedge Fiber Characteristics**



**Laser Processed Subassembly**

## Table of Contents

**Other Products and Capabilities**

**4**

## AMP NETCONNECT Premises Wiring Products

**Premises Wiring Products**

**Optical Fiber Connectivity: LC SECURE Connectors,
MPO SECURE Connectors, and MT-RJ SECURE Connectors**

**No Epoxy, No Polish Terminations
(SC, LC, MT-RJ and ST)**

**MPO High-Density Fiber Connectivity,
Cables and Cassettes**

**AMPTRAC Connectivity
Management System**

**Complete Product Line for Fiber Networking**

**25 Year System Warranty**

The AMP NETCONNECT Business Unit of TE offers a total fiber optic solution including fiber optic cable, connectivity and hardware; as well as network management through the new AMPTRAC Connectivity Management System. Please contact the AMP NETCONNECT business unit for more information on product and system warranties.

Additionally, the AMP NETCONNECT Business Unit offers a complete line of copper networking products, including shielded and unshielded twisted pair cabling solutions, cables, connectivity, cable assemblies, patch panels and faceplates.

For more information on any Premises Wiring products or systems, visit www.ampnetconnect.com or contact customer service at 1-800-553-0938.

The AMP NETCONNECT full line catalog (#82164) is also available through customer services or from your local TE sales representative.

## Telecom Outside Plant Products

**Telecom Outside Plant Products**



**Other Products and Capabilities**

**4**
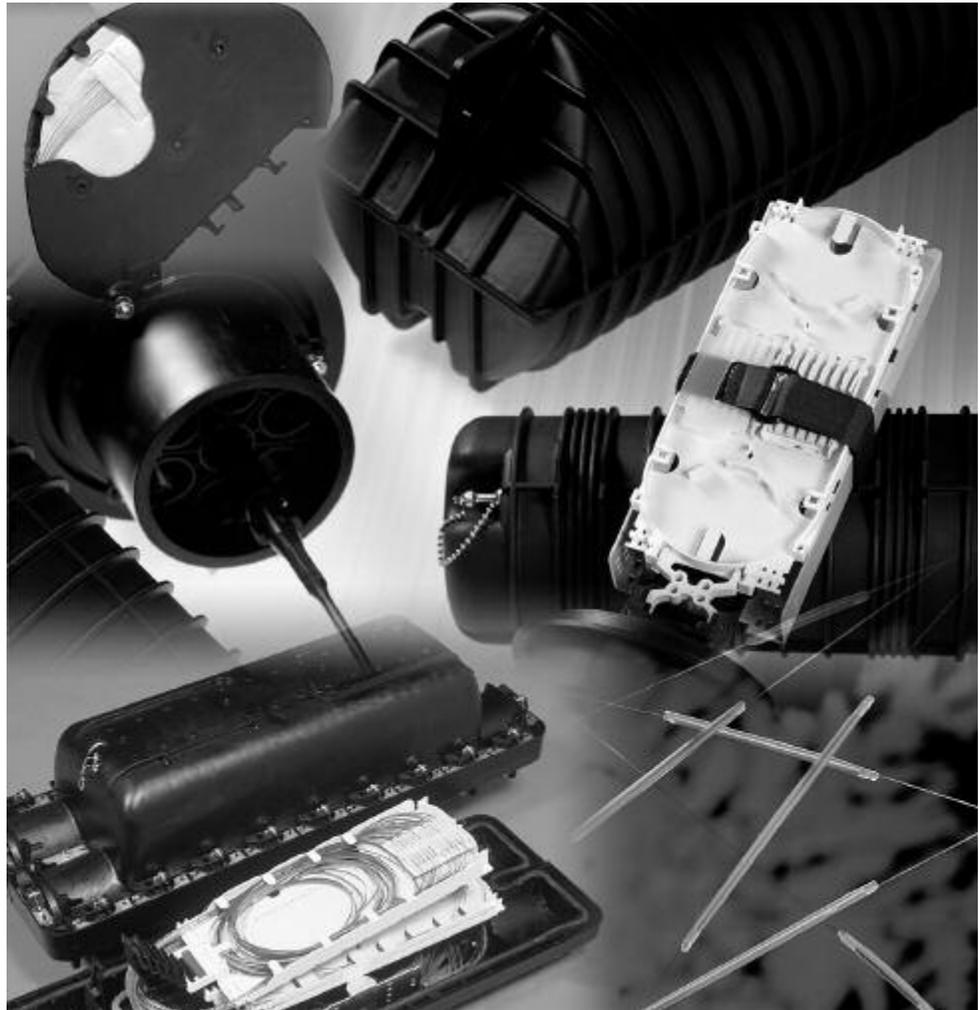
The Telecom Outside Plant Business Unit of TE has been created from a family of companies with a long tradition of making quality components for telecommunications networks and providing innovative solutions for their evolving needs.

The FIST, FOSC, and FibrBoss families of modular fiber management products enhance the design, implementation, and maintenance of fiberoptic networks, from the central office/exchange to the customer's premises.

For more information on Telecom Outside Plant products or services, visit http://www.telecomosp.com or contact customer service at 1-888-557-8901.

A full line Telecom Outside Plant Catalog (#1654451) is also available through customer services or your local TE sales representative.

# Attenuators

## Singlemode Build Out Attenuators

### Product Facts

- **A range of fixed attenuation values. Standard values of 1 through 20 and 25 dB**
- **LC, SC, FC, ST, and D4 styles**
- **Attenuation is wavelength independent and polarization insensitive**
- **Low PDL**
- **Low modal noise**
- **Vibration resistant**
- **Dual Window and Broadband Bandpass**
- **End face geometry per GR-326**
- **Designed to comply with Telcordia GR-910**

### Applications

- **Power leveling in DWDM transmission systems**
- **Test and Measurement**
- **Power attenuation at the receiver**

### Available Collateral

- **Test reports qualifying product to Telcordia GR-910 (2004)**
- **Application Specification 114-1129**
- **Installation/Cleaning Instruction Sheet 408-8895**
- **Product Specification 108-2099**

**http://www.te.com/ documents**

- **Customer Drawings**

### Customizable Features

- **Attenuation tolerance**
- **Attenuation values in 1 dB increments**
- **Labeling**
- **Kitting/Packaging**
- **Wavelength Dependent Loss**
- **Reflectance:**
  - **UPC to -55 dB max.**
  - **APC to -65 dB max.**

### Specifications

**Attenuation Values** —
1-20 dB and 25 dB (Fixed)

**Reflectance** —
≤ -55 and -65 dB for UPC and APC polish, respectively

**Operating Temperature** —
-40°C to +75°C

**Vibration Resistance** —
< 0.1 x attenuation

## Attenuators (Continued)

### Singlemode
### LC Attenuators, Build Out
### Style, Fixed Value

**LC/UPC**

28.6 [1.126]

6.25 [.246]

10.4 [.409]

Ø 1.25 [.049]
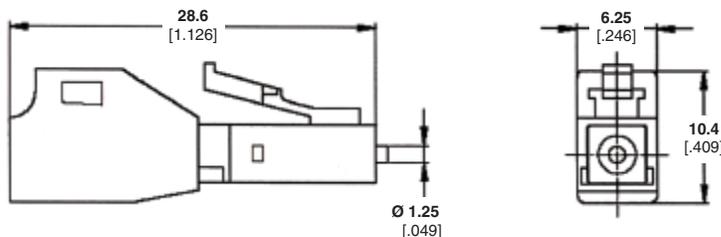
**Note:** Additional attenuation values available upon request.

**Broadband Bandpass Attenuators**
**Operating Wavelength**
**1260-1360 nm & 1430-1625 nm**

| Attenuation (dB) | Part Number |
|---|---|
| 1 | 1693560-1 |
| 2 | 1693560-2 |
| 3 | 1693560-3 |
| 4 | 1693560-4 |
| 5 | 1693560-5 |
| 6 | 1693560-6 |
| 7 | 1693560-7 |
| 8 | 1693560-8 |
| 9 | 1693560-9 |
| 10 | 1-1693560-0 |
| 11 | 1-1693560-1 |
| 12 | 1-1693560-2 |
| 13 | 1-1693560-3 |
| 14 | 1-1693560-4 |
| 15 | 1-1693560-5 |
| 16 | 1-1693560-6 |
| 17 | 1-1693560-7 |
| 18 | 1-1693560-8 |
| 19 | 1-1693560-9 |
| 20 | 2-1693560-0 |
| 25 | 2-1693560-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
Reflectance ≤ -55 dB

### Singlemode
### SC Attenuators, Build Out
### Style, Fixed Value

**SC/UPC**
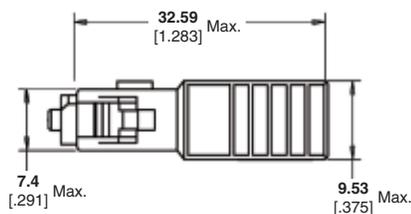
32.59 [1.283] Max.

7.4 [.291] Max.

9.53 [.375] Max.

**Note:** Additional attenuation values available upon request.

**Dual Window Attenuators**
**Operating Wavelength**
**1310/1550 nm ±25 nm**

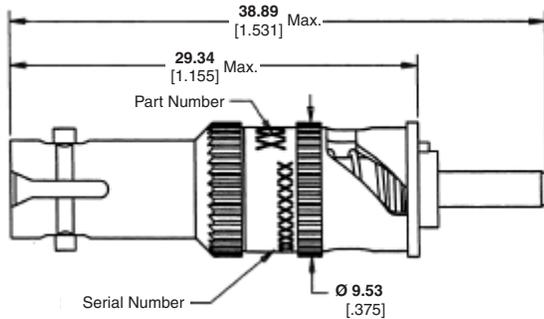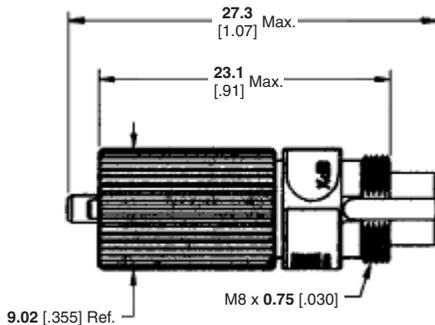| Attenuation (dB) | Part Number |
|---|---|
| 1 | 5209943-1 |
| 2 | 5209943-2 |
| 3 | 5209943-3 |
| 4 | 5209943-4 |
| 5 | 5209943-5 |
| 6 | 5209943-6 |
| 7 | 5209943-7 |
| 8 | 5209943-8 |
| 9 | 5209943-9 |
| 10 | 1-5209943-0 |
| 11 | 1-5209943-1 |
| 12 | 1-5209943-2 |
| 13 | 1-5209943-3 |
| 14 | 1-5209943-4 |
| 15 | 1-5209943-5 |
| 16 | 1-5209943-6 |
| 17 | 1-5209943-7 |
| 18 | 1-5209943-8 |
| 19 | 1-5209943-9 |
| 20 | 2-5209943-0 |
| 25 | 2-5209943-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
0 dB: 0.50 dB max
Reflectance ≤ -55 dB

**Broadband Bandpass Attenuators**
**Operating Wavelength**
**1260-1360 nm & 1430-1625 nm**

| Attenuation (dB) | Part Number |
|---|---|
| 1 | 5209250-1 |
| 2 | 5209250-2 |
| 3 | 5209250-3 |
| 4 | 5209250-4 |
| 5 | 5209250-5 |
| 6 | 5209250-6 |
| 7 | 5209250-7 |
| 8 | 5209250-8 |
| 9 | 5209250-9 |
| 10 | 1-5209250-0 |
| 11 | 1-5209250-1 |
| 12 | 1-5209250-2 |
| 13 | 1-5209250-3 |
| 14 | 1-5209250-4 |
| 15 | 1-5209250-5 |
| 16 | 1-5209250-6 |
| 17 | 1-5209250-7 |
| 18 | 1-5209250-8 |
| 19 | 1-5209250-9 |
| 20 | 2-5209250-0 |
| 25 | 2-5209250-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
0 dB: 0.50 dB max.
Reflectance ≤ -55 dB

**Note:** All part numbers are RoHS compliant.

**Other Products and Capabilities**

**4**

## Attenuators (Continued)

### Singlemode
### SC Attenuators, Build Out
### Style Fixed Value

#### SC/APC 8°

**7.4** [.291] Max.     **9.53** [.375] Max.

**32.59** [1.283] Max.
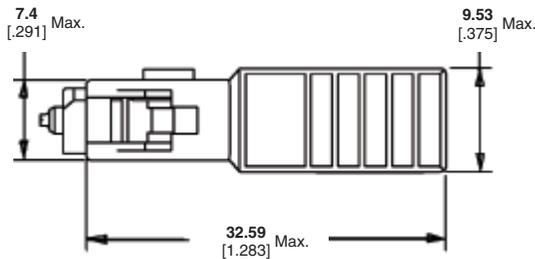
**Note:** Additional attenuation values available upon request.

* 9° APC Available (Part Number 5417496-X)

**Dual Window Attenuators**
**Operating Wavelength**
**1310/1550 nm ±25 nm**

| Attenuation (dB) | Part Number |
| --- | --- |
| 1 | 5209597-1 |
| 2 | 5209597-2 |
| 3 | 5209597-3 |
| 4 | 5209597-4 |
| 5 | 5209597-5 |
| 6 | 5209597-6 |
| 7 | 5209597-7 |
| 8 | 5209597-8 |
| 9 | 5209597-9 |
| 10 | 1-5209597-0 |
| 11 | 1-5209597-1 |
| 12 | 1-5209597-2 |
| 13 | 1-5209597-3 |
| 14 | 1-5209597-4 |
| 15 | 1-5209597-5 |
| 16 | 1-5209597-6 |
| 17 | 1-5209597-7 |
| 18 | 1-5209597-8 |
| 20 | 2-5209597-0 |
| 25 | 2-5209597-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
Reflectance ≤ -60 dB

**Broadband Bandpass Attenuators**
**Operating Wavelength**
**1260-1360 nm & 1430-1625 nm**

| Attenuation (dB) | Part Number |
| --- | --- |
| 1 | 5417021-1 |
| 2 | 5417021-2 |
| 3 | 5417021-3 |
| 4 | 5417021-4 |
| 5 | 5417021-5 |
| 6 | 5417021-6 |
| 7 | 5417021-7 |
| 8 | 5417021-8 |
| 9 | 5417021-9 |
| 10 | 1-5417021-0 |
| 11 | 1-5417021-1 |
| 12 | 1-5417021-2 |
| 13 | 1-5417021-3 |
| 14 | 1-5417021-4 |
| 15 | 1-5417021-5 |
| 16 | 1-5417021-6 |
| 17 | 1-5417021-7 |
| 18 | 1-5417021-8 |
| 19 | 1-5417021-9 |
| 20 | 2-5417021-0 |
| 25 | 2-5417021-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
Reflectance ≤ -65 dB

### Singlemode
### FC Attenuators, Build Out
### Style, Fixed Value

#### FC/UPC
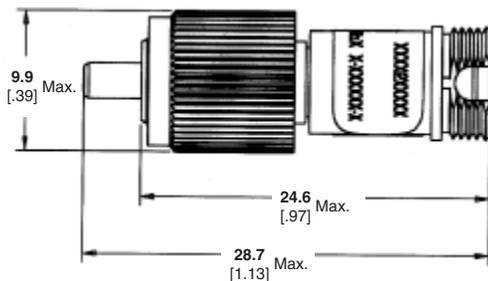
**9.9** [.39] Max.

**24.6** [.97] Max.

**28.7** [1.13] Max.

**Note:** Additional attenuation values available upon request.

**Dual Window Attenuators**
**Operating Wavelength**
**1310/1550 nm ±25 nm**

| Attenuation (dB) | Part Number |
| --- | --- |
| 1 | 5209948-1 |
| 2 | 5209948-2 |
| 3 | 5209948-3 |
| 4 | 5209948-4 |
| 5 | 5209948-5 |
| 6 | 5209948-6 |
| 7 | 5209948-7 |
| 8 | 5209948-8 |
| 9 | 5209948-9 |
| 10 | 1-5209948-0 |
| 11 | 1-5209948-1 |
| 12 | 1-5209948-2 |
| 13 | 1-5209948-3 |
| 14 | 1-5209948-4 |
| 15 | 1-5209948-5 |
| 16 | 1-5209948-6 |
| 17 | 1-5209948-7 |
| 18 | 1-5209948-8 |
| 19 | 1-5209948-9 |
| 20 | 2-5209948-0 |
| 25 | 2-5209948-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
Reflectance ≤ -55 dB

**Broadband Bandpass Attenuators**
**Operating Wavelength**
**1260-1360 nm & 1430-1625 nm**

| Attenuation (dB) | Part Number |
| --- | --- |
| 1 | 5209285-1 |
| 2 | 5209285-2 |
| 3 | 5209285-3 |
| 4 | 5209285-4 |
| 5 | 5209285-5 |
| 6 | 5209285-6 |
| 7 | 5209285-7 |
| 8 | 5209285-8 |
| 9 | 5209285-9 |
| 10 | 1-5209285-0 |
| 11 | 1-5209285-1 |
| 12 | 1-5209285-2 |
| 13 | 1-5209285-3 |
| 14 | 1-5209285-4 |
| 15 | 1-5209285-5 |
| 16 | 1-5209285-6 |
| 17 | 1-5209285-7 |
| 18 | 1-5209285-8 |
| 19 | 1-5209285-9 |
| 20 | 2-5209285-0 |
| 25 | 2-5209285-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
0 dB: 0.50 dB max.
Reflectance ≤ -55 dB

**Note:** All part numbers are RoHS compliant.

## Attenuators (Continued)

### Singlemode ST Attenuators, Build Out Style, Fixed Value

#### ST/UPC

38.89 [1.531] Max.

29.34 [1.155] Max.

Part Number

Serial Number

Ø 9.53 [.375]

**Dual Window Attenuators**
**Operating Wavelength**
**1310/1550 nm ±25 nm**

| Attenuation (dB) | Part Number |
|---|---|
| 1 | 5417549-1 |
| 2 | 5417549-2 |
| 3 | 5417549-3 |
| 4 | 5417549-4 |
| 5 | 5417549-5 |
| 6 | 5417549-6 |
| 7 | 5417549-7 |
| 8 | 5417549-8 |
| 9 | 5417549-9 |
| 10 | 1-5417549-0 |
| 11 | 1-5417549-1 |
| 12 | 1-5417549-2 |
| 13 | 1-5417549-3 |
| 14 | 1-5417549-4 |
| 15 | 1-5417549-5 |
| 16 | 1-5417549-6 |
| 17 | 1-5417549-7 |
| 18 | 1-5417549-8 |
| 19 | 1-5417549-9 |
| 20 | 2-5417549-0 |
| 25 | 2-5417549-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .15 x nominal attenuation value
< 5 dB: ± 0.75 dB
Reflectance ≤ -55 dB

**Broadband Bandpass Attenuators**
**Operating Wavelength**
**1260-1360 nm & 1430-1625 nm**

| Attenuation (dB) | Part Number |
|---|---|
| 1 | 5417399-1 |
| 2 | 5417399-2 |
| 3 | 5417399-3 |
| 4 | 5417399-4 |
| 5 | 5417399-5 |
| 6 | 5417399-6 |
| 7 | 5417399-7 |
| 8 | 5417399-8 |
| 9 | 5417399-9 |
| 10 | 1-5417399-0 |
| 11 | 1-5417399-1 |
| 12 | 1-5417399-2 |
| 13 | 1-5417399-3 |
| 14 | 1-5417399-4 |
| 15 | 1-5417399-5 |
| 16 | 1-5417399-6 |
| 17 | 1-5417399-7 |
| 18 | 1-5417399-8 |
| 19 | 1-5417399-9 |
| 20 | 2-5417399-0 |
| 25 | 2-5417399-5 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB
0 dB: 0.50 dB max.
Reflectance ≤ -55 dB

### Singlemode D4 Attenuators, Build Out Style, Fixed Value

#### D4/PC

27.3 [1.07] Max.

23.1 [.91] Max.

M8 x 0.75 [.030]

9.02 [.355] Ref.

**Note:** Additional attenuation values available upon request.

**Dual Window Attenuators**

**Operating Wavelength**
**1310/1550 nm ±25 nm**

| Attenuation (dB) | Part Number |
|---|---|
| 5 | 5209570-5 |
| 10 | 1-5209570-0 |
| 15 | 1-5209570-5 |
| 20 | 2-5209570-0 |

**Note:** Attenuation Tolerance, Ambient
≥ 5 dB: ± .15 x nominal attenuation value
< 5 dB: ± 0.75 dB
Reflectance ≤ -45 dB

**Other Products and Capabilities**

**4**

**Note:** All part numbers are RoHS compliant.

## Switches

**Ruggedized Multimode Switches**

**Refractive Plate Switch**
**2 x 2 Bypass Configuration**

**Part Number**
**6588871-1**

**Product Facts:**

■ **No optical path interruption @200 G's for 8 ms**

■ **Successfully passed MIL-S-901D (Navy) Heavyweight Shock Test (Barge Test)**

■ **Fiber type 62.5/125 μm multimode**

**Specifications**

**Operating Temperature Range** — -30° to +85° C

**Storage Temperature Range** — -40° to +85° C

**Durability** — >1,000,000 cycles

**Minimum Actuation Voltage** — 4.75 V

**Maximum Actuation Voltage** — 5.25 V

**Actuation Current at Typical** — 5.0 V

**Actuation Voltage** — 100mA (maximum)



TE's Ruggedized Refractive Plate Switch is a multimode optical switch that is capable of withstanding a 200 G shock with a duration of >8ms without interruption of the signal path.

This switch is designed for extreme environments that require absolute product quality on optical installations and optical signal integrity.

**Product Dimensions:**
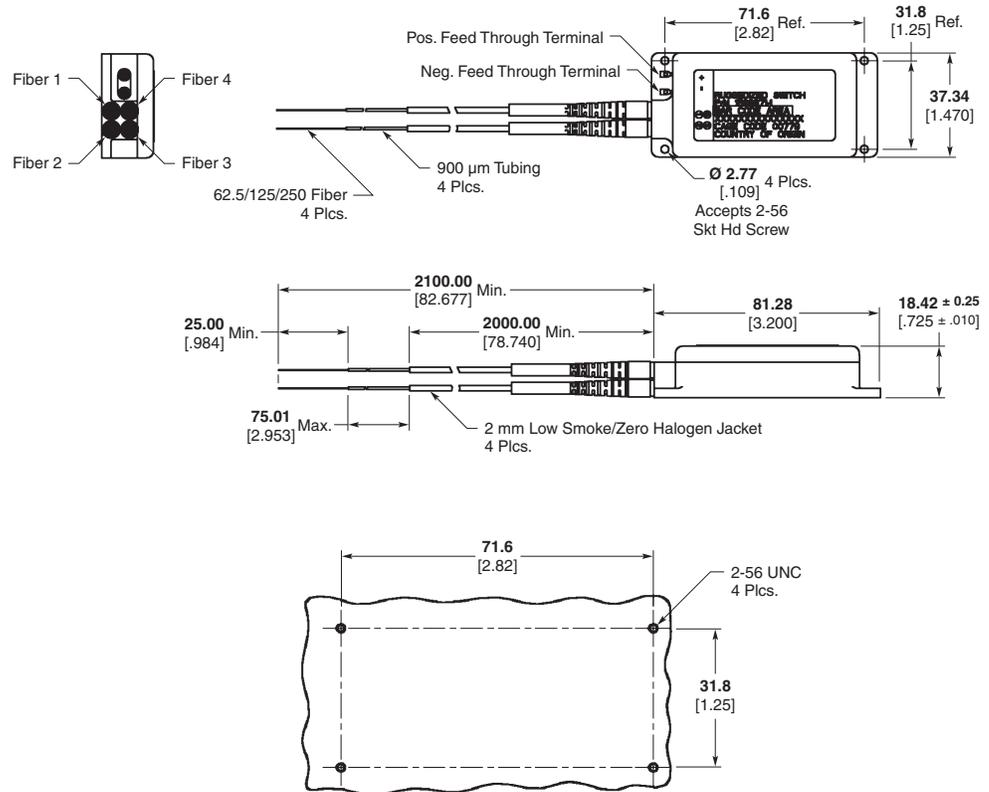


**Recommended Mounting Layout**

**Note:** All part numbers are RoHS compliant.

## Table of Contents

**Fiber to the Antenna**

**5**

## Fiber to the Antenna Rugged Interconnect



Next generation WiMax and LTE Fiber to the antenna designs require rugged cable assemblies that plug directly into transceivers though a bulkhead.

It has to be a connector design that can accommodate a large tolerance in Z-direction. It has to allow one handed mating (to facilitate installation at the antenna).

With a large Z axis tolerance, they will accommodate the broadest range of transceivers, so end customers can pick the transceiver of their choice.

### Applications

■ **Base Stations**

■ **Industrial**

■ **Aerospace & Defense**

## FULLAXS Fiber to the Antenna Rugged Interconnect

### Product Facts

- **Open bulkhead for easy access to SFP**
- **Positive feedback to operator when fully mated**
- **One-hand mating**
- **Duplex LC interface**
- **Bulkhead cutouts allow for removal of transceiver through the bulkhead (no need to open RRH for transceiver replacement)**
- **Robust bayonet locking for easy, fast, and secure mating**
- **Multimode and singlemode**
- **Water proof, dust proof and corrosion resistant**
- **Expansion to RJ45, etc**
- **Plug has tolerance free design, fully free floating in Z-axis**
- **No Cable buckling at any time during or after installation**
- **Cost effective glass-filled polymer or metal diecasted bulkhead**
- **Field installable version available**

### Specifications

**Temperature** — −40°C – +85°C

**150 N Pull Force** — per IEC61300-2-4

**Protection Class** — IP67

**Cycles** — 50 Mating Cycles

**Vibration** — per GR3115 (3.26.3)

**Salt Mist** — per IEC 61300-2-26

**Vibration** — per IEC 61300-2-1

**Shock** — per IEC 61300-2-9

**Impact** — IEC 61300-2-12

**Temperature / Humidity** — IEC 61300-2-22

### Mechanical

**Retention** — 150 N cable retention

**Rating** — IP67 Rated

**Interface** — LC interface

**Adapter Footprint** — 36 mm x 36 mm

**Locking Style** — Bayonet style

**Duplex LC Interconnect** — MM or SM

**Tools** — No tools required

**Operating Temperature** — −40°C to +85°C

**Mating Durability** — min. 50 cycles

**Fiber to the Antenna**

**5**

## ODC™ Plug and Socket Cable Assemblies

**Product Facts**

- **2 and 4 Channel**
- **Multimode — 2 & 4 Ch; Singlemode — 2 Ch**
- **Compact design with 2 x or 4 x 1.25 mm ferrules**
- **Built-in socket available with square or hexagonal flange**
- **Water proof, dust proof and corrosion resistant**
- **Screw lock mechanism**
- **Scoop proof**
- **One hand, blind-mating possible**
- **Attached protection cap**
- **EMI shielded**
- **Low-Smoke, Zero-Halogen (LSZH)**



The ODC connectors, together with the support optical cable, are becoming the standard interface specified in 3G, 4G and WiMax Base Station remote radios and Fiber-to-the-Antenna applications.

The ODC cable assembly is based on the N Type RF Coax connector. The prod-

uct, however, is not limited to the above applications. As the ODC cable assemblies have passed tests like salt mist, vibration and shock and meets protection class IP68, they are well suited for Industrial and Aerospace and Defense applications.

**Applications**

- **Base Stations**
- **Industrial**
- **Aerospace & Defense**

**Technical Documents**

**Protection Class**
IP68
**Salt Mist**
IEC 61300-2-26: passed
**Vibration**
IEC 61300-2-1: passed
**Shock**
IEC 61300-2-9: passed

**Optical**

Insertion loss according to IEC 61300-3-34
**Multimode** —
Typ. ≤ 0.25 dB
Max. ≤ 0.70 dB
**Singlemode** —
Typ. ≤ 0.30 dB
Max. ≤ 1.00 dB
**Return Loss** — Single mode ≥ 45 dB

**Mechanical**

**Technology** — Full ceramic ferrule and sleeve
**Mechanically Robust** —
ODC plug ≤ 800 N tensile load
ODC socket ≤ 30 N tensile load
**Installation Torque Force** —
min. 1 Nm
max. 2 Nm.
**Operating Temperature** —
-40°C up to +85°C
**Mating Durability** —
min. 100 cycles

ODC is a product and trademark of HUBER+SUHNER AG.

## ODC™ Plug and Socket Cable Assemblies (Continued)

**Interface Dimensions**

**2-Fiber ODC Plug**
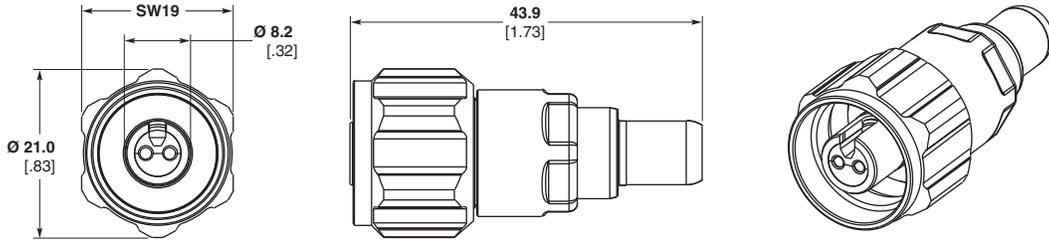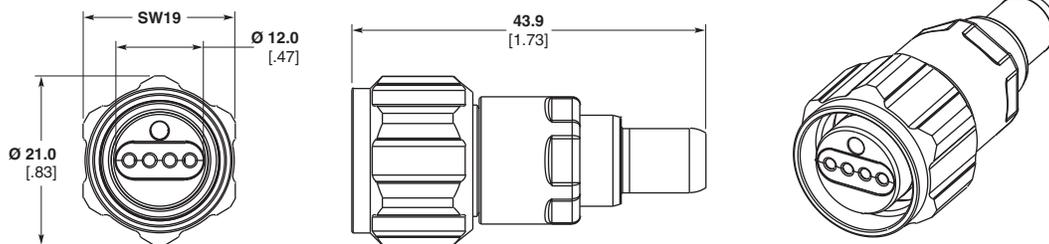
SW19 · Ø 8.2 [.32] · Ø 21.0 [.83] · 43.9 [1.73]

**4-Fiber ODC Plug**

SW19 · Ø 12.0 [.47] · Ø 21.0 [.83] · 43.9 [1.73]

**Fiber to the Antenna**

5

## ODC™ Plug and Socket Cable Assemblies (Continued)

### Interface Dimensions
(Continued)

### 2-Fiber Small Square ODC Socket
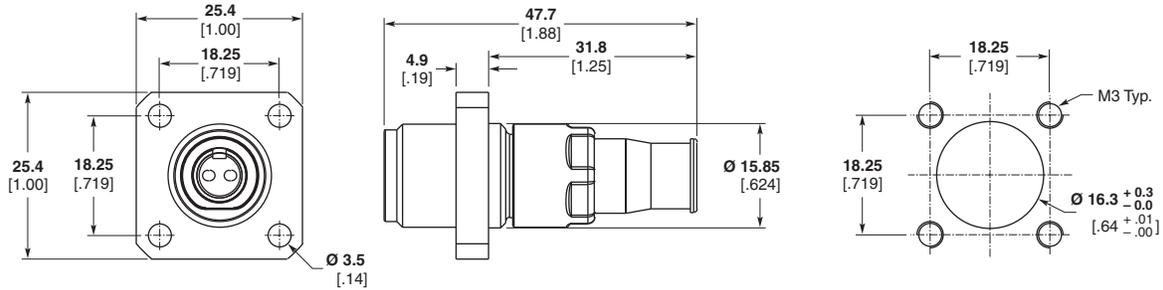


### 2-Fiber Hexagonal ODC Socket



From **2.8 to 4.0** [.11 to .16] (Panel Thickness)
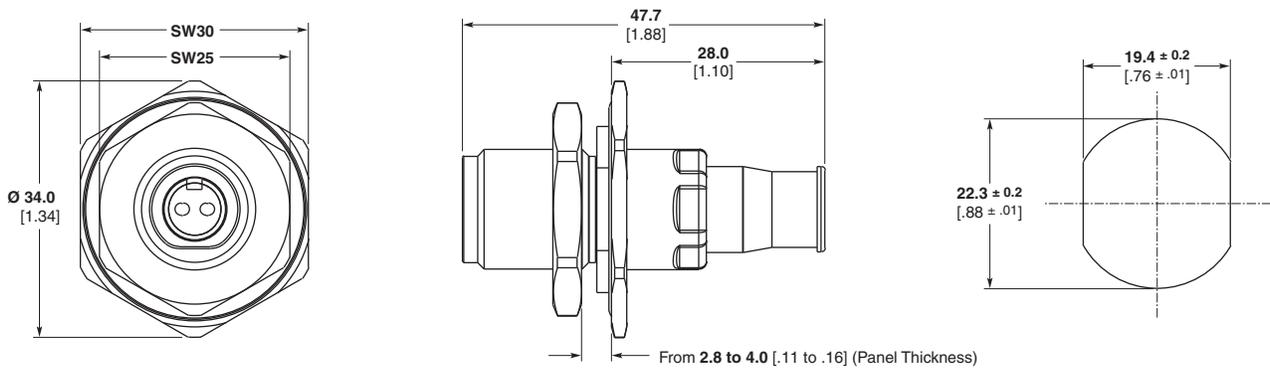
### 4-Fiber Small Square Socket
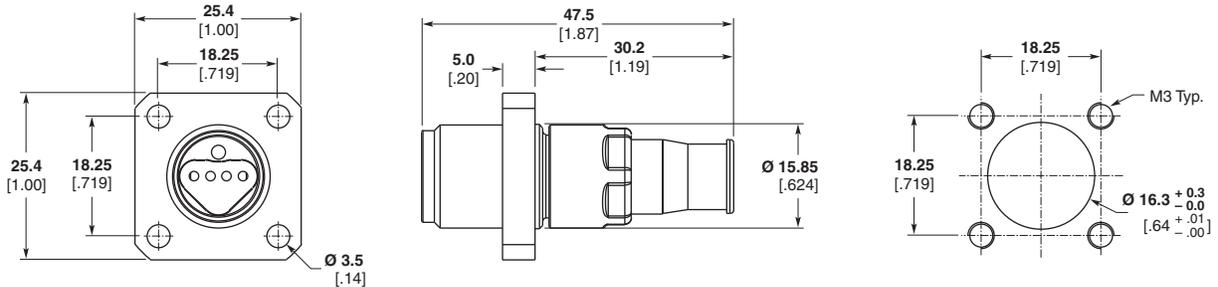


### 4-Fiber Hexagonal Socket
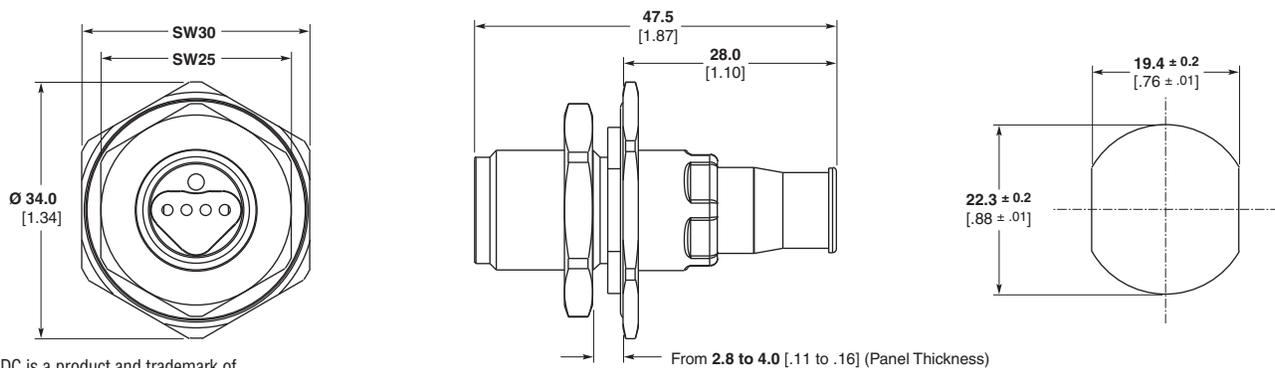


From **2.8 to 4.0** [.11 to .16] (Panel Thickness)

ODC is a product and trademark of HUBER+SUHNER AG.

## ODC™ Plug and Socket Cable Assemblies (Continued)

### Product Dimensions

**2-Fiber Plug to
LC Duplex Assembly**

SW19

Keyway

Ø 8.2
[.32]

Ø 21.0
[.83]

Pin 2          Pin 1

**View X-X
ODC 2 Fiber Plug to LC**

43.9
[1.73]
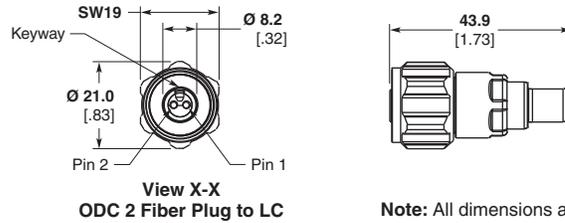
**Fiber Path**

| ODC Plug | | LC Connector |
|---|---|---|
| Pin 1 | ⟷ | A |
| Pin 2 | ⟷ | B |

**Note:** All dimensions are reference dimensions.

X

X

**ODC Plug**          **Outdoor IP68**

B

A

ODC Ruggedized Field Cable
5.5 mm Diameter

ODC Protective Tubing
Color: Black
2.1 mm Diameter

**4-Fiber Plug to
LC Duplex Assembly**

SW19

Keyway

Ø 12.0
[.47]

Ø 21.0
[.83]

Pin 4          Pin 1
Pin 3        Pin 2

**View X-X
ODC 4 Fiber Plug to LC**

43.9
[1.73]
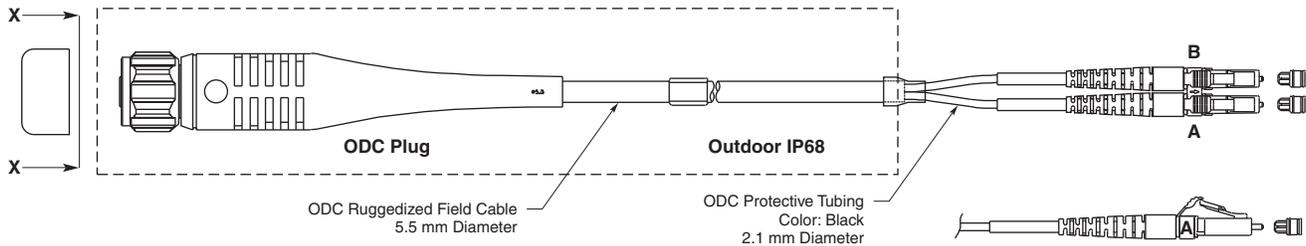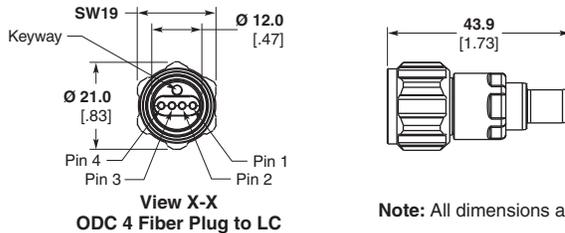
**Fiber Path**

| ODC Plug | | LC Connector |
|---|---|---|
| Pin 1 | ⟷ | 1 |
| Pin 2 | ⟷ | 2 |
| Pin 3 | ⟷ | 3 |
| Pin 4 | ⟷ | 4 |

**Note:** All dimensions are reference dimensions.

X

X

**ODC Plug**          **Outdoor IP68**

B

A

ODC Ruggedized Field Cable
5.5 mm Diameter

ODC Protective Tubing
Color: Black
2.1 mm Diameter
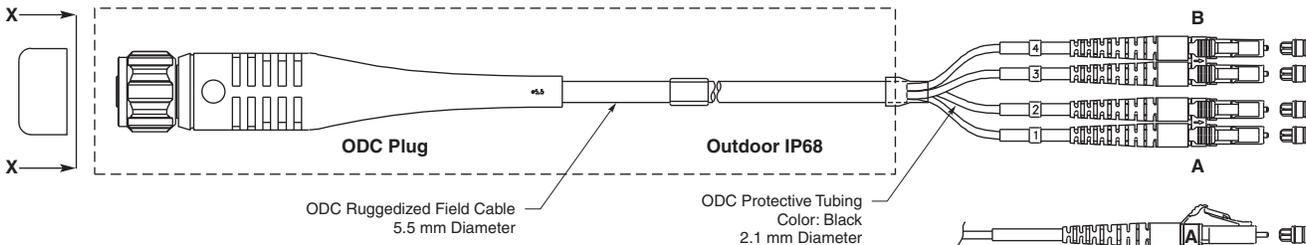
### Cable Assembly Part Numbers

| Base Part Number[1] | Description | Fiber Size | Available Sizes |
|---|---|---|---|
| 1985834 | 2-Fiber Plug to LC Duplex Assembly | Singlemode | 1 to 99 meters [2] |
| 1985835 | 2-Fiber Plug to LC Duplex Assembly | Multimode (50/125) | |
| 1985836 | 2-Fiber Plug to LC Duplex Assembly | Multimode (62.5/125) | |
| 1985837 | 4-Fiber Plug to LC Duplex Assembly | Multimode (50/125) | |
| 1985838 | 4-Fiber Plug to LC Duplex Assembly | Multimode (62.5/125) | |
| 1985844 | 2-Fiber Plug to LC Duplex Assembly | Singlemode | 100 to 999 meters [3] |
| 1985845 | 2-Fiber Plug to LC Duplex Assembly | Multimode (50/125) | |
| 1985846 | 2-Fiber Plug to LC Duplex Assembly | Multimode (62.5/125) | |
| 1985847 | 4-Fiber Plug to LC Duplex Assembly | Multimode (50/125) | |
| 1985848 | 4-Fiber Plug to LC Duplex Assembly | Multimode (65.5/125) | |

ODC is a product and trademark of HUBER+SUHNER AG.

**Note:** All part numbers are RoHS compliant.

1. For complete part numbers, obtain proper customer drawing.
2. The length is defined by the dash number (i.e.: 8-1985834-2 is 82 meters long, 1-1985834-5 is 15 meters long)
3. The length is defined by the dash number (i.e.: 8-1985844-2 is 820 meters long, 1-1985844-5 is 150 meters long)
**Note:** Other dust caps (screw type) and connector types, in combination with ODC Plug (or socket), are available upon request.

## ODC™ Plug and Socket Cable Assemblies (Continued)

### Product Dimensions
(Continued)

### 2-Fiber Socket to LC Duplex Assembly
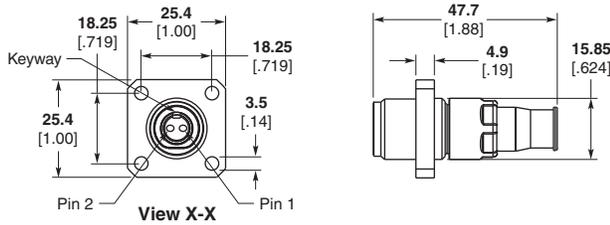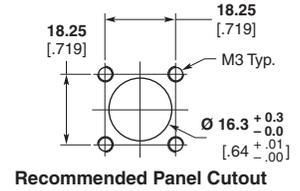
**Fiber Path**

| ODC Socket | | LC Connector |
|---|---|---|
| Pin 1 | ⟷ | A |
| Pin 2 | ⟷ | B |

**Recommended Panel Cutout**

**ODC 2 Fiber Socket Small Square to LC**

**View X-X**

**Note:** All dimensions are reference dimensions.

ODC Socket IP68

Simplex Cable 1.9 mm Diameter
Color: Orange if Multimode or Yellow if Singlemode
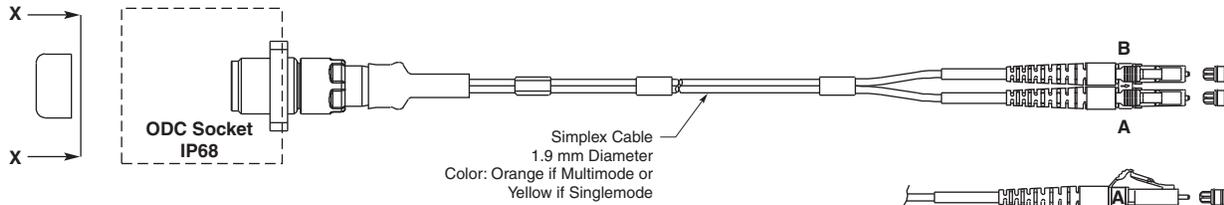
### 4-Fiber Socket to LC Duplex Assembly
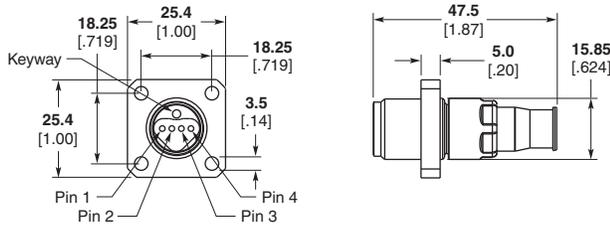
**Fiber Path**

| ODC Socket | | LC Connector |
|---|---|---|
| Pin 1 | ⟷ | 2 |
| Pin 2 | ⟷ | 1 |
| Pin 3 | ⟷ | 4 |
| Pin 4 | ⟷ | 3 |
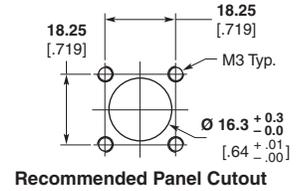
**Recommended Panel Cutout**

**ODC 4 Fiber Socket Small Square to LC**

**View X-X**

**Note:** All dimensions are reference dimensions.

ODC Socket IP68

Simplex Cable 1.9 mm Diameter
Color: Orange if Multimode or Yellow if Singlemode
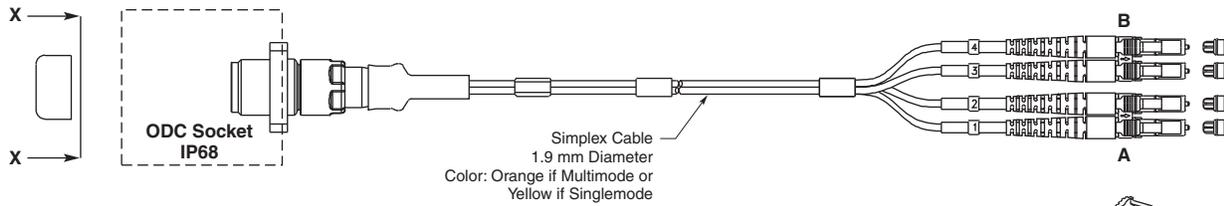
| Base Part Number[1] | Description | Fiber Size | Available Sizes |
|---|---|---|---|
| 1985839 | 2-Fiber Socket to LC Duplex Assembly | Singlemode | |
| 1985840 | 2-Fiber Socket to LC Duplex Assembly | Multimode (50/125) | |
| 1985841 | 2-Fiber Socket to LC Duplex Assembly | Multimode (62.5/125) | 0.3 to 9.9 meters [2] |
| 1985842 | 4-Fiber Socket to LC Duplex Assembly | Multimode (50/125) | |
| 1985843 | 4-Fiber Socket to LC Duplex Assembly | Multimode (62.5/125) | |

1. For complete part numbers, obtain proper customer drawing.
2. The length is defined by the dash number (i.e.: 3-1985839-5 is 3.5 meters long, 1-1985839-6 is 1.6 meters long)
**Note:** Other dust caps (screw type) and connector types, in combination with ODC Plug (or socket), are available upon request.
**Note:** All part numbers are RoHS compliant.

ODC is a product and trademark of HUBER+SUHNER AG.

# Max-Travel Fiber to the Antenna Rugged Interconnect

Next generation WiMax and LTE Fiber to the antenna designs require rugged cable assemblies that plug directly into transceivers though a bulkhead.

Max-Travel provides the widest tolerance of transceiver lengths and position, while allowing one handed mating (to facilitate installation at the antenna).

With a Z axis tolerance of 6 mm, it will accommodate the broadest range of transceivers, so end customers can pick the transceiver of their choice.

## Product Facts

■ **Mates with 6 mm variation in transceiver length (6 mm Z Axis Travel)**

■ **One-hand mating**

■ **Duplex LC interface**

■ **Bulkhead cutouts allow for removal of transceiver through the bulkhead (no need to open RRH for transceiver replacement)**

■ **Robust bayonet locking for easy, fast, and secure mating**

■ **Multimode and singlemode**

■ **Water proof, dust proof and corrosion resistant**

## Applications

■ **Base Stations**

■ **Industrial**

■ **Aerospace & Defense**

## Specifications

**Temperature** — −40°C – +85°C

**400 N Pull Force** — per IEC61300-2-4

**Protection Class** — IP67

**Cycles** — 500 Mating Cycles

**Vibration** — per GR3115 (3.26.3)

**Salt Mist** — per IEC 61300-2-26

**Vibration** — per IEC 61300-2-1

**Shock** — per IEC 61300-2-9

**Impact** — IEC 61300-2-12

**Temperature / Humidity** — IEC 61300-2-22

## Mechanical

**Retention** — 400 N cable retention

**Rating** — IP67 Rated

**Interface** — LC interface

**Adapter footprint** — 36 mm x 37 mm

**Locking Style** — Bayonet style

**Shell** — Full metal shell for EMI protection

**Duplex LC interconnect** — MM or SM

**Tools** — No tools required

**Operating Temperature** — −40°C to +85°C

**Mating Durability** — min. 100 cycles

**Fiber to the Antenna**

**5**

**SFP Transceiver Placement Tolerance = ± 3 mm**

6 mm Z Axis Travel

6 mm of Travel

**Axial Float of LC Connectors = 6 mm**
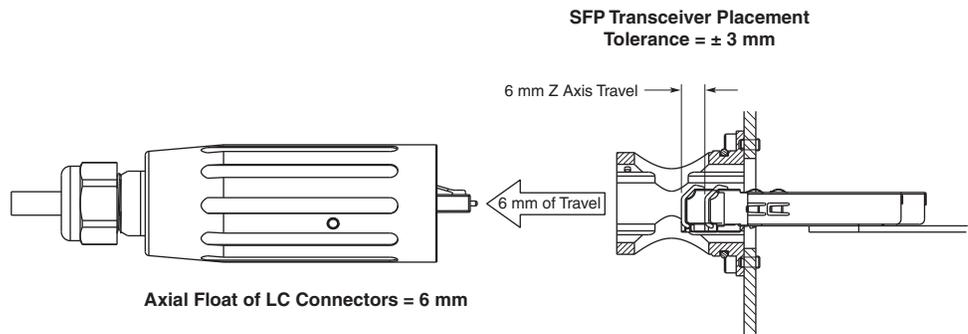
## LC ODVA Compliant Connectors

### Sealed Circular LC ODVA Compliant Connector

### Product Facts

- **IP67 rated to ensure protection from dust and water immersion**
- **LC connector qualified to Telcordia GR-326 and TIA/EIA 568B.3**
- **Temperature range of –40°C to 85°C**
- **Bayonet-style mechanical lock**
- **Flame retardant materials per UL 94 V-0**
- **Dual mounting bulkhead design**
- **Singlemode and multimode fiber**
- **Can be used with cable types 9/125, 50/125 and 62.5/125**
- **LC to LC internal to the box Jumpers**
- **LC connector accepts tactical cable with 4.5 mm – 7.5 mm OD**
- **ODVA Compliant Plug to X interface on tactical with break out**
- **ODVA Compliant Plug to Plug on tactical cable**
- **Build to customer need**

### Applications

**The LC ODVA Compliant Connector is ideal for:**

- **Harsh environments where chemicals, corrosive gases and liquids are commonplace**
- **Inside and outside industrial plant and equipment that interface with industrial Ethernet networks**
- **Remote interface applications such as towers and antennae as well as FTTX in PON and at the home applications**
- **Mobile routers and internet hardware**



**Plug Part Numbers:**
**1828618-1 (Multimode)**
**1828618-2 (Singlemode)**

**Receptacle Part Numbers:**
**1828619-1 (Multimode)**
**1828619-2 (Singlemode)**

**Plug & Receptacle Cap Part Numbers:**

| | |
|---|---|
| **Plug Cap** | **1828740-1** |
| **Receptacle Cap** | **1918177-1** |



21.00 [.827]
9.46 [.373]
97.6 [3.84]
Ø 31.50 [1.240]



Gasket Panel
2.00 [.079]
19.20 [.756]
29.60 [1.165]
33.73 [1.328]

12.93 [.509]
Ø 28.50 [1.122]

**Recommended Panel Cutout
Max. Panel Thickness 3.2 mm**

Ø 34.0 [1.34]
37.0 [1.45]
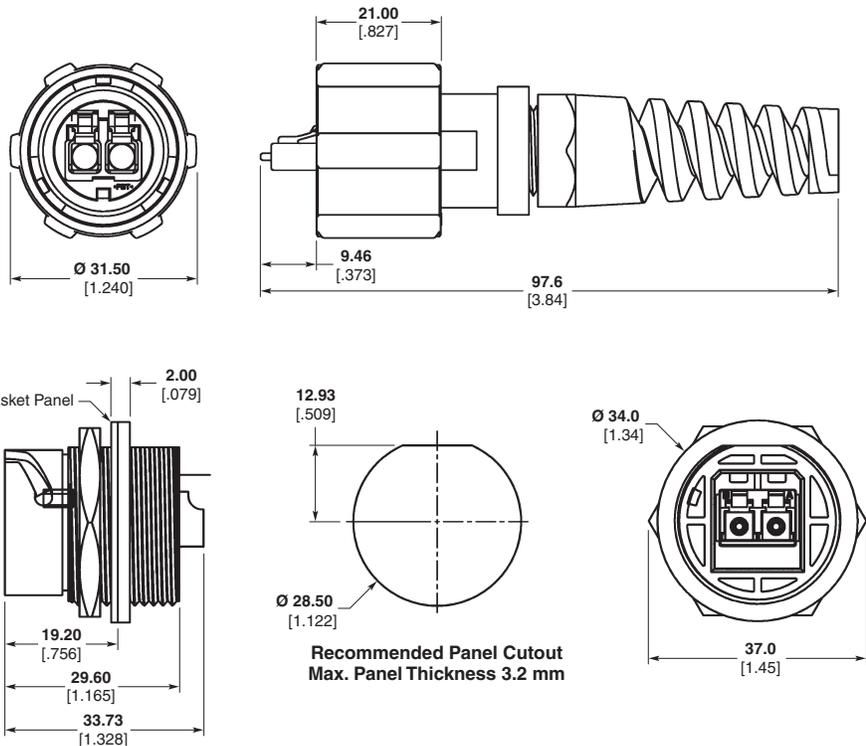
### Standard Cable Assemblies

| Part Number | Description |
|---|---|
| 1828935-X | LC ODVA Compliant Interface, 62.5, 2 Fiber |
| 1828936-X | LC ODVA Compliant Interface, Singlemode, 2 Fiber |

**Note:** X = length in meters

**ASSEMBLY CAPABILITIES
TE has extensive rugged optic harness capabilities.
Please consult your local TE Sales Representative for assistance.**

**Note:** All part numbers are RoHS compliant.

## LC ODVA Compliant Connectors (Continued)

**Sealed Circular LC Shielded EMI Connector**

**EMI Shielded Receptacle Assembly**

■ **Components are thin film coated using a four-step SS/Cu/Cu/SS vacuum deposition process**

■ **This coating results in an approximate 99% shielding effectiveness over uncoated assemblies**

**Part Number 1985193-1**



**Fiber to the Antenna**

**5**

**Note:** All part numbers are RoHS compliant.

# PRO BEAM Expanded Beam Rugged Optics Products

## Expanded Beam Products

### Product Facts

- **PRO BEAM Sr., PRO BEAM Jr. and PRO BEAM Mini Connector field deployable interconnects**

- **ARINC 600 connectors, with inserts/holder blocks designed for Mini Expanded Beam — up to 128 channels on size 3 ARINC 600**

- **MIL-C-38999 Series III shell  size 11 style circular connectors — Cable assemblies up to 4 fibers**

- **Unique Modular Design, for use with multimode and singlemode fiber**

- **Tactical cables, cable reels, backpacks**

- **Cable assembly and termination services**

- **Ball lens expands cross-sectional area of light over 200 times for multimode and over 2000 times for singlemode**

- **Rugged hermaphroditic construction (i.e., same insert mates to each other)**

- **Physically non-contacting mating conditions; no wear, installed fiber ferrule protected by ball lens**

## Expanded Beam Technology
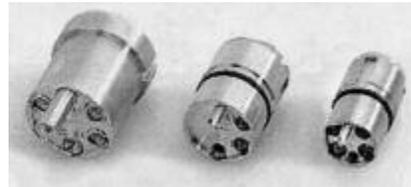


**From left to right: PRO BEAM Sr., PRO BEAM Jr. & PRO BEAM Mini Expanded Beam inserts.**



**Expanded Beam Principle**

Fiber Optic Interconnect/ Cable System using Expanded Beam technology, which physically expands and collimates the transmission signal into an optical beam over 14 times its original diameter (the cross sectional area of the light beam increases over 200 times for multimode optical signals).  For singlemode signals, the collimated beam is over 45 times its original diameter (the cross-sectional area of the light beam increases over 2,000 times.).  It is then refocused back down onto the core of the receiving fiber.  This approach provides ease of alignment and low sensitivity to thermal changes and contamination. High strength, precision connector housings enhance a durable connection, optimizing low loss and repeatable performance.

Suitable for aerospace, avionics, field-deployable communications, marine ship-to-shore applications, security systems, mobile diagnostic units, oil and gas exploration and other harsh environment applications demanding strength, durability and reliable performance in conditions of multiple coupling/ decouplings, blindmate situations, and high vibration.

### Product Facts

- **No wear on fiber optic interface; Very vibration resistant**

- **Easy to handle, easy to clean. Durable connection that is highly resistant to dirt/debris**

- **Singlemode or multimode**

- **Common 850/1300 Dual Wavelength, 1310, or 1550 nm wavelengths**

- **Easy alignment for low-loss, repeatable performance**

- **Consistent overall optical "link budget" assured**

- **Low sensitivity to thermal fluctuations and interface contamination**

- **Repeatable low-loss performance in harsh environments**

## Expanded Beam Inserts
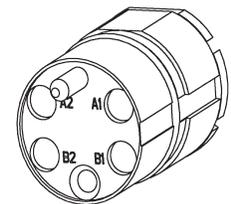


- **PRO BEAM Sr. Insert — the original, larger format, Field Tactical, hermaphroditic Connector System**

- **PRO BEAM Jr. Insert — the second generation, reduced size, Field Tactical Connector System**

- **Mini Expanded Beam Insert for multi-channel small form factor — the smallest expanded beam multi-channel insert in the industry, a TE exclusive**

**ASSEMBLY CAPABILITIES**
**TE has extensive rugged optic harness capabilities.**
**Please consult your local TE Sales Representative for assistance.**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Jr. Connectors

**Performance Specifications**

**Optical, Multimode Version**
**Insertion Loss, Typical** — 0.7 dB @ 1300 nm*

**Optical, Singlemode Version**
**Insertion Loss, Typical** — 0.7 dB @ 1310 nm or 1500 nm*

**Return Loss** — > 34 dB @ 1310 nm or 1550 nm**

*When tested with reference quality launch/receive cable assemblies

**RL Tested Open Ended

**Mechanical**

**Vibration, Sinusoidal** — 10 - 500 Hz, 3 directions; 0.75 mm amplitude @ 10g acceleration

**Bump** — 4,000 Bumps, 6 directions @ 50g acceleration

**Free Fall** — 500 falls on concrete; Severity 1.2 m

**Coupling Endurance** — 3,000 couplings

**Weight** — Plug — 123 grams, typical
D-Hole bulkhead — 102 grams, typical

**Temperature**

**Operational Temperature** — -40°C/+85°C

**Storage Temperature** — -55°C/+85°C

**Temperature, Cyclic** — -55°C/+85°C

**Humidity (Damp Heat)** —95% RH

**Immersion**

**Water** — 15 m depth (plug) - 15 m (Bulkhead)

**Material and Finish**

**Shell Alloy** — Aluminum; or nickel aluminum bronze (high saline environment)

**Plating (For Aluminum Shells Only)** — clear hard anodized; or green chromate conversion zinc (PRO BEAM Jr. Bulkheads only)

**Bulkhead Connector Panel Thicknesses**

**PRO BEAM Jr. Bulkhead Connector D-Hole** — 4 mm max.

**PRO BEAM Jr. Bulkhead Connector Square Flange** — 6 mm max.
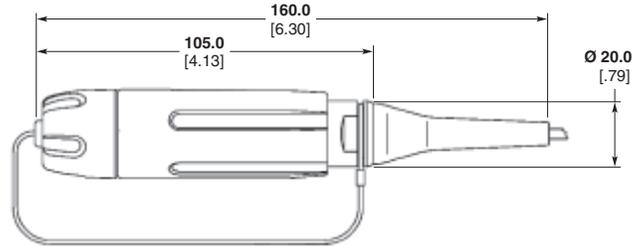
PRO BEAM Jr. Cable Connector, Plug
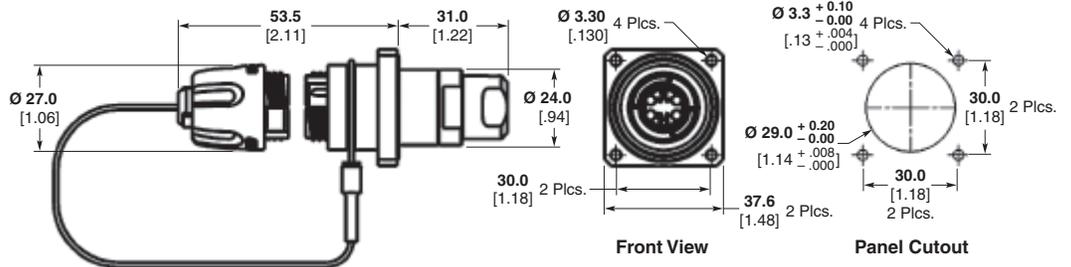
PRO BEAM Jr. Square Flange Mount Bulkhead

Front View

Panel Cutout
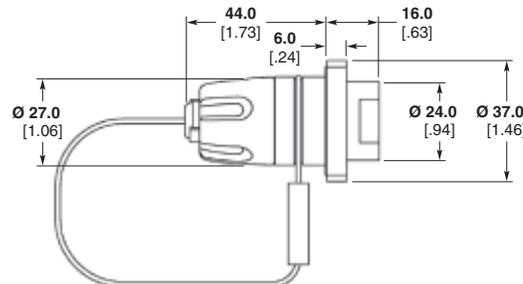
PRO BEAM Jr., Low Profile, Square Flange Mount Bulkhead
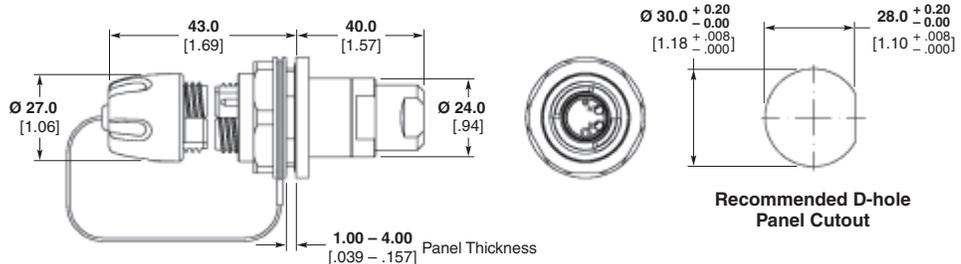
PRO BEAM Jr. D-Hole Bulkhead, Standard Cable Adapter
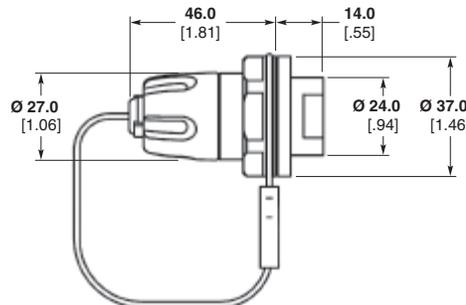
Recommended D-hole Panel Cutout

PRO BEAM Jr. Low Profile D-Hole Bulkhead

**Fiber to the Antenna**

**5**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

**PRO BEAM Jr. Connectors**
(Continued)

**80.0**
[3.15]

Ø 20.0
[.79]

Ø 37.0
[1.46]

**Standard Bulkhead Cable Adapter, with Boot**

**115.0**
[4.53]

Ø 20.0
[.79]
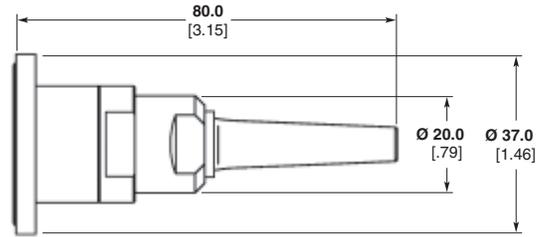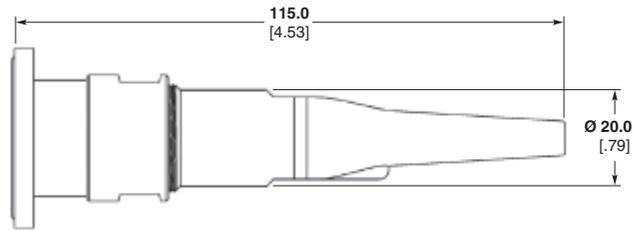
**Environmentally Sealed Bulkhead Cable Adapter, with Boot**

**PRO BEAM Jr. Replacement Receptacles for TFOCA-II Panel Mount Connector Applications**
(see page 85 for Part Numbers)

**Panel Cutout Dimensions**

**45.0**
[1.77]

**14.0**
[.55]

Ø 37.0
[1.46]

Ø 27.0
[1.06]

Ø 24.0
[.94]

**29.08 – 28.96**
[1.145 – 1.140]

Ø 30.35 ± 0.13
[1.195 ± .005]
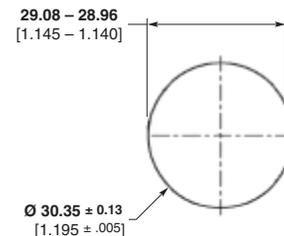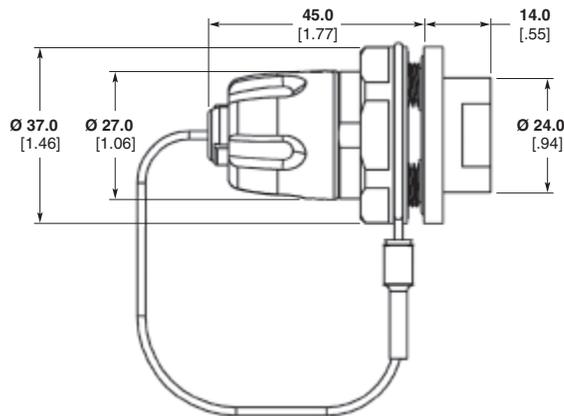
**Recommended TFOCA-II®
Panel Cutout**

**PRO BEAM Jr. D-Hole Low Profile Buffered Fiber Bulkhead Replacement Connector for TFOCA-II Product**

**45.0**
[1.77]

**4.0**
[.16]

**14.0**
[.55]

Ø 27.0
[1.06]

Ø 41.0
[1.61] Sq.

Ø 24.0
[.94]

Ø 3.05
[.120] 4 Plcs.

15.88
[.625] 2 Plcs.

15.88
[.625] 2 Plcs.

Ø 34.95
[1.376]
Min.

15.88
[.625] 2 Plcs.

15.88
[.625] 2 Plcs.

15.88
[.625] 2 Plcs.
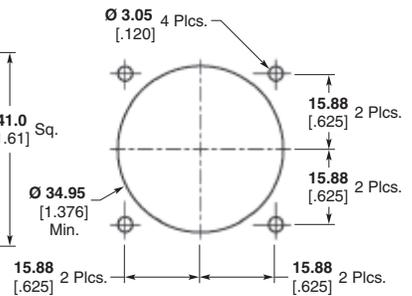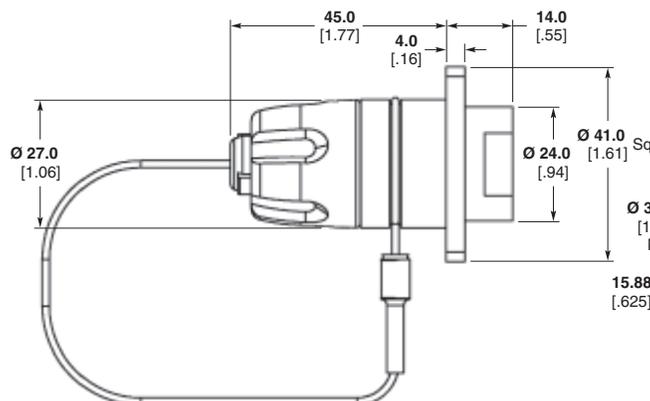
**Recommended TFOCA-II®
Panel Cutout**

TFOCA-II is a trademark of Amphenol
Fiber Systems International.

**PRO BEAM Jr. Square Flange, Low Profile, Buffered Fiber Bulkhead Replacement for TFOCA-II Product**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Jr. Connectors
(Continued)

**Connector Assembly**
1 Shell Kit
1 Insert Kit
1 Cable Adapter Kit*
X Ferrule Kits (X = No.
   of optical channels)

**Part Numbers listed are
Shell alloy = aluminum
Plating = hard anodized.
Consult TE for other plating/
material options such as
NiAlBz for Naval applications.**

### PRO BEAM Jr. Connector Shell Kits

| Description | Part Number |
|---|---|
| PRO BEAM Jr. Plug w/EPDM rubber | 1754436-1 |
| PRO BEAM Jr. Plug w/Fluorosilicone rubber | 1754436-2 |
| PRO BEAM Jr. D-Hole Low Profile, Buffered Fiber Bulkhead | 1693741-1 |
| PRO BEAM Jr. D-Hole Standard Bulkhead | 1754437-1 |
| PRO BEAM Jr. D-Hole Sealed Bulkhead | 1754438-1 |
| PRO BEAM Jr. Square Flange Low Profile Buffered Fiber Bulkhead | 1754439-1 |
| PRO BEAM Jr. Square Flange Standard Bulkhead | 1754440-1 |
| PRO BEAM Jr. Square Flange Sealed Bulkhead | 1754441-1 |

### PRO BEAM Jr. Replacement Receptacles for TFOCA-II Panel Mount Connector Applications

| Description | Part Number |
|---|---|
| PRO BEAM Jr. TFOCA-II Replacement D-Hole Low-Profile Buffered Fiber Bulkhead | 1754445-1 ♦ |
| PRO BEAM Jr. TFOCA-II Replacement D-Hole Sealed Bulkhead | 1754446-1 ♦ |
| PRO BEAM Jr. TFOCA-II Replacement Square Flange Low-Profile Buffered Fiber Bulkhead | 1754447-1 ♦ |
| PRO BEAM Jr. TFOCA-II Replacement Square Flange Sealed Bulkhead | 1754448-1 ♦ |

### PRO BEAM Jr. Insert Kits

| Description | Part Number |
|---|---|
| 2 x 850 / 1300 nm Multimode | 1515743-1 |
| 2 x 1310 nm Singlemode | 1515739-1 |
| 2 x 1550 nm Singlemode | 1516040-1 |
| 4 x 850 / 1300 nm Multimode | 1515747-1 |
| 4 x 1310 nm Singlemode | 1515740-1 |
| 4 x 1550 nm Singlemode | 1516041-1 |

**ASSEMBLY CAPABILITIES
TE has extensive rugged
optic harness capabilities.
Please consult your local
TE Sales Representative
for assistance.**

#### Ferrule Kits

| Fiber Hole Size | Mode | PRO BEAM Connector | Part Number |
|---|---|---|---|
| 125 µm | SM | PRO BEAM Jr. | 1588908-2 |
| 126 µm | SM | PRO BEAM Jr. | 1588908-1 |
| 126 µm | MM | PRO BEAM Jr. | 1588700-1 |

### PRO BEAM Jr. Connector Plug & Sealed Bulkhead Cable Adapter Kits

| Cable Dia. (Max.) | Part Number |
|---|---|
| 3.10 .122 | 1515814-1 |
| 3.60 .142 | 1515781-3 |
| 4.10 .161 | 1515848-2 |
| 4.60 .181 | 1516147-1 |
| 5.10 .201 | 1515834-2 |
| 5.65 .222 | 1515827-2 |
| 6.10 .240 | 1515859-3 |
| 6.70 .264 | 1588116-1 |
| 7.50 .295 (Breakout Cable Only) | 1828168-1 (Plug) |
| 7.50 .295 | 1754719-3 (Sealed Bulkhead) |

**Technical Documents**
**Product Specification**
108-2177   Design Objectives
**Application Specification**
114-13099
**Instruction Sheets**
408-8791   Grounding D-Hole
            Bulkhead
408-8797   Plug
408-8798   Standard D-Hole Bulkhead
408-8811   Sealed D-Hole Bulkhead
408-8834   Low Profile Square Flange
            Bulkhead
408-8840   Low Profile D-Hole
            Bulkhead
408-8841   Standard Square Flange
            Bulkhead

http://www.te.com/documents

### PRO BEAM Jr. Connector Standard Bulkhead Cable Adapter Kits*

| Cable Dia. (Max.) | Part Number |
|---|---|
| 3.10 [.122] | 1515791-2 |
| 3.60 [.142] | 1515808-1 |
| 5.10 [.201] | 1515835-2 |
| 5.65 [.222] | 1515829-1 |
| 6.10 [.240] | 1515796-2 |
| 4 x 3.00 [ 4 x .118] | 1515749-1 |

*Standard Cable Adapter — Not applicable for Low Profile.

**Note:** Part Numbers are RoHS compliant except: ♦ Indicates non-RoHS compliant.

**Fiber to the Antenna**

5

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

**PRO BEAM Jr. Connectors**
(Continued)

**Spare Parts & Tools**
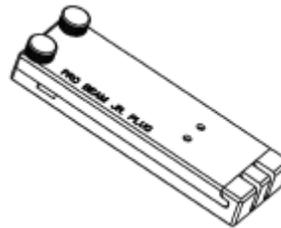
**Technical Documents**
**Product Specifications**
408-8857   Curing Fixtures for
           PRO BEAM Jr. and
           PRO BEAM Sr. Connectors
408-8828   Cleaning Procedure for
           EB C/A's

**Tooling Specifications**
408-8795   Crimp Tool with Die Set for
           PRO BEAM Jr. and
           PRO BEAM Sr. Connectors
408-10022  Die Assembly for
           PRO BEAM Mini and
           PRO BEAM Jr. Circular
           Crimps

http://www.te.com/documents

### Curing Fixtures

| Connector | Part Number |
|---|---|
| PRO BEAM Jr. Cable Plug (having cable with KEVLAR strength member fiber) | 1693797-1 |
| PRO BEAM Jr. Sealed D-Hole Bulkhead | |
| PRO BEAM Jr. Standard D-Hole and Square Flange Bulkhead | 1693800-1 |
| PRO BEAM Jr. Low Profile Buffered Fiber Bulkhead | 1754122-1 |

Instruction Sheet 408-8857. Available at www.te.com

### Cable Crimp Components

| Description | Part Number |
|---|---|
| Crimp Sleeve (use with all PRO BEAM Jr. Connector Crimp Support sizes) | 1515269-2 |
| 2.2 mm Crimp Support | 1515567-1 |
| 3.1 mm Crimp Support | 1515568-1 |
| 3.6 mm Crimp Support | 1515569-1 |
| 3.8 mm Crimp Support | 1515570-1 |
| 4.1 mm Crimp Support | 2-1515270-0 |
| 4.6 mm Crimp Support | 1516142-1 |
| 5.1 mm Crimp Support | 1515571-1 |
| 5.65 mm Crimp Support | 1515572-1 |
| 6.1 mm Crimp Support | 1515573-1 |
| 6.5 mm Crimp Support | 1515574-1 |
| 6.7 mm Crimp Support | 1515575-1 |
| Square Crimp Support for (4) 3 mm Cables | 1515632-1 |

### Ferrule Kits

| Fiber Hole Size | Mode | PRO BEAM | Part Number |
|---|---|---|---|
| 125 µm | SM | PRO BEAM Jr. | 1588908-2 |
| 126 µm | SM | PRO BEAM Jr. | 1588908-1 |
| 126 µm | MM | PRO BEAM Jr. | 1588700-1 |

### Protective Caps

| Description | PRO BEAM | Part Number |
|---|---|---|
| Standard cap, for D-Hole Bulkhead | PRO BEAM Jr. | 1515868-1 |
| Standard cap, for Flange Mount Bulkhead | PRO BEAM Jr. | 1515787-2 |
| Standard cap, for connector plug | PRO BEAM Jr. | 1515867-1 |

Kevlar® is a trademark of E.I. du Pont de Nemours and Company.

**Note:** All part numbers are RoHS compliant.

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Mini Connectors

TE is pleased to announce the natural extension from our PRO BEAM Sr. and PRO BEAM Jr. Connector product lines.

The PRO BEAM Mini Connector saves space and weight and is perfect for high density applications. The product offers the same durability as its larger counterparts.



PRO BEAM Sr., PRO BEAM Jr. & PRO BEAM Mini Connectors



PRO BEAM Mini Plug Connector

**Connector Assembly**
1 Shell Kit
1 Insert Kit
1 Cable Adapter Kit*
X Ferrule Kits (X = No. of optical channels)

*Not applicable for Low Profile

#### PRO BEAM Mini Connector Shell Kits

| Type | Mount Style | Attribute Difference | Part Number | | |
|------|-------------|----------------------|-------------|---|---|
| | | | (HA Aluminum) | (OD Aluminum) | (NiAlBronze) |
| Plug | | EPDM Grip | 1828698-1 | N/A | 1828698-2 |
| Bulkhead | D-Hole | Low Profile - Buffered Fiber | 1828699-1 | 1828699-2 ♦ | 1828699-3 |
| | | Low Profile - 1.8 Jacketed | 1985140-1 | 1985140-2 | 1985140-3 |
| | Square Flange | Sealed | 1918185-1 | * | 1918185-2 |
| | | Low Profile - Buffered Fiber | 1828826-1 | * | * |
| | | Neutrik Cutout-Drop-In | 1918603-1 | * | * |

* Contact TE for availability.

#### PRO BEAM Mini Insert Kits

| Description | Part Number |
|-------------|-------------|
| 2 x 850 / 1300 nm Dual Multimode | 1374759-4 |
| 2 x 1310 nm Singlemode | 1588129-2 |
| 2 x 1550 nm Singlemode | 1588128-2 |
| 4 x 850 / 1300 nm Dual Multimode | 1374759-2 |
| 4 x 1310 nm Singlemode | 1588129-3 |
| 4 x 1550 nm Singlemode | 1588128-3 |

#### Ferrule Kits

| Fiber Hole Size | Mode | PRO BEAM Connector | Part Number |
|-----------------|------|--------------------|-------------|
| 125 µm | SM | PRO BEAM Mini | 1754700-1 |
| 126 µm | SM | PRO BEAM Mini | 1754700-2 |
| 126 µm | MM | PRO BEAM Mini | 1754699-1 |

#### PRO BEAM Mini Cable Adapter Kits For Plug

| Cable Diameter | Part Number |
|----------------|-------------|
| 5 mm | 1828700-1 |
| 5.5 mm | 1828700-2 |
| 6 mm | 1828700-3 |

**ASSEMBLY CAPABILITIES**
**TE has extensive rugged optic harness capabilities.**
**Please consult your local TE Sales Representative for assistance.**

**Note:** Part Numbers are RoHS compliant except: ♦ Indicates non-RoHS compliant.

**Fiber to the Antenna**

**5**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Mini Connectors
(Continued)

### Performance Specifications

### Optical, Multimode Version

**Insertion Loss, Typical** —
0.7 dB @ 1300 nm*

### Optical, Singlemode Version

**Insertion Loss, Typical** —
0.8 dB @ 1310 nm*

**Return Loss** — > 34 dB @ 1310 nm
or 1550 nm**

*When tested with reference quality
 launch/receive cable assemblies

**RL Tested Open Ended

### Mechanical

**Vibration, Sinusoidal** —
10 - 500 Hz, 3 directions;
0.75 mm amplitude @ 10g acceleration

**Bump** — 4,000 Bumps, 3 directions
@ 40g acceleration

**Free Fall** — 500 falls on concrete;
Severity 1.2 m

**Coupling Endurance** —
3,000 couplings

**Weight** —
Plug — 50 grams, typical
D-Hole bulkhead — 39 grams, typical

### Temperature

**Operational Temperature** —
-40°C/+85°C

**Storage Temperature** —
-55°C/+85°C

**Temperature, Cyclic** —
-55°C/+85°C

**Humidity (Damp Heat)** —95% RH

### Immersion

**Water** — 5 m depth (plug) -
          2 m (Bulkhead)

### Pressure

**Low Pressure** — 25 kPa @ -55°C

### Material and Finish

**Shell Alloy** — Aluminum; or nickel
aluminum bronze (high saline environment)

**Plating (For Aluminum Shells
Only)** — clear hard anodized; or green
chromate conversion zinc (PRO BEAM
Jr. Bulkheads only)

### Technical Documents

408-10065 Plug
408-10067 Square Flange Bulkhead
408-10069 Low Profile D-Hole Bulkhead
408-10076 Sealed D-Hole Bulkhead
http://www.te.com/documents
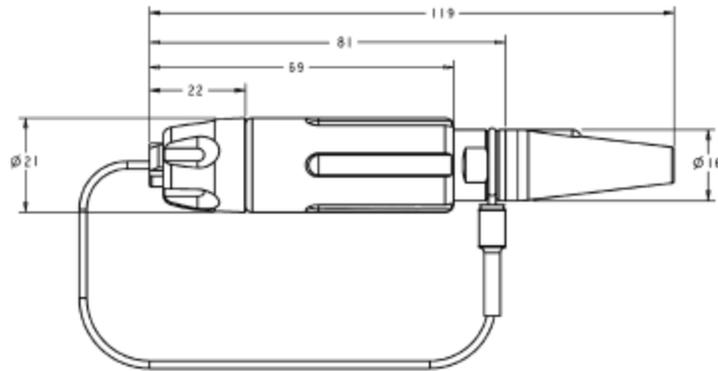


PRO BEAM Mini Cable Connector, Plug
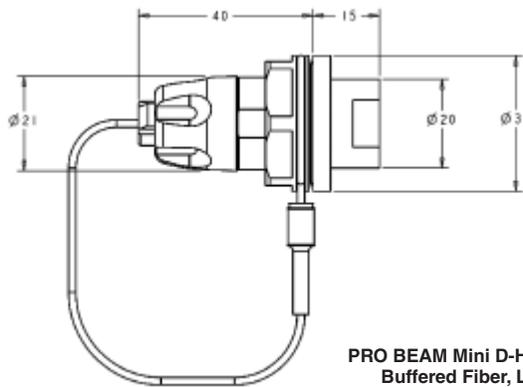


PRO BEAM Mini D-Hole Bulkhead,
Buffered Fiber, Low Profile
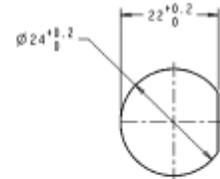
Recommended Panel Cutout
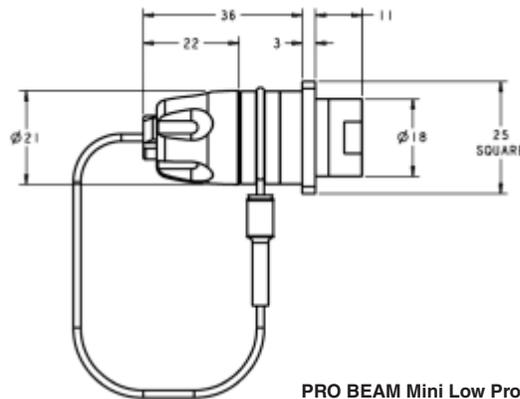


PRO BEAM Mini Low Profile, Square Flange Mount Bulkhead
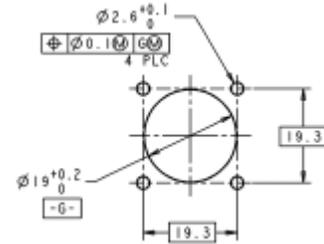
Recommended Panel Cutout
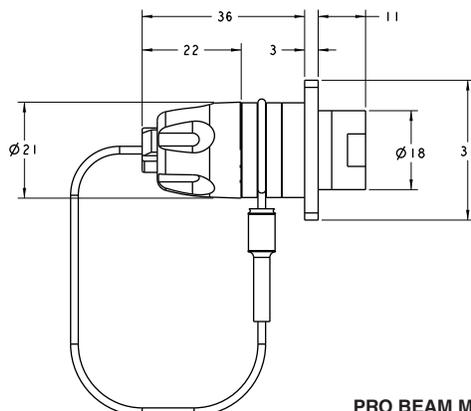


PRO BEAM Mini Bulkhead with XLR Flange
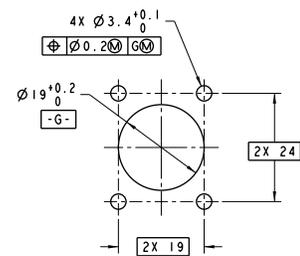
Recommended Panel Cutout

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Mini Connectors
(Continued)
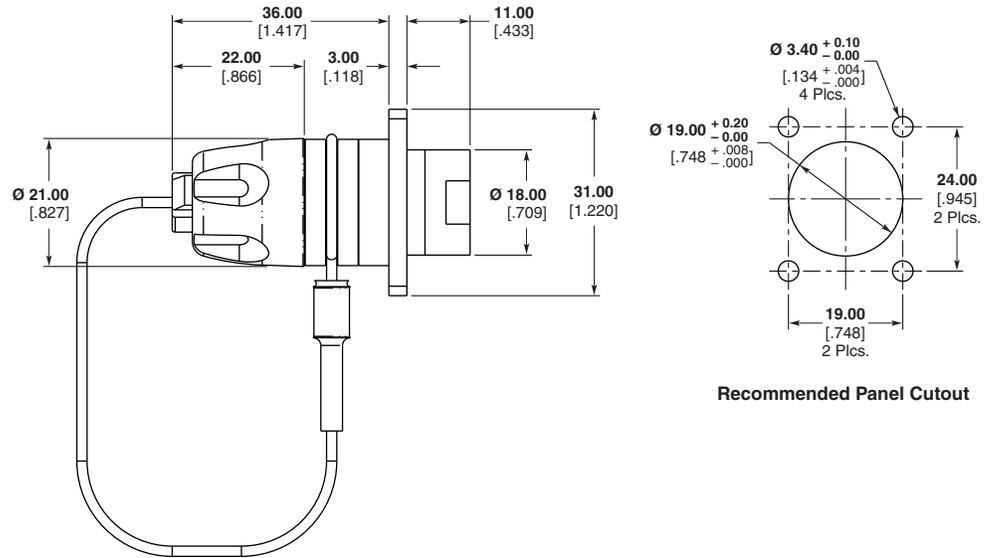


**PRO BEAM Mini Low Profile,
Alternate Square Flange Mount Bulkhead**

**Recommended Panel Cutout**
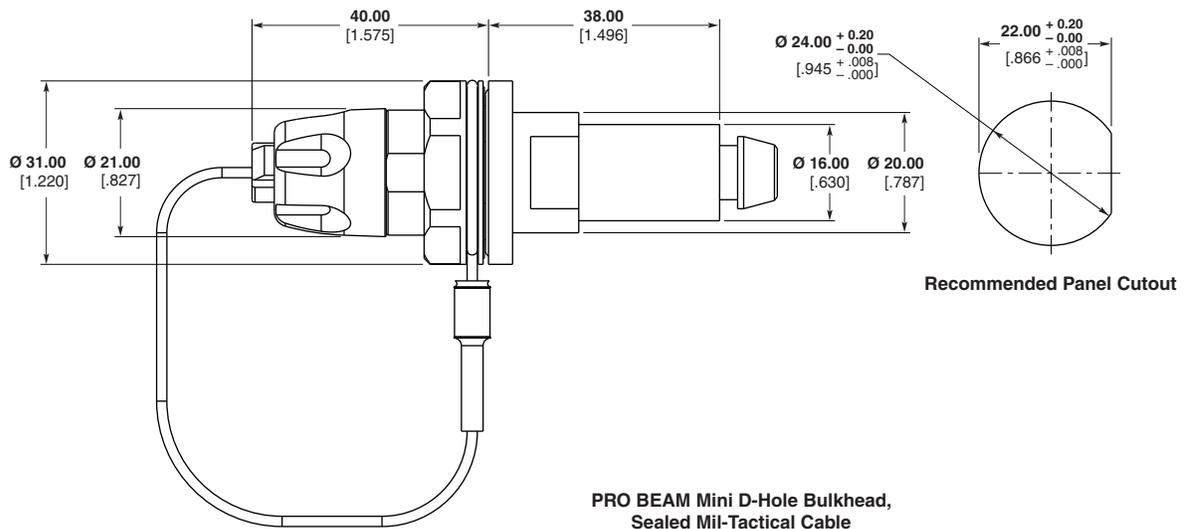


**PRO BEAM Mini D-Hole Bulkhead,
Sealed Mil-Tactical Cable**

**Recommended Panel Cutout**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Sr. Connectors

**Performance Specifications**

**Optical, Multimode Version**
**Insertion Loss, Typical** —
0.7 dB @ 1300 nm*

**Optical, Singlemode Version**
**Insertion Loss, Typical** —
0.7 dB @ 1310 nm*

**Return Loss** — > 34 dB
@ 1310 nm or 1550 nm**

*When tested with reference quality
launch/receive cable assemblies

**RL Tested Open Ended

**Mechanical**

**Vibration, Sinusoidal** —
10 - 500 Hz, 3 directions;
0.75 mm amplitude @ 10g acceleration

**Bump** — 4,000 Bumps, 6 directions,
@ 50g acceleration

**Free Fall** — 500 falls on concrete;
Severity 1.2 m

**Coupling Endurance** —
3,000 couplings

**Weight** —
Plug — 290 grams, typical
Chassis bulkhead — 150 grams, typical

**Temperature**

**Operational Temperature** —
-40°C/+85°C

**Storage Temperature** —
-55°C/+85°C

**Temperature, Cyclic** —
-55°C/+85°C

**Humidity (Damp Heat)** —95% RH

**Immersion**

**Water** — 5 m depth (plug),
2 m (Bulkhead)

**Material and Finish**

**Shell Alloy** — Aluminum; or nickel
aluminum bronze (high saline environ-
ment)

**Plating (For Aluminum Shells
Only)** — clear hard anodized

**Bulkhead Connector Panel
Thicknesses**

**PRO BEAM Sr. D-Hole Connector** —
6.5 mm max.

**PRO BEAM Sr. Square Flange
Connector** — 8.5 mm max.

**Technical Documents**

**Product Specifications**
408-8799    Plug
408-8800    D-Hole Bulkhead
408-8877    Square Flange Bulkhead

**Application Specification**
114-13122

http://www.te.com/documents
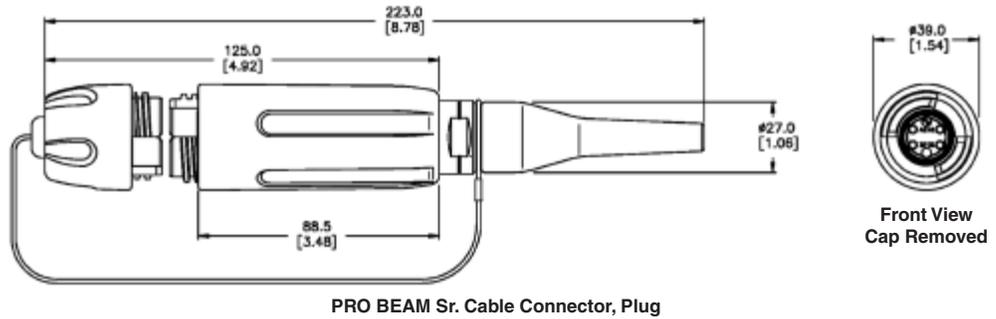


PRO BEAM Sr. Cable Connector, Plug
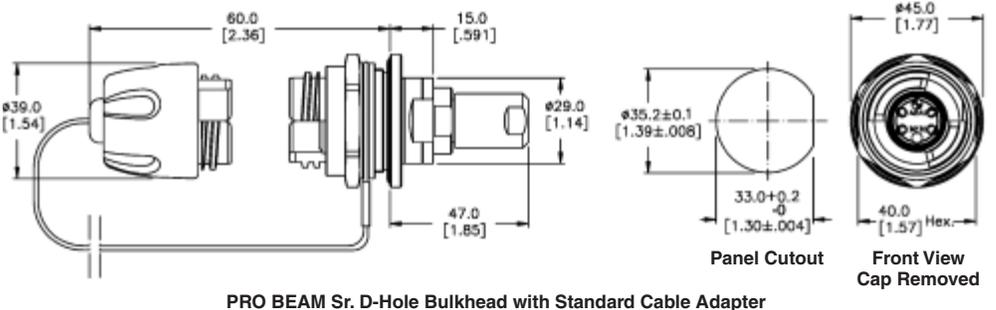


PRO BEAM Sr. D-Hole Bulkhead with Standard Cable Adapter
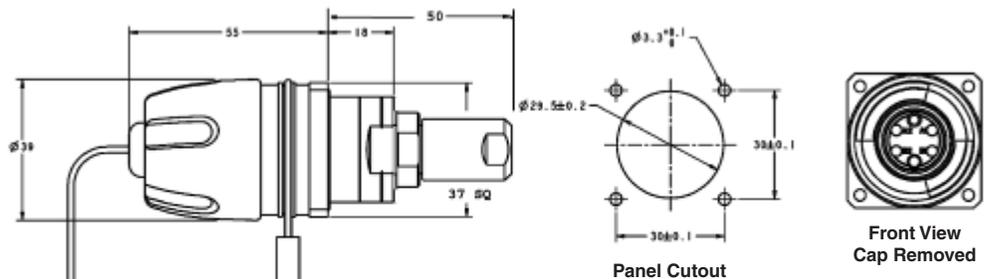


PRO BEAM Sr. Square Flange Mount Bulkhead with Standard Cable Adapter

### Please contact your local TE Sales Representative for Part Numbers and availability.

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### PRO BEAM Sr. Connectors
(Continued)

**Connector Assembly**
1 Shell Kit
1 Insert Kit
1 Cable Adapter Kit*
X Ferrule Kits (X = No.
   of optical channels)

*Not applicable for Low Profile

**Part numbers listed are
Shell alloy = aluminum
Plating = hard anodized.
Consult TE for other plating/
material options such as
NiAlBz for Naval applications.**

| PRO BEAM Sr. Connector Shell Kits | Part Number |
|---|---|
| PRO BEAM Sr. Plug w/EPDM rubber | 1754842-1 |
| PRO BEAM Sr. D-Hole Standard Bulkhead | 1754843-1 |
| PRO BEAM Sr. Square Flange Standard Bulkhead | 1754844-1 |

| PRO BEAM Sr. Insert Kits | Part Number |
|---|---|
| 2 x 850 / 1300 nm Multimode | 1693001-1 |
| 2 x 1310 nm Singlemode | 1515734-2 |
| 4 x 850 / 1300 nm Multimode | 1693001-2 |
| 4 x 1310 nm Singlemode | 1515735-1 |

**Ferrule Kits**

| Fiber Hole Size | Mode | PRO BEAM Connector | Part Number |
|---|---|---|---|
| 125 µm | SM | Sr. | 1515941-1 |
| 126 µm | SM | Sr. | 1515941-2 |
| 126 µm | MM | Sr. | 1588801-1 |

**PRO BEAM Sr. Connector Plug Adapter Kits**

| Cable Dia. (Max.) | Part Number |
|---|---|
| **5.10** .201 | 1515940-1 |
| **5.65** .222 | 1515940-3 |
| **6.20** .244 | 1515940-5 |

### Technical Documents
**Product Specifications**
408-8857  Curing Fixtures for
          PRO BEAM Jr. and
          PRO BEAM Sr. Connectors
408-8828  Cleaning Procedure for
          EB C/A's
**Tooling Specifications**
408-8795  Crimp Tool with Die Set for
          PRO BEAM Jr. and
          PRO BEAM Sr. Connectors
408-10022 Die Assembly for
          PRO BEAM Mini and
          PRO BEAM Jr. Circular
          Crimps

http://www.te.com/documents

**PRO BEAM Sr. Connector Standard Bulkhead Cable Adapter Kits**

| Cable Dia. (Max.) | Style | Part Number |
|---|---|---|
| **5.10** .201 | Standard Cable Adapter | 1515847-1 |
| **5.65** .222 | Standard Cable Adapter | 1515724-2 |
| Buffered Fiber | Low Profile Adapter | 1515299-2 |

**ASSEMBLY CAPABILITIES**
**TE has extensive rugged optic harness capabilities.**
**Please consult your local TE Sales Representative for assistance.**

**Note:** All part numbers are RoHS compliant.

**Fiber to the Antenna**

**5**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### Cable Assemblies and Accessories

#### Product Facts

- **Ruggedized cable assemblies custom tailored for field use in harsh environments**
- **Heavy-duty light-weight cable reel organizes and protects connectors and cable for easy pay-out and safe storage**
- **Options for 500 meter reels include special backpack harnesses, a separate reel stand, or a combination reel and reel stand**

### PRO BEAM Jr. Kits

**PRO BEAM Jr. Termination Kit 1828650-1**

**Cleaning Kit 1828335-2**

**ASSEMBLY CAPABILITIES**
TE has extensive rugged optic harness capabilities. Please consult your local TE Sales Representative for assistance.

**Featured Cable Assemblies**



**TFOCA to PRO BEAM Jr. Plug Cable Assembly**
1828536-1 ◆

**LP D-Hole Bulkhead to 4 ST 62.5/125 on 1.8 mm cable**
6828454-1 ◆

**Plug to Plug (100 meters)**
6754475-2

**Typical Reels and Reel Stands for Field-Deployable Cable Assemblies**



**1918930-1**



**Tactical Reel/Drum Options**

### Cable Reels

| Reel Capacity (Random Lay) | | | | |
|---|---|---|---|---|
| Cable Diameter | | Notes/Description | Flange Diameter | Part Number |
| 5.0 mm | 5.5 mm | | | |
| 225 M | 186 M | Reel & Reel Stand Combination Reel can be detached from stand without tools | 310 mm | 1918930-1 |
| 297 M | 247 M | Reel* | 310 mm | 1754515-1 |
| 570 M | 462 M | Reel* | 370 mm | 1754515-2 |
| 998 M | 816 M | Reel* | 460 mm | 1754515-3 |
| 1271 M | 1052 M | Reel* | 510 mm | 1754515-4 |

* See Accessories options below



**Backpack with Reel**



**Reel with Stand "Static Frame"**



**Backpack Harness**

### Accessories

| Description | Reel Diameter | Part Number |
|---|---|---|
| Backpack | 370 mm Dia. Reel | 1754516-1* |
| Backpack | 460 mm Dia. Reel | 1754516-2* |
| Backpack | 510 mm Dia. Reel | 1754516-3* |
| Static Frame | 500 mm Dia. Max | 1754517-1* |
| Static Frame | 700 mm Dia. Max | 1754517-2* |

* Reel must be ordered separately.
**Note:** For lower cost alternative options. Please contact your local TE Sales Representative or TE Product Information Center at 1-800-522-6752.
**Note:** Part Numbers are RoHS compliant except: ◆ Indicates non-RoHS compliant.

TFOCA-II is a trademark of Amphenol Fiber Systems International.

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

**Tactical Field
Splice Repair Kit
Part Number 1985212-1**



### Materials List

| Quantity | Description |
|---|---|
| 4 | Flexible Splice Housings |
| 10 | Mechanical Splices |
| 1 | Cleaver |
| 1 | Cable Stripper |
| 2 | Buffer Stripper (sizes): 126 micron, 200 micron |
| 1 | Utility Knife with 3 Spare Blades |
| 1 | KEVLAR Shears |
| 1 | 6 inch Metal Ruler, (units in metric) |
| 1 | Illuminated Microscope with Batteries |
| 40 | Alcohol (at least 70%) Pads |
| 1 | Wipes, 5 x 8 inch, 280 count box |
| 1 | Plastic Frame Safety Glasses (ANSI approved lenses) |
| 1 | Tweezers |
| 1 | Roll Tape |
| 1 | Fine Tip Marking Pen |
| 1 | Set of Instructions (illustrated) — Waterproof |
| 1 | Portable Field Storage Case. This case shall be ruggedized and house all components necessary to repair broken cable. Dimensions of the case shall not exceed 7.5" H x 20" W x 14" — Black in color. |

KEVLAR is a trademark of E. I. du Pont de Nemours and Company.

**Note:** All part numbers are RoHS compliant.

**Fiber to the Antenna**

**5**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

**Optical Test Set for Fiber Optic Cables — Designed for harsh environments**

**Product Facts**

- **Especially designed to support the installation of optical links in the field**
- **Able to test both cable drums and entire links**
- **Powered by batteries with high autonomy**
- **Suitable for diagnostics and construction teams**
- **Easy to use, ergonomic, rugged design**
- **Suitable for cable length up to 10 km**
- **Supports up to 4 fibers per cable with various types of connectors**



### Diagnostic Features

**Power Meter**

The optical power from any source can easily be measured with the power meter function.

**Optical Source**

A continuous optical signal is generated and transmitted with selectable output power.

**Drum Test / Cable Test**

Test of an entire cable drum with automatic good/bad indication.  The test of an entire cable is realized with a 2nd KPG-opt or a loop connector.

**Test Frames (optional)**

The KPG-opt can generate specific test frames as used in optical networks and LOS systems.

**Optical Tester**

| Description | Part Number |
|---|---|
| 850 nm 38999 III Size 11 Optical Test Kit | 1918016-1 |
| 850/1300 nm PRO BEAM Jr. Optical Test Kit | 1918016-2 |
| 1310 nm PRO BEAM Jr. Optical Test Kit | 1985006-1 |

For additional wavelength testers, contact your local TE Sales epresentative.

| Protective Case |
|---|
| 1918082-1 |

**Note:** All part numbers are RoHS compliant.

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

**ARMOR-LIGHT Tactical Field Deployable Fiber Optic Cable for Extreme Environments (Metallic for Rodent Proof)**

### 4-Color Optical Fiber Cable Specification for Armored Cable for Ruggedized Applications

**Construction:**

- **4-color coded fibers**
- **Fiber types 50/125/250 µm, 62.5/125/250 µm and 9/125/250 µm**
- **Stainless steel gel filled tube**
- **Stainless steel wire**
- **Jacket — Nylon, black**

PA Jacket
Stainless Steel Tube
Stainless Steel Wires
Gel Filled
Primary Coated Fiber
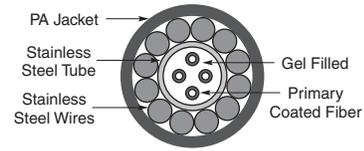
| Fiber Type | Part Number | Outside Dia. (mm) | Weight kg/km | Max. Attenuation dB/km | | | | Bandwidth MHz-km | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 850 nm | 1300 nm | 1310 nm | 1550 nm | 850 nm | 1300 nm |
| 62.5/125 | 1588957-1 | 3.8 | 24 | 3.5 | 1.0 | X | X | 160 | 500 |
| 50/125 | 1588957-2 | 3.8 | 24 | 2.7 | 0.9 | X | X | 400 | 1200 |
| SM | 1588957-4 | 3.8 | 24 | X | X | 0.40 | 0.25 | X | X |

**Notes:** 35 mm recommended bend radius.
3.1 kN breaking strength.

### 2-Color Optical Fiber Cable Specification for Armored Cable for Ruggedized Applications

**Construction:**

- **2-color coded fibers**
- **Fiber types 50/125/250 µm, 62.5/125/250 µm and 9/125/250 µm**
- **Stainless steel gel filled tube**
- **Stainless steel wire**
- **Jacket — Nylon, black**

PA Jacket
Stainless Steel Tube
Stainless Steel Wires
Gel Filled
Primary Coated Fiber
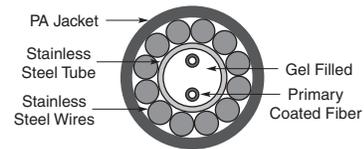
| Fiber Type | Part Number | Outside Dia. (mm) | Weight kg/km | Max. Attenuation dB/km | | | | Bandwidth MHz-km | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 850 nm | 1300 nm | 1310 nm | 1550 nm | 850 nm | 1300 nm |
| 62.5/125 | 1693808-1 | 3.8 | 24 | 3.5 | 1.0 | X | X | 160 | 500 |
| 50/125 | 1693808-2 | 3.8 | 24 | 2.7 | 0.9 | X | X | 400 | 1200 |
| SM | 1693808-4 | 3.8 | 24 | X | X | 0.40 | 0.25 | X | X |

**Notes:** 35 mm recommended bend radius.
3.1 kN breaking strength.

**Note:** All part numbers are RoHS compliant.

### Non-Metallic Tactical Field Deployable Fiber Optic Cable

#### Product Facts

- **All terrain field deployable cable, up to 4 fibers, singlemode or multimode**
- **Developed for deployment under the most demanding conditions**
- **Tight buffered fibers are protected by Aramid yarns and a tough ruggedized polyurethane sheath**
- **Tested in accordance with MIL-PRF-85045**
- **Flexible, water resistant, high crush resistant, and lightweight,**
- **Designs available to be resilient against radiation exposure**

#### Technical Data

**Mil-Standard Distribution Cable — 2 Fiber Singlemode**
**Attenuation** — ≤ 0.5 dB/km @ 1310 nm / ≤ 0.5 dB/km @ 1550 nm
**Diameter** — 5.8 mm
**Weight** — 25 kg/km
**Minimum Bending Radius** — 29 mm
**Crush Resistance** — 2000 N/cm
**Operating Temperature** — -55° C to +85° C

**Mil-Standard Distribution Cable — 4 Fiber Singlemode**
**Attenuation** — ≤ 0.5 dB/km @ 1310 nm / ≤ 0.5 dB/km @ 1550 nm
**Diameter** — 5.8 mm
**Weight** — 27 kg/km
**Minimum Bending Radius** — 28 mm
**Crush Resistance** — 2000 N/cm
**Operating Temperature** — -55° C to +85° C

**Mil-Standard Distribution Cable — 2 Fiber Multimode**
**Fiber Type** — 50 µm/125 µm and 62.5/125
**Attenuation** — ≤ 3.5 dB/km @ 850 nm / ≤ 1.0 dB/km @ 1300 (62.5/125); ≤ 3.5 dB/km @ 850 nm / ≤ 1.5 dB/km @ 1300 (50/125)

**Mil-Standard Distribution Cable — 4 Fiber Multimode**
**Fiber Type** — 50 µm/125 µm and 62.5/125
**Attenuation** — ≤ 3.5 dB/km @ 850 nm / ≤ 1.0 dB/km @ 1300 (62.5/125); ≤ 3.5 dB/km @ 850 nm / ≤ 1.5 dB/km @ 1300 (80/125)

Other fibers (i.e. Polyimide, Silicon buffer, Carbon coated, radiation hardened, etc.) are available upon request.

Contact TE or your local TE Sales Representative for part numbers, pricing, and availability.

**Fiber to the Antenna**

**5**

## PRO BEAM Expanded Beam Rugged Optics Products (Continued)

### Hand Held Visual Fault Locator (VFL)

### Product Facts

- **650 nm (visible) Class 2 1.0 mW max Diode Laser**
- **Continuous and flashing (2-3 Hz pulsed) modes**
- **Rugged rubber shell and body design modeled after a popular military connector**
- **Lanyard attached dust cover**
- **Standard 2.5 mm adapter for SC, ST, and FC connectors**
- **Optional 1.25 mm adapter for LC and MU connectors.**
- **Unique design allows adapter to permanently reside on VFL so it is not misplaced allowing user to choose 1.25 mm or 2.5 mm**
- **Uses 1 "AA" style battery for >30 hours of continuous use**
- **Soft-sided belt case for convenience and storage**

The TE Hand Held Visual Fault Locator (VFL) is a rugged and affordable solution for identifying breaks and bending in optical fibers and cabling. Its powerful, red (650 nm) laser provides the ability to locate damaged, broken, or tightly bent fibers that cause undesirable attenuation in your system.

The jacket of the cable will glow red at the location of the fault. The flash button allows the user to toggle between continuous or pulsed mode. The compact, rugged, and balanced design is based upon a popular harsh environment fiber optic connector. The single "AA" style battery is good for >30 hours of continuous use and the soft-sided protective case with belt loop provides a convenient and protective means of storage.

### Applications

Affordable VFL Solution for:

- Identifying breaks, bends, and other damage in optical fibers
- Tracing fiber paths
- Identifying termination errors
- Continuity testing

| Description | Part Number |
|---|---|
| Hand Held Visual Fault Locator | 1828352-1 |
| 1.25 mm Adapter for Hand Held VFL | 1828353-1 |
| Includes Part Numbers 1828352-1 and 1828353-1 | 1828352-2 |

### Product Dimensions

**Length** — 18.5 cm [7.283 in]
**Width** — 2.2 cm [0.866 in]
**Thickness** — 2.2 cm [0.866 in]
**Weight (w/battery)** — 150 g [0.33 lb]

### Combination LIGHTCRIMP PLUS SC/ST/LC Termination Kit
### Part Number 1985162-1

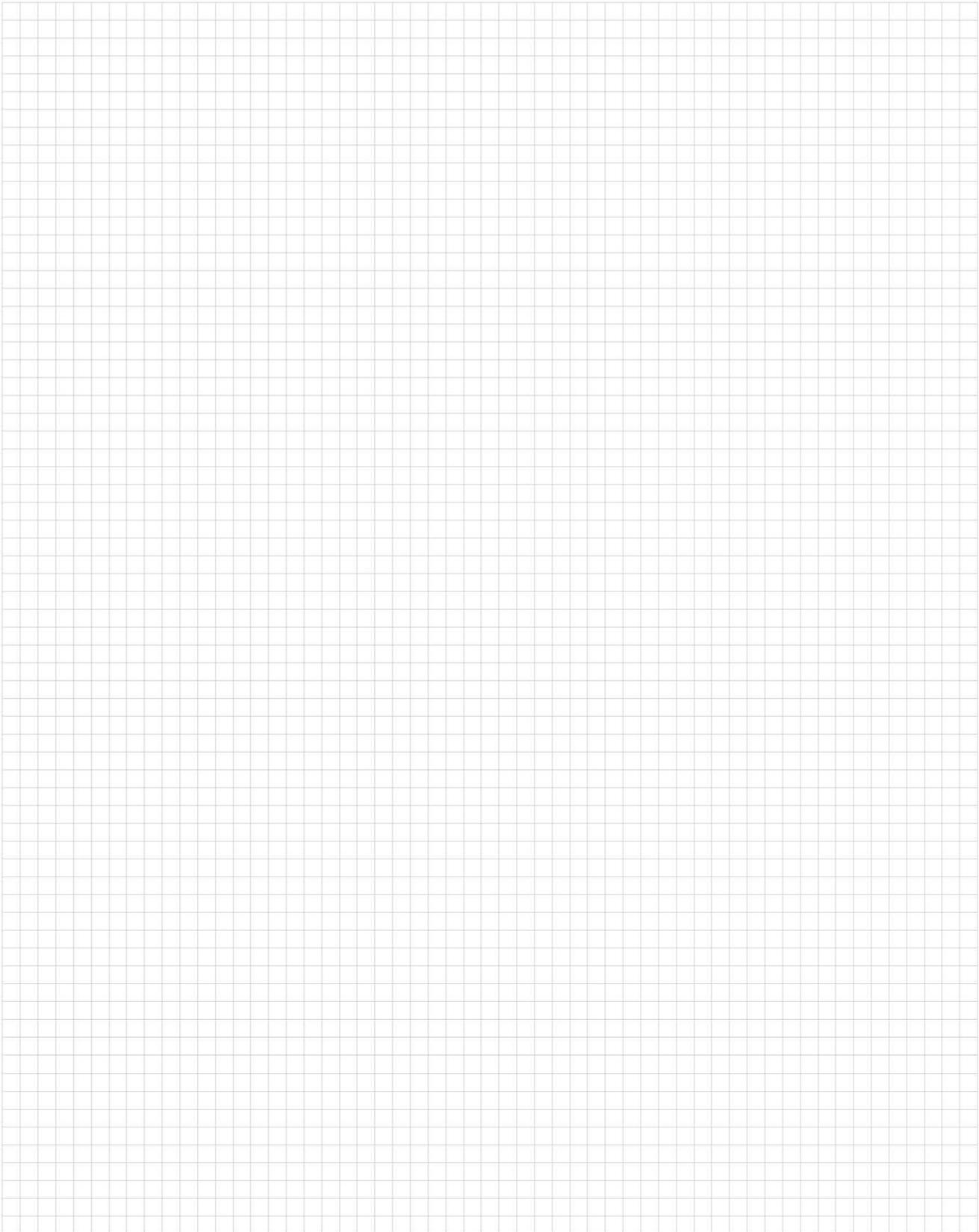**Note:** All part numbers are RoHS compliant.

## Part Number Index

**Note:** This index lists all cataloged parts by base no. only. Complete part nos. (with prefixes and/or suffixes) are shown on the page(s) indicated.

## Part Number Index (Continued)

## Tooling and Accessories Part Number Index

**Note:** This index lists all cataloged parts by base no. only. Complete part nos. (with prefixes and/or suffixes) are shown on the page(s) indicated.

## Engineering Notes

Dimensions are in millimeters
and inches unless otherwise
specified.
USA: +1 (800) 522-6752

Canada: +1 (905) 475-6222
Mexico/C. Am.: +52 (0) 55-1106-0800
Latin/S. Am.: +54 (0) 11-4733-2200
Germany: +49 (0) 6251-133-1999

UK: +44 (0) 800-267666
France: +33 (0) 1-3420-8686
Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

**te.com**

**TE**
*connectivity*