



# Fiber Optic Products



## Introduction

Tyco Electronics' Fiber Optics Business Unit is recognized as the world's preeminent supplier of fiber optic connectors and interconnection devices. We offer an extensive variety of optical connectors, cable assemblies, fiber manage-

ment systems, and optoelectronic active and passive components — connectivity solutions. With unparalleled, world-class technologies and high quality products, Tyco Electronics demonstrates its commitment to

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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.

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- Ability to browse RoHS Compliant Products in our on-line catalog
- Downloadable Technical Data Customer Information Presentation
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**RoHS**  
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#### MT-RJ SECURE Connectors

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#### MPO Cable Assemblies

(See Cable Assemblies & Backplane Interconnects Section 2, pages 125-133)

#### MPO SECURE Connectors

(See Connectors, Adapters, Tooling & Accessories Section 1, pages 8, 11, 12)

#### LIGHTPLANE Connector System

(See Cable Assemblies & Backplane Interconnects Section 2, pages 136, 137)

#### LIGHTRAY MPX System Interconnects

(See Cable Assemblies & Backplane Interconnects Section 2, pages 138-152)

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## Expanded SECURE Connector Product Line Includes MPO and LC Interfaces

**Ten variants in ten colors  
offered in two new  
interfaces**



Tyco Electronics has expanded its SECURE connector product offering to include both MPO and LC interfaces. Through the use of ten different color/key variations, customers operating multiple networks in common areas can physically segregate their network throughout the system, from the backbone to the equipment panel.

Primary colors and keys are available in red, blue, yellow and green, with additional, secondary options for up to ten different color/keying configurations. Only connectors and adapters of the same color will intermate, and no standard product can plug into a secure adapter.

The LC SECURE product is compatible with both jack-

eted and buffered fiber. It is available in both LIGHTCRIMP PLUS and standard epoxy/polish styles for singlemode and multimode fibers. Each connector features a color-coded key that will only mate with like-colored adapters to minimize connection to the wrong networks. Standard colors include red, blue, green and yellow. An additional six colors are available as needed.

The MPO SECURE products are available in the same colors and are compatible with color-coded MPO SECURE cassettes. Standard MPO SECURE trunk cables are available in fiber counts to 72 fibers. MPO SECURE cassettes are available as twelve or

twenty-four fiber assemblies. Cables and cassettes are available with 50  $\mu$ m, Laser Optimized (10 Gig) and 62.5  $\mu$ m multimode fiber.

The success of the MT-RJ SECURE product line has fostered growing interest in the SECURE product concept. The addition of the LC and MPO interfaces to the AMP NETCONNECT SECURE product portfolio will allow a wider adoption of the concept and allow more customers to take advantage of the benefits the system offers.

A complete line of connectivity, cable assemblies, and cables are available for MT-RJ SECURE, LC SECURE and MPO SECURE. See pages 9-13 for details.



## LC SECURE Product Offering

### LIGHTCRIMP PLUS and Epoxy Style LC Product Facts

- **LIGHTCRIMP PLUS—**  
No Epoxy/No Polish
- Strip, Cleave and Crimp
- LC small form factor design is half the size of SC
- 10 exclusive connector variants
- Color coded plugs & adapters match MT-RJ & MPO SECURE offerings
- **LIGHTCRIMP PLUS—**  
Termination to 250 or 900  $\mu$ m tight-buffered fiber, 1.6–2.0 mm jacketed fiber using standard tooling
- **Epoxy Style—**Termination to 250 or 900  $\mu$ m tight-buffered fiber 1.6 – 2.0 mm jacketed fiber
- **Epoxy Style—**Suitable for use with heat-cured or anaerobic (quick cure) adhesives (See instruction sheet for recommended anaerobic adhesives)
- Product qualification to TIA/EIA 568-B.3
- Field installable duplex clip (black) for polarity correction if needed
- Plug nose features can provide up to 70 mutually exclusive keying combinations
- Distinct keyway geometry on plug nose & color coding assures identifiable key-type
- Extended lugs on plug side-walls prevent SECURE connectors from mating with non-secure adapters
- Molded internal geometry produces tamper resistant system
- Key placement allows SECURE plugs to interface with standard 1.25 mm test equipment, inspection microscopes and application tooling
- Termination kits — same as standard product



### LIGHTCRIMP PLUS LC SECURE Kits

| Color  | Simplex 50/125 MM SECURE | Simplex 50/125 Laser Optimized (10 Gig) MM SECURE | Simplex 62.5/125 MM SECURE | Simplex SM SECURE | Notes   |
|--------|--------------------------|---------------------------------------------------|----------------------------|-------------------|---------|
| Red    | 1828853-1                | 1828854-1                                         | 1828855-1                  | 1828856-1         | Primary |
| Yellow | 1828853-2                | 1828854-2                                         | 1828855-2                  | 1828856-2         | Primary |
| Green  | 1828853-3                | 1828854-3                                         | 1828855-3                  | 1828856-3         | Primary |
| Blue   | 1828853-4                | 1828854-4                                         | 1828855-4                  | 1828856-4         | Primary |
| Rose   | 1828853-5                | 1828854-5                                         | 1828855-5                  | 1828856-5         |         |
| Aqua   | 1828853-6                | 1828854-6                                         | 1828855-6                  | 1828856-6         |         |
| Brown  | 1828853-7                | 1828854-7                                         | 1828855-7                  | 1828856-7         |         |
| Violet | 1828853-8                | 1828854-8                                         | 1828855-8                  | 1828856-8         |         |
| Orange | 1828853-9                | 1828854-9                                         | 1828855-9                  | 1828856-9         |         |
| Slate  | 1-1828853-0              | 1-1828854-0                                       | 1-1828855-0                | 1-1828856-0       |         |

Highlighted Part Numbers are routinely stocked for shortest lead times.

### Epoxy Style LC Kits

| Color  | Simplex Jumper Multimode | Simplex Buffer Multimode | Simplex Jumper Singlemode | Simplex Buffer Singlemode | Notes   |
|--------|--------------------------|--------------------------|---------------------------|---------------------------|---------|
| Red    | 1828078-1                | 1828861-1                | 1828079-1                 | 1828862-1                 | Primary |
| Yellow | 1828078-2                | 1828861-2                | 1828079-2                 | 1828862-2                 | Primary |
| Green  | 1828078-3                | 1828861-3                | 1828079-3                 | 1828862-3                 | Primary |
| Blue   | 1828078-4                | 1828861-4                | 1828079-4                 | 1828862-4                 | Primary |
| Rose   | 1828078-5                | 1828861-5                | 1828079-5                 | 1828862-5                 |         |
| Aqua   | 1828078-6                | 1828861-6                | 1828079-6                 | 1828862-6                 |         |
| Brown  | 1828078-7                | 1828861-7                | 1828079-7                 | 1828862-7                 |         |
| Violet | 1828078-8                | 1828861-8                | 1828079-8                 | 1828862-8                 |         |
| Orange | 1828078-9                | 1828861-9                | 1828079-9                 | 1828862-9                 |         |
| Slate  | 1-1828078-0              | 1-1828861-0              | 1-1828079-0               | 1-1828862-0               |         |

Highlighted Part Numbers are routinely stocked for shortest lead times.

### Duplex Clip: Part Number 1754371-1

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

## LC SECURE Product Offering (Continued)

### LC Duplex Adapters Product Facts

- Flange mount, flangeless, and SL Series for use with AMP NETCONNECT SL panels
- High quality ceramic sleeves
- Suitable for singlemode and multimode
- Key and color compatible to Epoxy Style and LIGHTCRIMP PLUS Product



### LC Duplex Adapters

| Color  | SECURE Adapter Flanged | SECURE Adapter Flangeless | SECURE Adapter SL | Notes   |
|--------|------------------------|---------------------------|-------------------|---------|
| Red    | 1828073-1              | 1828074-1                 | 1828075-1         | Primary |
| Yellow | 1828073-2              | 1828074-2                 | 1828075-2         | Primary |
| Green  | 1828073-3              | 1828074-3                 | 1828075-3         | Primary |
| Blue   | 1828073-4              | 1828074-4                 | 1828075-4         | Primary |
| Rose   | 1828073-5              | 1828074-5                 | 1828075-5         |         |
| Aqua   | 1828073-6              | 1828074-6                 | 1828075-6         |         |
| Brown  | 1828073-7              | 1828074-7                 | 1828075-7         |         |
| Violet | 1828073-8              | 1828074-8                 | 1828075-8         |         |
| Orange | 1828073-9              | 1828074-9                 | 1828075-9         |         |
| Slate  | 1-1828073-0            | 1-1828074-0               | 1-1828075-0       |         |

Highlighted Part Numbers are routinely stocked for shortest lead times.

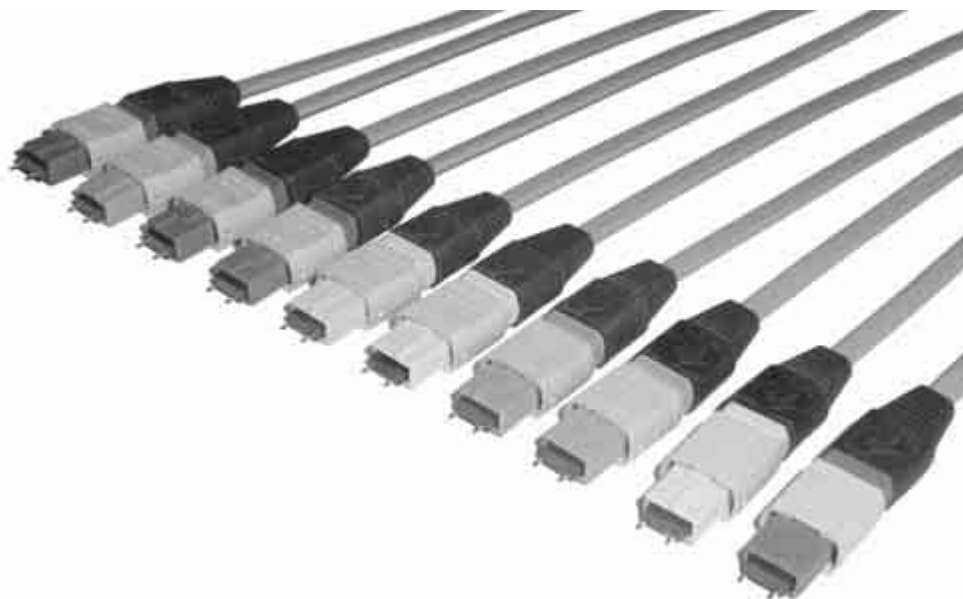
**Note:** All part numbers are RoHS compliant.

## MPO SECURE Fiber Optic Products

### MPO SECURE Trunk Cable Assemblies

#### Product Facts

- Feature color-coded, keyed designs to limit improper connections in segregated or SECURE networks
  - MPO SECURE plug only mates with same color MPO SECURE port
- Trunk cable fiber polarity is pair-flipped (AB/BA)
  - Trunk cables with straight-through polarity (AB/BA) are available
- Pulling socks protect MPO terminations during installation
- Twelve (12) fibers per MPO SECURE plug
- Additional counts and lengths are available
- Trunk cables come pre-tested and ready for immediate use
- MPO SECURE trunk cables are plenum cables
  - Plenum cables can be used in riser spaces
- For use with MPO SECURE Cassettes listed on page 12



| Description | Fiber Type                                                    | SECURE Color/Keying | Part Number |
|-------------|---------------------------------------------------------------|---------------------|-------------|
| 12-Fiber    | 50/125 $\mu$ m Multimode                                      | Red                 | 6754273-X   |
|             |                                                               | Yellow              | 6754276-X   |
|             |                                                               | Green               | 6754274-X   |
|             |                                                               | Blue                | 6754275-X   |
|             | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | Red                 | 6754420-X   |
|             |                                                               | Yellow              | 6754421-X   |
|             |                                                               | Green               | 6754422-X   |
|             |                                                               | Blue                | 6754423-X   |
|             | 62.5/125 $\mu$ m Multimode                                    | Red                 | 6754269-X   |
|             |                                                               | Yellow              | 6754272-X   |
|             |                                                               | Green               | 6754270-X   |
|             |                                                               | Blue                | 6754271-X   |
| 24-Fiber    | 50/125 $\mu$ m Multimode                                      | Red                 | 6754281-X   |
|             |                                                               | Yellow              | 6754284-X   |
|             |                                                               | Green               | 6754282-X   |
|             |                                                               | Blue                | 6754283-X   |
|             | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | Red                 | 6754424-X   |
|             |                                                               | Yellow              | 6754425-X   |
|             |                                                               | Green               | 6754426-X   |
|             |                                                               | Blue                | 6754427-X   |
|             | 62.5/125 $\mu$ m Multimode                                    | Red                 | 6754277-X   |
|             |                                                               | Yellow              | 6754280-X   |
|             |                                                               | Green               | 6754278-X   |
|             |                                                               | Blue                | 6754279-X   |

X denotes length in feet: -1 = 10, -2 = 20, -3 = 30, -4 = 40, -5 = 50, -6 = 60, -7 = 70, -8 = 80, -9 = 90, 1- -0 = 100, 1- -1 = 110, 1- -2 = 120, 1- -3 = 130, 1- -4 = 140, 1- -5 = 150, 1- -6 = 160, 1- -7 = 170, 1- -8 = 180, 1- -9 = 190, 2- -0 = 200, 2- -1 = 210, 2- -2 = 220, 2- -3 = 230, 2- -4 = 240, 2- -5 = 250, 2- -6 = 260, 2- -7 = 270, 2- -8 = 280, 2- -9 = 290, 3- -0 = 300

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

## MPO SECURE Fiber Optic Products (Continued)

### MPO SECURE Optical Fiber Cassettes

#### Product Facts

- Cassette fiber polarity is pair-flipped (AB/BA)
  - Cassettes with straight-through polarity (AB/AB) are available
- Cassettes have one MPO connection (12-Fiber) or two MPO connections (24-Fiber) on the back of each cassette
- Cassettes house MPO one or two 12-fiber break-out assemblies
- Cassettes have same footprint as Snap-in Adapter Plates
  - Mount in all AMP NETCONNECT enclosures that accept Snap-in Adapter Plates
- Cassettes come pre-tested and ready for immediate use
- MPO SECURE cassettes accept one or two MPO SECURE connectors and transition to the same color MT-RJ SECURE connectors
- MPO SECURE plug only mates with same color MPO SECURE port
- For use only with MPO SECURE Trunk Cable Assemblies on this page



| Description                | Fiber Count | Duplex Port Count | Part Number |           |
|----------------------------|-------------|-------------------|-------------|-----------|
|                            |             |                   | MT-RJ       | LC        |
| 50/125 $\mu$ m Multimode   | 12          | 6                 | 6754286-X   | 1918779-X |
|                            | 24          | 12                | 6754288-X   | 1918780-X |
| 62.5/125 $\mu$ m Multimode | 12          | 6                 | 6754285-X   | 1918781-X |
|                            | 24          | 12                | 6754287-X   | 1918782-X |
| Laser Optimized (10 Gig)   | 12          | 6                 | 1918777-X   | 1918783-X |
|                            | 24          | 12                | 1918778-X   | 1918784-X |

X denotes color: -1 = Standard; -2 = Red; -3 = Green; -4 = Blue; -5 = Yellow; -6 = Orange; -7 = Brown; -8 = Violet; -9 = Rose; 1- -0 = Slate; 1- -1 = Aqua.

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

## MT-RJ SECURE Product Expansion — Now 10 Variants of the MT-RJ SECURE Products



In response to several customers, the MT-RJ SECURE product line has been expanded with an additional six color/key versions. In addition to the original four colors (blue, green, red and yellow), the six new colors (brown, rose, aqua, violet, slate and orange) now make for ten variations. In keeping with the MT-RJ SECURE products features, only plugs and jacks of the same color will mate, and none of the MT-RJ SECURE products will mate with the standard versions. A complete line of jacks, cable assemblies and colored cables are available. For more information see pages 73, 74 and 121.





## Rugged Fiber Optic Products

### Product Facts

- Expanded Beam
  - PRO BEAM Sr.Connectors
  - PRO BEAM Jr.Connectors
  - PRO BEAM Mini Connectors
  - Mini 38999
  - Mini ARINC
  - Mini GPRC
- LuxCis Optical Termini
  - One common terminus for GPRC, 38999, ARINC, Quadrax Cavity Reducers
- Sealed Circular LC ODVA Conforming Connector



Expanded Beam Products



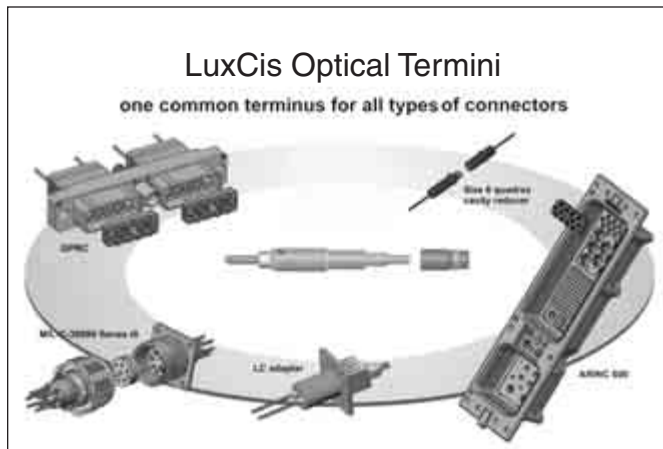
PRO BEAM Sr., Jr. & Mini Connectors

Tyco Electronics is proud to offer a full rugged fiber optic product family.

With Tyco Electronics' Expanded Beam, LuxCis Optical Termini, and the

Sealed Circular LC ODVA Conforming Connector, the end user is guaranteed a complete choice that meets their cost and optical performance needs in multiple industries.

For specific information, please contact your local Tyco Electronics Sales Representative.



LuxCis Optical Termini

LuxCis is a trademark of Radiall, S.A. Product is manufactured under license from Radiall, S.A.

**ASSEMBLY  
CAPABILITIES**  
Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.



Sealed Circular LC ODVA Conforming Connector

## Rugged Fiber Optic Products (Continued)

### Expanded Beam Products

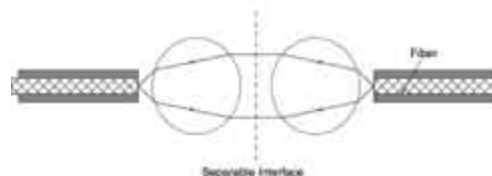
#### Product Facts

- 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



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

### Expanded Beam Technology



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.

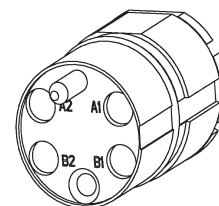
#### Product Facts

- 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

#### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

#### 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 Tyco Electronics exclusive

## Rugged Fiber Optic 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

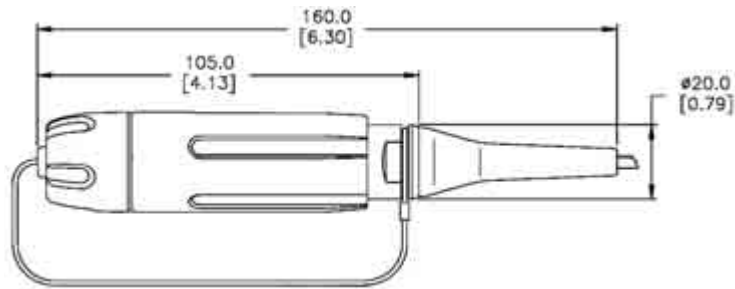
**Shell Alloy** — Aluminum; or nickel  
aluminum bronze (high saline environ-  
ment)

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

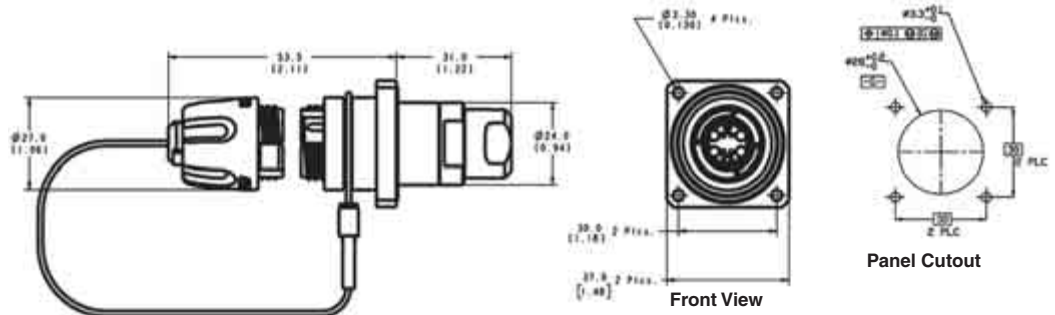
#### Bulkhead Connector Panel Thicknesses

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

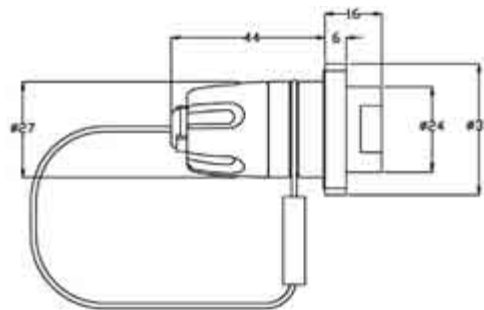
**PRO BEAM Jr. Bulkhead Connector  
Square Flange** — 6 mm max.



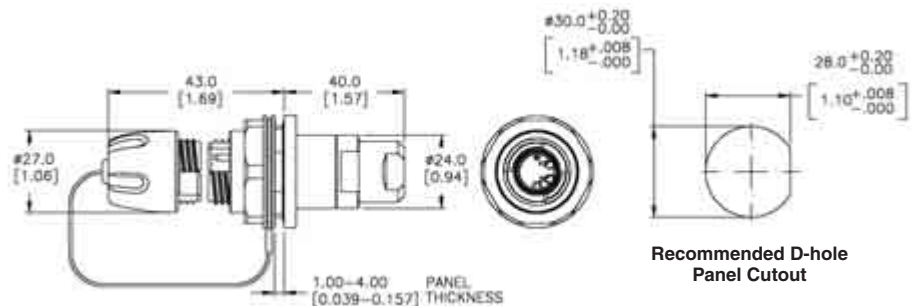
PRO BEAM Jr. Cable Connector, Plug



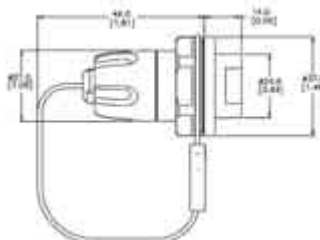
PRO BEAM Jr. Square Flange Mount Bulkhead



PRO BEAM Jr., Low Profile,  
Square Flange Mount Bulkhead



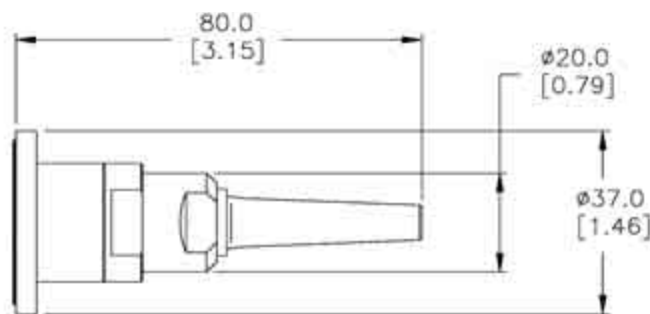
PRO BEAM Jr. D-Hole Bulkhead, Standard Cable Adapter



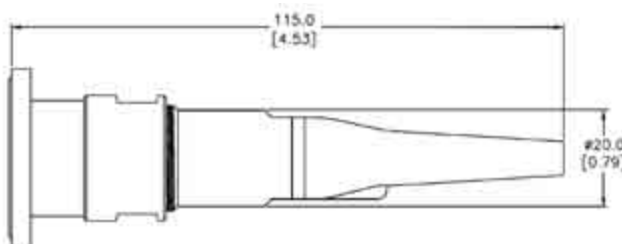
PRO BEAM Jr. Low Profile D-Hole Bulkhead

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

**Rugged Fiber Optic Products (Continued)**



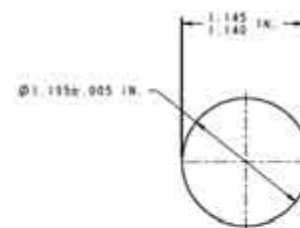
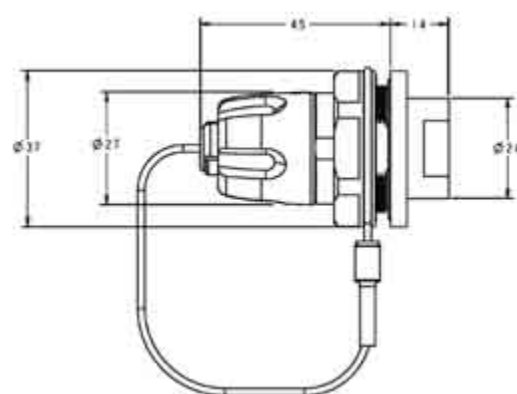
Standard Bulkhead Cable Adapter, with Boot



Environmentally Sealed Bulkhead Cable Adapter, with Boot

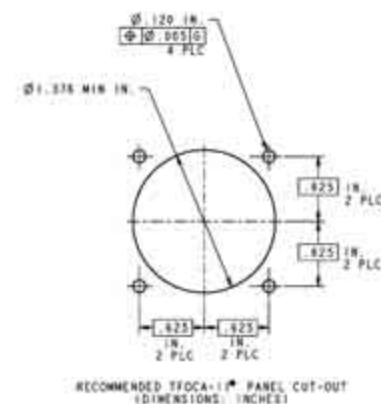
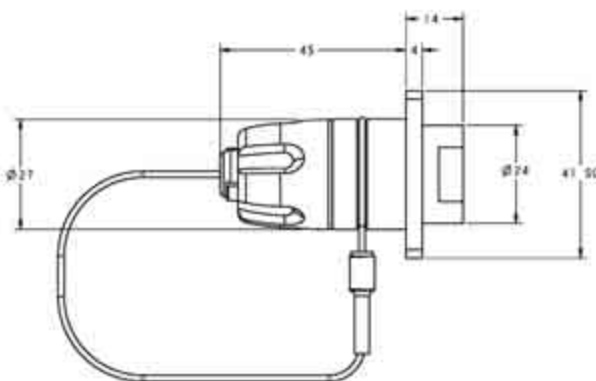
**PRO BEAM Jr. Replacement  
Receptacles for TFOCA-II  
Panel Mount Connector  
Applications**  
(see page 18 for Part Numbers)

**Panel Cutout Dimensions**



RECOMMENDED TFOCA-II<sup>®</sup> PANEL CUT-OUT  
(DIMENSIONS: INCHES)

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



RECOMMENDED TFOCA-II<sup>®</sup> PANEL CUT-OUT  
(DIMENSIONS: INCHES)

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

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

## Rugged Fiber Optic 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 Tyco Electronics  
for other plating/material  
options such as NiAlBz for  
Naval applications.

#### ASSEMBLY CAPABILITIES

Tyco Electronics has  
extensive Rugged Optic Harness  
capabilities. Please consult  
your local Tyco Electronics  
Sales Representative  
for assistance.

#### 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.tycoelectronics.com/documents>

### 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   |

### Ferrule Kits

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

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

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

### 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.



## PRO BEAM Jr. Connectors

(Continued)

### Spare Parts & Tools

### Technical Documents

#### Product Specifications

408-8857 Curing Fixtures for  
PRO BEAM Jr. and 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 Sr.  
Connectors

408-10022 Die Assembly for Mini and  
Jr. Circular Crimps

<http://www.tycoelectronics.com/documents>


## Rugged Fiber Optic Products (Continued)

### 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.tycoelectronics.com](http://www.tycoelectronics.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 $\mu$ m     | SM   | Jr.      | 1588908-2   |
| 126 $\mu$ m     | SM   | Jr.      | 1588908-1   |
| 126 $\mu$ m     | MM   | Jr.      | 1588700-1   |

### Protective Caps

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

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

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



## Rugged Fiber Optic Products (Continued)

### PRO BEAM Mini Connectors

Tyco Electronics is pleased to announce the natural extension from our PRO BEAM Sr. and 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., Jr. & 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 Tyco Electronics 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   | Mini               | 1754700-1   |
| 126 µm          | SM   | Mini               | 1754700-2   |
| 126 µm          | MM   | Mini               | 1754699-1   |

### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

### 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   |

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

## Rugged Fiber Optic 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 environ-  
ment)

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

#### Technical Documents

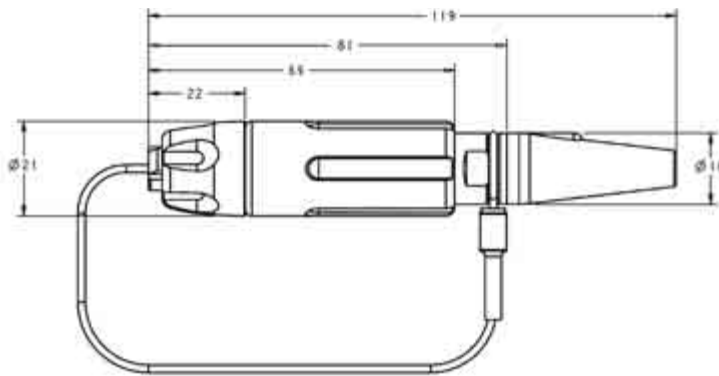
408-10065 Plug

408-10067 Square Flange Bulkhead

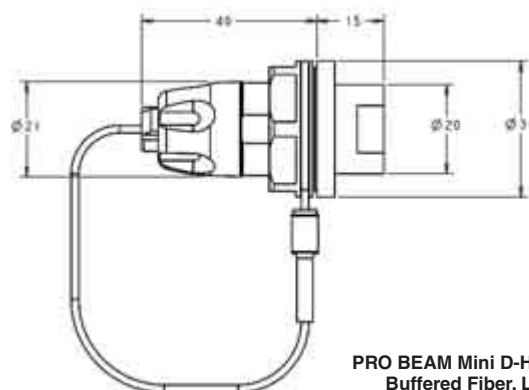
408-10069 Low Profile D-Hole Bulkhead

408-10076 Sealed D-Hole Bulkhead

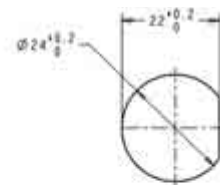
<http://www.tycoelectronics.com/documents>



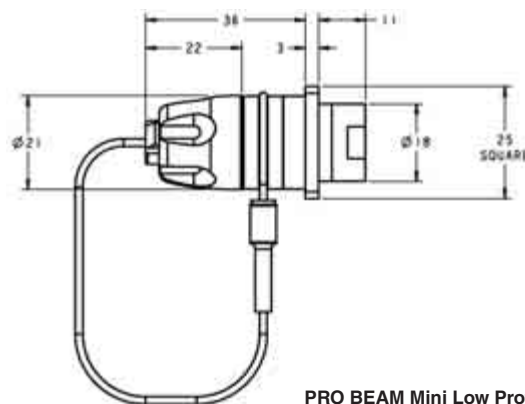
PRO BEAM Mini Cable Connector, Plug



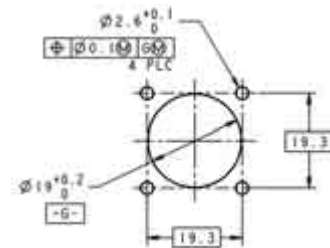
PRO BEAM Mini D-Hole Bulkhead,  
Buffered Fiber, Low Profile



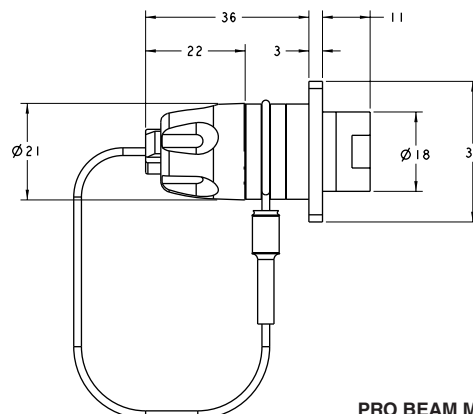
Recommended Panel Cutout



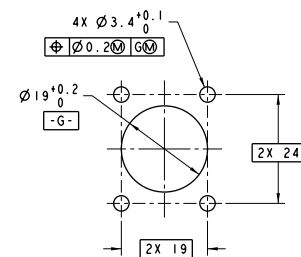
PRO BEAM Mini Low Profile, Square Flange Mount Bulkhead



Recommended Panel Cutout



PRO BEAM Mini Bulkhead with XLR Flange

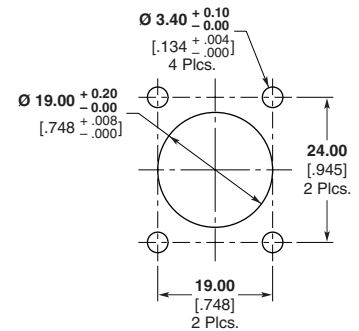
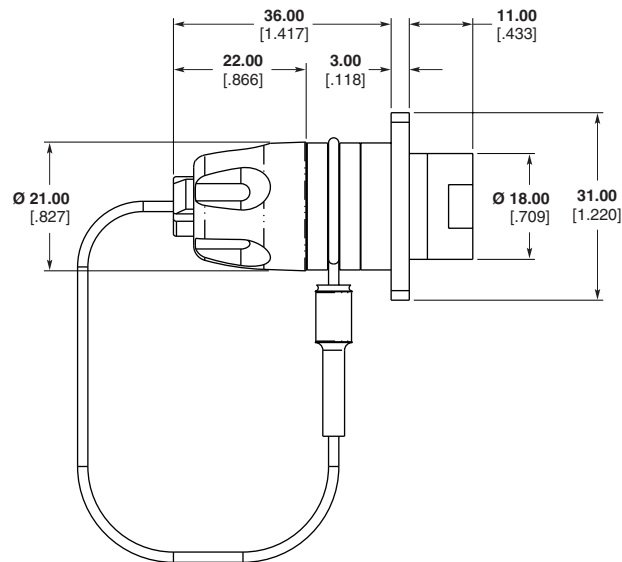


Recommended Panel Cutout

## Rugged Fiber Optic Products (Continued)

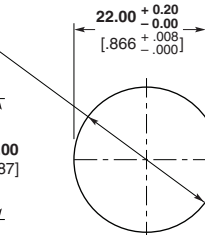
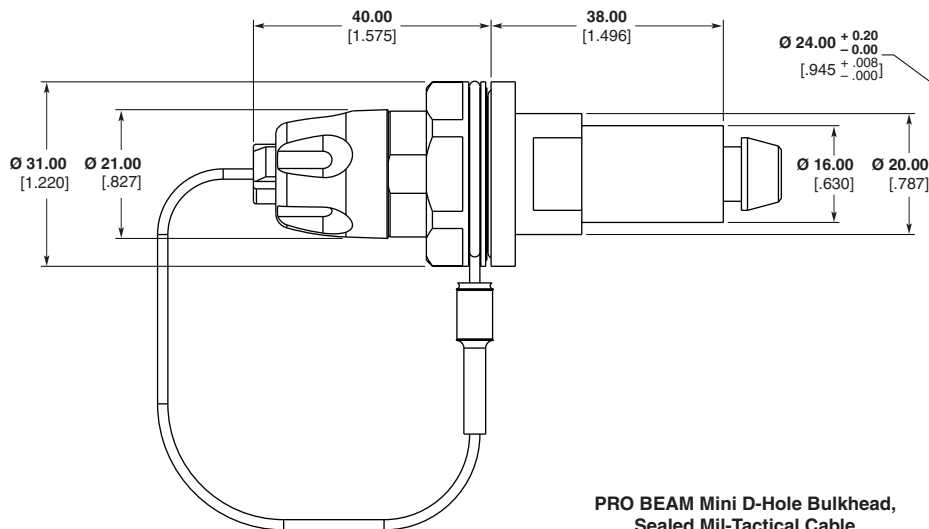
### PRO BEAM Mini Connectors

(Continued)



Recommended Panel Cutout

PRO BEAM Mini Low Profile,  
Alternate Square Flange Mount Bulkhead



Recommended Panel Cutout

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

## Rugged Fiber Optic 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

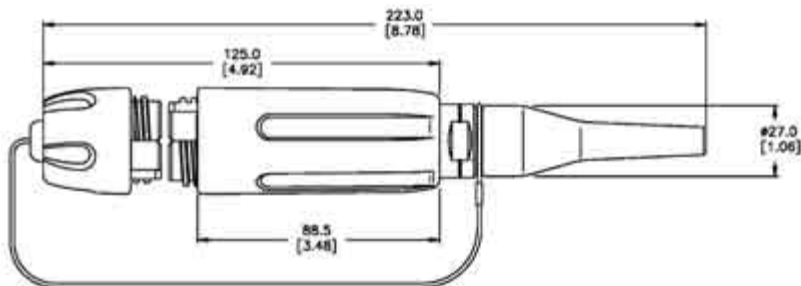
408-8800 D-Hole Bulkhead

408-8877 Square Flange Bulkhead

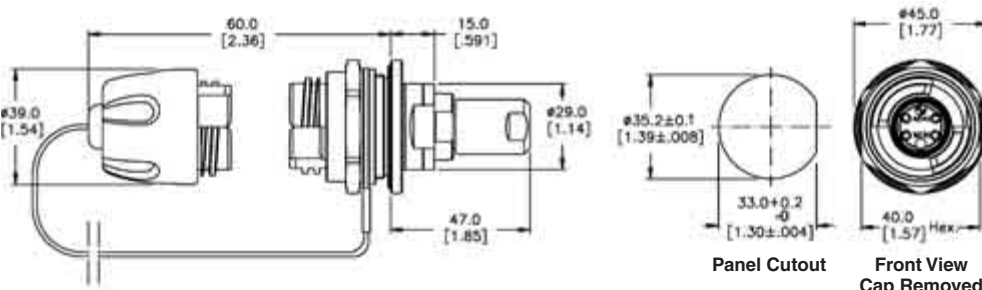
##### Application Specification

114-13122

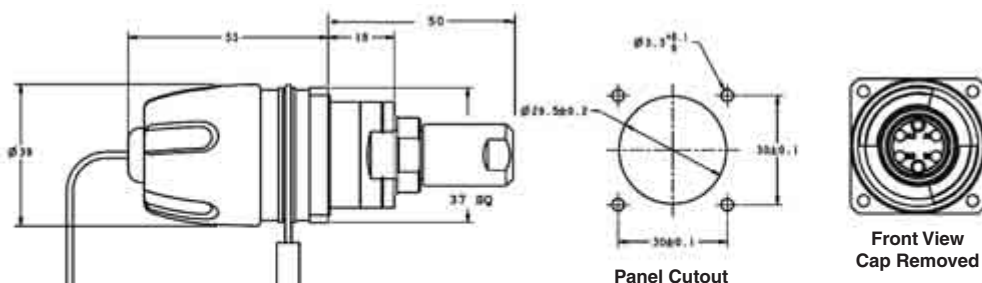
<http://www.tycoelectronics.com/documents>



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  
**Tyco Electronics**  
Sales Representative  
for Part Numbers and  
availability.

## Rugged Fiber Optic 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 Tyco Electronics  
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.<br>(Max.) | Part Number |
|----------------------|-------------|
| 5.10<br>.201         | 1515940-1   |
| 5.65<br>.222         | 1515940-3   |
| 6.20<br>.244         | 1515940-5   |

### Technical Documents

#### Product Specifications

408-8857 Curing Fixtures for  
PRO BEAM Jr. and 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 Sr.  
Connectors  
408-10022 Die Assembly for Mini and  
Jr. Circular Crimps

<http://www.tycoelectronics.com/documents>

#### PRO BEAM Sr. Connector Standard Bulkhead Cable Adapter Kits

| Cable Dia.<br>(Max.) | Style                  | Part Number |
|----------------------|------------------------|-------------|
| 5.10<br>.201         | Standard Cable Adapter | 1515847-1   |
| 5.65<br>.222         | Standard Cable Adapter | 1515724-2   |
| Buffered<br>Fiber    | Low Profile Adapter    | 1515299-2   |

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

## 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

## 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<br>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

## PRO BEAM Jr. Kits

**PRO BEAM Jr. Termination Kit**  
1828650-1

**Cleaning Kit**  
1828335-2

**ASSEMBLY CAPABILITIES**  
Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.



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 Tyco Electronics' Sales Representative or Tyco Electronics 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.

Catalog 1307895  
Revised 11-07  
www.tycoelectronics.com

Dimensions are in millimeters and inches unless otherwise specified. Values in brackets are standard equivalents.

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

USA: 1-800-522-6752  
Canada: 1-905-470-4425  
Mexico: 01-800-733-8926  
C. America: 52-55-1106-0803

South America: 55-11-2103-6000  
Hong Kong: 852-2735-1628  
Japan: 81-44-844-8013  
UK: 31-73-624-6639



## Rugged Fiber Optic 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.<br>This case shall be ruggedized and house all components necessary to repair broken cable.<br>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.

## 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 Tyco Electronics Sales Representative.

#### Protective Case

1918082-1

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

## Rugged Fiber Optic Products (Continued)

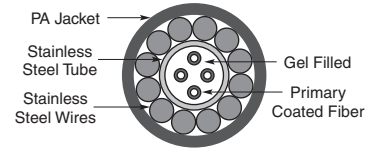
### ARMOR-LIGHT Tactical Field Deployable Fiber Optic Cable for Extreme Environments (Metallic for Rodent Proof)



### 4-Color Optical Fiber Cable Specification for Armored Cable for Ruggedized Applications

#### Construction:

- 4-color coded fibers
- Fiber types 50/125/250  $\mu$ m, 62.5/125/250  $\mu$ m and 9/125/250  $\mu$ m
- Stainless steel gel filled tube
- Stainless steel wire
- Jacket — Nylon, black



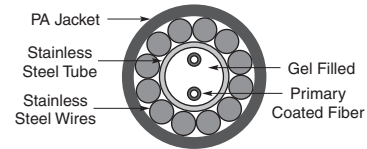
| Fiber Type | Part Number | Outside Dia. (mm) | Weight kg/km | Max. Attenuation dB/km |         |         |         | Bandwidth MHz-km |         |
|------------|-------------|-------------------|--------------|------------------------|---------|---------|---------|------------------|---------|
|            |             |                   |              | 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  $\mu$ m, 62.5/125/250  $\mu$ m and 9/125/250  $\mu$ m
- Stainless steel gel filled tube
- Stainless steel wire
- Jacket — Nylon, black



| 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** —  $\leq 0.5$  dB/km @ 1310 nm /  $\leq 0.5$  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** —  $\leq 0.5$  dB/km @ 1310 nm /  $\leq 0.5$  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  $\mu$ m/125  $\mu$ m and 62.5/125

**Attenuation** —  $\leq 3.5$  dB/km @ 850 nm /  $\leq 1.0$  dB/km @ 1300 (62.5/125);  $\leq 3.5$  dB/km @ 850 nm /  $\leq 1.5$  dB/km @ 1300 (50/125)

#### Mil-Standard Distribution Cable — 4 Fiber Multimode

**Fiber Type** — 50  $\mu$ m/125  $\mu$ m and 62.5/125

**Attenuation** —  $\leq 3.5$  dB/km @ 850 nm /  $\leq 1.0$  dB/km @ 1300 (62.5/125);  $\leq 3.5$  dB/km @ 850 nm /  $\leq 1.5$  dB/km @ 1300 (80/125)

Other fibers (i.e. Polyimide, Silicon buffer, Carbon coated, radiation hardened, etc.) are available upon request.

Contact Tyco Electronics or your local Tyco Electronics Sales Representative for part numbers, pricing, and availability.

## Product Facts

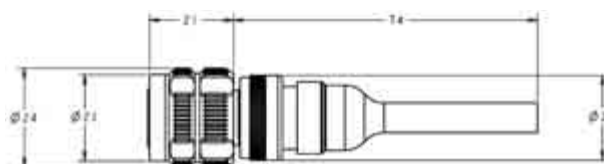
- Available in shell size 11, housed on D38999 Series III style shells for harness applications
- Multiple options available for backshells. Consult your local Tyco Electronics Sales Representative
- Shell polarizations A through E available upon request

### Shell Alloy — Aluminum

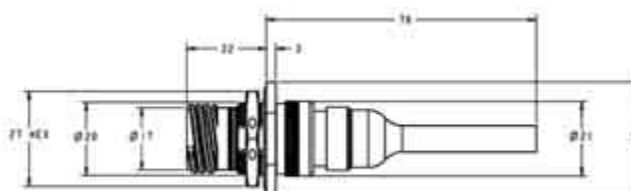
**Plating** — Nickel & green chromate

\*Refer to customer drawing for dash number designation

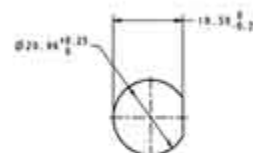
For part number details and plating options, contact your local Tyco Electronics Sales Representative.



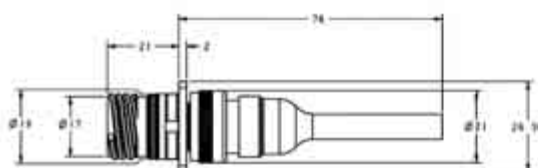
## Plug Shell Kit



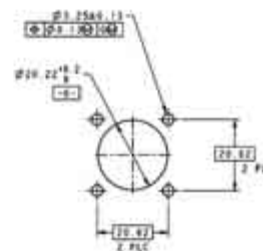
### D-Hole Receptacle Shell Kit



**Receptacle Panel Cut-Out**  
(shell size 11)  
per MIL-DTL-38999K, figure 11



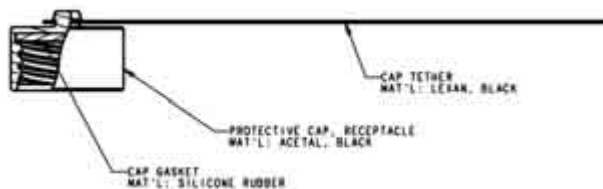
## Square Flange Receptacle Shell Kit



**Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.**



**38999 Plug Cap**  
**1918024-1**



38999 Receptacle Cap  
1918025-1 = Jam Nut Receptacle  
1918025-2 = Square Flange Receptacle

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

## Rugged Fiber Optic Products (Continued)

### “Mini” Expanded Beam for Harsh Environments

(Continued)

|                          | Mini EB 38999 Connector Shell Kits (N-Key) |             |                                 |             |                      |             |
|--------------------------|--------------------------------------------|-------------|---------------------------------|-------------|----------------------|-------------|
|                          | Ø1.8 mm Max Simplex Cable                  |             | MIL-Tactical Distribution Cable |             | Buffered Fiber Only  |             |
|                          | Electroless Ni Plate                       | OD Zn/Ni    | Electroless Ni Plate            | OD Zn/Ni    | Electroless Ni Plate | OD Zn/Ni    |
| Use with:                |                                            |             |                                 |             |                      |             |
| Finish:                  |                                            |             |                                 |             |                      |             |
| Plug:                    | 6754518-1                                  | 1754518-7 ♦ | 6828045-1                       | 1828045-7 ♦ | 1918883-1            | 1918883-7 ♦ |
| Jam-Nut Receptacle:      | 6754519-1                                  | 1754519-7 ♦ | 6828046-1                       | 1828046-7 ♦ | 1918884-1            | 1918884-7 ♦ |
| Flange-Mount Receptacle: | 6754520-1                                  | 1754520-7 ♦ | 6828047-1                       | 1828047-7 ♦ | 1918885-1            | 1918885-7 ♦ |

### 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   | Mini               | 1754700-1   |
| 126 µm          | SM   | Mini               | 1754700-2   |
| 126 µm          | MM   | Mini               | 1754699-1   |

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

## Expanded Beam Avionics-Related Standards and Specifications for ARINC 600, 664, 763 and 801

### ARINC 664 — Aircraft Data Network

Tyco Electronics' ARINC Connectors with Mini Expanded Beam inserts will meet/exceed all 100 Base-FX Ethernet LAN applications

### ARINC 763 — Avionics Network Server System —

Tyco Electronics' ARINC 600 Connectors are designed to meet/exceed 100 Base-FX Ethernet LAN applications.

**Network Server Unit (NSU)** — can use ARINC 600 Size 1 connector with up to 8 Expanded Beam fiber optic channels (two Mini Expanded Beam inserts in cavity C)

**Server Interface Unit (SIU)** — can use ARINC 600 Size 3 connector with up to 16 Expanded Beam fiber optic channels (four Mini Expanded Beam inserts in cavity F)

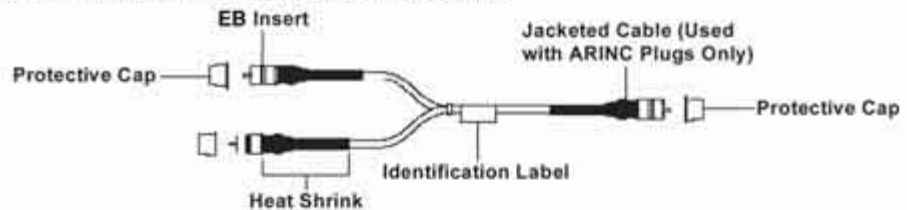
**Integrated Network Server Unit (INSU)** — can use ARINC 600 Size 3 connector with up to 16 Expanded Beam fiber optic channels (four Mini Expanded Beam inserts in cavity F)

### ARINC 801 — Fiber Optics Working Group

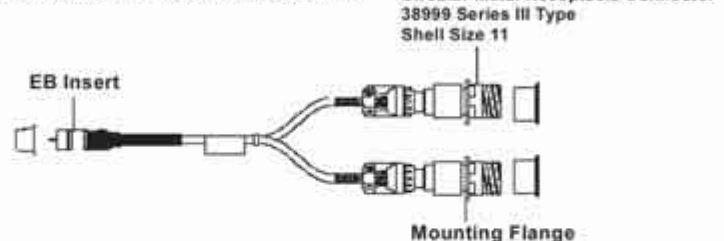
Tyco Electronics provides a single reference point for Flight Level Optics that are multi-sourced.

## Typical Assemblies for In-Flight Network Applications

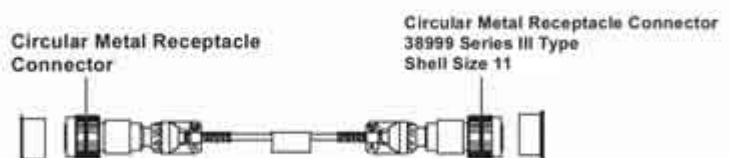
ARINC EB Connector-to-ARINC EB Connector Cable Assembly



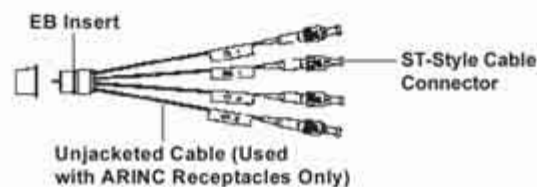
ARINC EB Connector-to-Circular Metal Connector Cable Assembly



Circular Metal Connector-to-Circular Metal Connector Cable Assembly



ARINC EB Connector-to-ST-Style Cable Assembly



## Typical Assemblies



### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

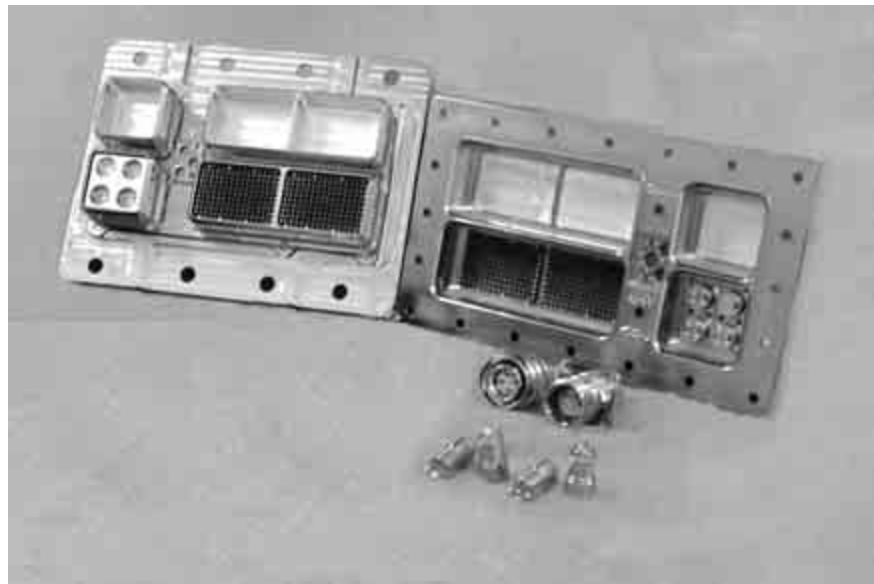


## Rugged Fiber Optic Products (Continued)

### ARINC 600 and 404

#### Product Facts

- For Mini Expanded Beam Inserts
- For use in 100 base-FX Ethernet LAN applications per ARINC 664 and ARINC 763
- Insert holders designed to ARINC 600, Supplement 13 or to specific customer needs for Mini Expanded Beam inserts
- Drop-In Insert Holders utilize Standard ARINC 600 Retainers
  - Hard Stop on Plug Side
  - Spring-Loaded Stop on Receptacle Side
  - Captive Hardware
- Facial Sealing — Optional
  - Bonded to Receptacle Block Mating Face
  - Raised Collar Seal around Optics Insert compresses against Chamfer on Plug Block Mating Face

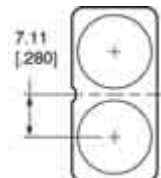


### ARINC 600 Insert Holders for Mini-Expanded Beam Contacts

#### Size 1 Power Cavities



ARINC 600, 1 Position  
1MP

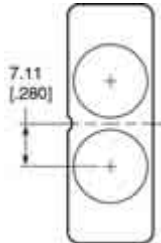


ARINC 600, 2 Position  
2MP

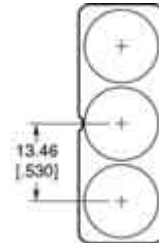
#### Size 1 Signal Cavities



ARINC 600, 1 Position  
1MS



ARINC 600, 2 Position  
2MS



ARINC 600, 3 Position  
3MS

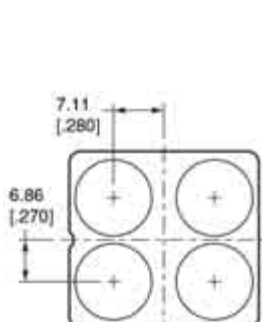
#### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

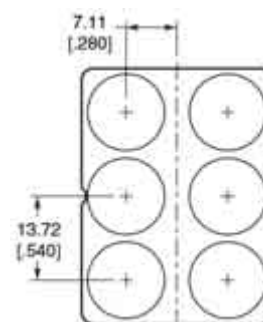
See next page (33) for Size 2 / 3 Power and Signal Cavities

## Rugged Fiber Optic Products (Continued)

### Size 2 / 3 Power and Signal Cavities

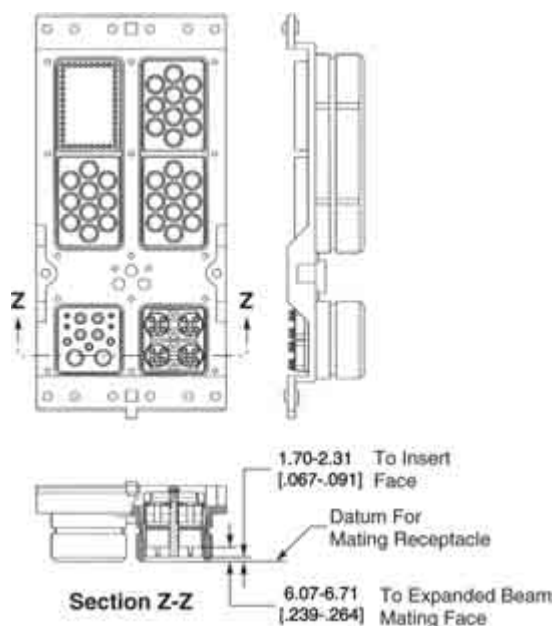


ARINC 600, 4 Position  
4MP

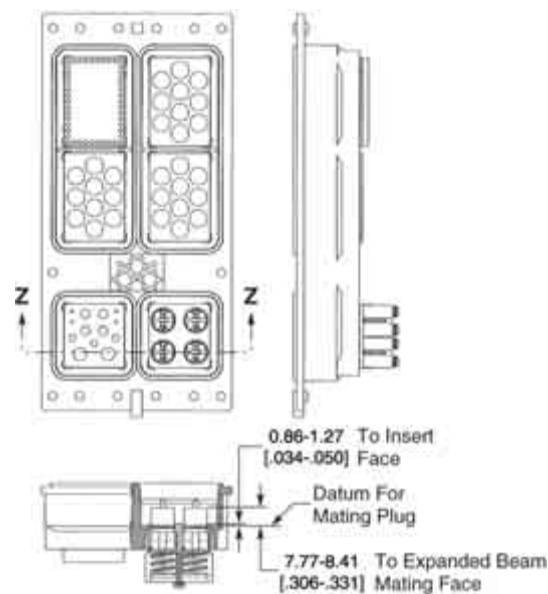


ARINC 600, 6 Position  
6MS

### ARINC 600 Insert Holders for Mini-Expanded Beam Contacts



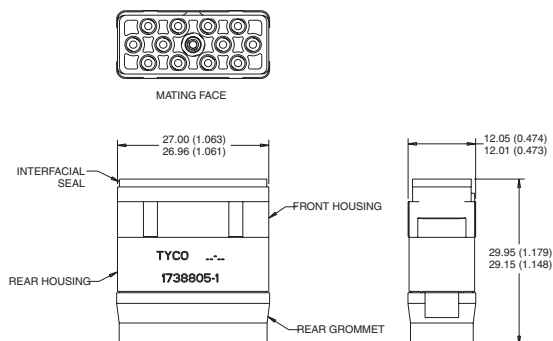
Typical Layout for Plug



Typical Layout for Receptacle

## Rugged Fiber Optic Products (Continued)

### F12 LuxCis Insert Assemblies



#### Product Facts

- ARINC 801 approved
- Optical termini for use with GPR, ARINC 600, circular MIL-DTL-38999 connectors
- Industry Standard 1.25 mm ceramic ferrule
- Compatible with 1.5-2.2 mm tight jacket and loose tube cable construction:
  - MT - Tight jacket cable
  - ML - Loose tube cable
- Singlemode (SM) and Multimode (MM) versions
- LuxCis Optical Termini part numbers:
  - 1828199-1 MM/ML Version
  - 1828200-1 MM/MT Version
  - 1918614-1 SM/ML Version
  - 1918616-1 SM/ML Version-APC
  - 1918615-1 SM/MT Version
  - 1918617-1 SM/MT Version-APC

#### Materials:

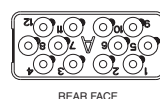
**Housings** – Nickel Plated Copper  
**Ferrule** – Zirconia  
**Spring** – Stainless Steel  
**Crimp Sleeve** – Nickel Plated Copper  
**Protective Cover** – Silicone

#### Optical Performance

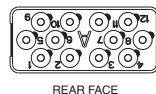
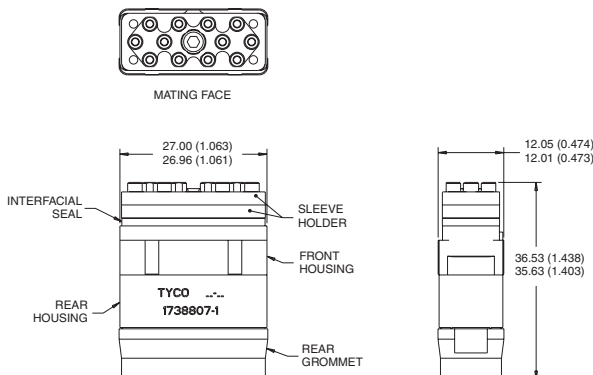
**Singlemode**, 1310 nm/1550 nm (UPC)  
**Attenuation, Mean** – 0.15dB  
**Return Loss** - >50dB  
**Multimode**, 850 nm, 1310 nm  
**Attenuation, Mean** – 0.10dB  
**Return Loss** - >20dB

#### Assembly Capabilities

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

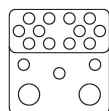


Insert Assembly, without Sleeve Holder, Environmental, F12  
 Key A 1738805-1  
 Key B 1738806-1

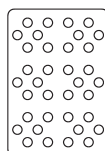


Insert Assembly, with Sleeve Holder, Environmental, F12, Key A  
 GPRB  
 Key A 1738807-1  
 Key B 1738808-1

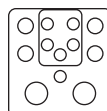
#### LuxCis Inserts



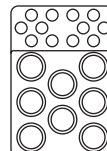
17F12Q2



36F36



12F5C2



20F12Q8

LuxCis Inserts and Cavity Reducers accept LuxCis Optical Termini.

LuxCis is a trademark of Radiall, S.A. Product is manufactured under license from Radiall, S.A.

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

## Rugged Fiber Optic Products (Continued)

### Comparative on Expanded Beam Inserts

### Comparative on Expanded Beam Inserts' weight and Insertion Forces when applied to an ARINC housing

- ARINC 600 connector mated pair size 2 = 440 grams (without copper contacts)
- ARINC style Mini and Junior size Expanded Beam inserts = 5 pounds insertion force each when applied to the Rack and Panel ARINC Connector inserts
- Signal Cavity Optical Holder insert (i.e.: holds up to six mini inserts with four fiber ball lenses each or up to 24 fibers each insert set) = @ 30 grams
- Power Cavity Optical Holder insert (i.e.: holds up to four mini inserts with four fiber ball lenses each or up to 16 fibers each insert set) = @ 20 grams
- Insert mated pair PRO BEAM Jr. Connector insert set = @ 41.79 grams
- Insert mated pair PRO BEAM mini Connector insert set = @ 16.17 grams
- Fiber = single fiber  $\leq 4$  kg / km
- Fiber = four fiber jacketed with a support member  $\leq 24$  kg / km
- Static spring force per mated Expanded Beam insert pair = 5 lbs.

### LuxCis Optical Termini Notes

LuxCis is a trademark of Radiall, S.A.  
Product is manufactured under license from Radiall, S.A.

### Sealed Circular LC ODVA Conforming Notes

## Rugged Fiber Optic Products (Continued)

### LuxCis Optical Termini

#### Product Facts

- Optical termini for use with GPR, ARINC 600, circular MIL-DTL-38999 connectors.
- Industry Standard 1.25 mm ceramic ferrule
- Compatible with 1.5-2.2 mm Tight jacket and loose tube cable construction:
  - MT - Tight jacket cable
  - ML - Loose tube cable
- SM / MM versions

#### Materials

**Housings** — Nickel Plated Copper  
**Ferrule** — Zirconia  
**Spring** — Stainless Steel  
**Crimp Sleeve** — Nickel Plated Copper  
**Protective Cover** — Silicone

#### Optical Performance

**Singlemode, 1310 nm/1550 nm (UPC):**

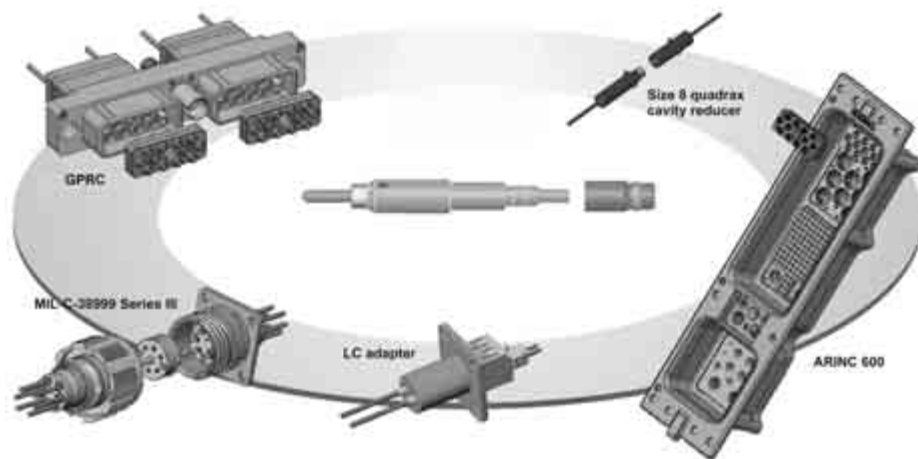
**Attenuation, Mean** — 0.15dB  
**Return Loss** — > 50dB

**Multimode, 850 nm/1310 nm:**

**Attenuation, Mean** — 0.10dB  
**Return Loss** — > 20dB

## LuxCis Optical Termini

one common terminus for all types of connectors



#### Mechanical / Environmental Performance

| Test Description            | Standard                       | LuxCis Optical Termini in GPR A & B Connector | LuxCis Optical Termini in 38999 Connector    | LuxCis Optical Termini in ARINC 600 Connector  |
|-----------------------------|--------------------------------|-----------------------------------------------|----------------------------------------------|------------------------------------------------|
| Thermal Shock               | SAE-AS-13441 met 1003.1        | -55C / +100C                                  | -55C / +100C                                 | -55C / +100C                                   |
| Temperature Life            | TIA/EIA 455-20A                | 500h @ +100C                                  | 500h @ +100C                                 | 500h @ +100C                                   |
| Vibration                   | TIA/EIA 455-11                 | 8h/axis<br>3.8g <sup>2</sup> /Hz<br>43 G rms  | 8h/axis<br>3.8g <sup>2</sup> /Hz<br>43 G rms | 8h/axis<br>0.2g <sup>2</sup> /Hz<br>16.4 G rms |
| Shock                       | TIA/EIA 455-14A                | 300 G - 3ms                                   | 300 G - 3ms                                  | 50G - 11ms                                     |
| Mate/Unmate (GPR/ARINC 600) | SAE-AS-13441 met 2016          | 100 Cycles                                    | N/A                                          | 100 Cycles                                     |
| Mate/Unmate (38999)         | TIA/EIA 455-21A                | N/A                                           | 500 Cycles                                   | N/A                                            |
| Maint. Aging                | SAE-AS-13441 met 2002-1        | 10 Cycles                                     | 10 Cycles                                    | 10 Cycles                                      |
| Salt Spray                  | SAE-AS-13441 met 1001.1 cond C | 96 hr                                         | 500 hr                                       | 48 hr                                          |
| Cable Ret. (1.8 mm)         | SAE-AS-13441 met 2009-1        | 68N                                           | 68N                                          | 68N                                            |
| Humidity (GPR/38999)        | TIA/EIA 455-5 met B7A          | 10 cycles / 24h<br>90% RH<br>-25C/+65C        | 10 cycles / 24h<br>90% RH<br>-25C/+65C       | N/A                                            |
| Humidity (ARINC 600)        | TIA/EIA 455-5 met B            | N/A                                           | N/A                                          | 10 cycles / 24h<br>90% RH<br>-25C/+65C         |
| Altitude Imm.               | TIA/EIA 455-15                 | 10,000 ft (69.6kPa)                           | 10,000 ft (69.6kPa)                          | 10,000 ft (69.6kPa)                            |

#### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

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## LuxCis Optical Termini (Continued)

There are three types of LuxCis Optical Termini available dependent upon cable structure.

Tyco Electronics has multiple connector types/families available for the LuxCis Optical Termini System.

These are:

- General Purpose Rectangular Connectors
  - F5 & F12 Inserts
- MIL-DTL-38999 connectors
  - 13-04, 15-06, 21-16
- ARINC 600
  - F12 combinations and F36
- Quadrax Cavity Reducers
- Motherboard & Daughtercard Solutions

### Connector Options:

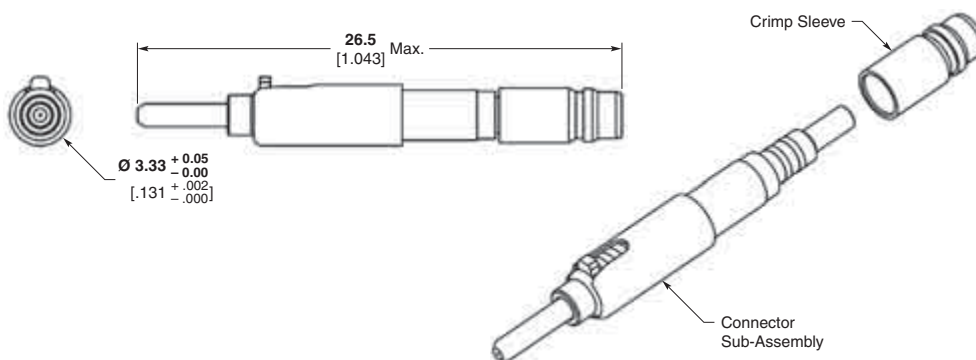
For part numbers, details, and / or additional connector types and arrangements, contact your local Tyco Electronics Sales Representative.

### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.

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## Rugged Fiber Optic Products (Continued)



### LuxCis Optical Termini Part Numbers

| Cable Dia.   | Cable Structure<br>ML (loose & tight)<br>MT (ultra tight) | S/M Fiber<br>125.3 µm<br>PC/UPC | S/M Fiber<br>125.3 µm<br>APC | M/M Fiber<br>128 µm<br>PC |
|--------------|-----------------------------------------------------------|---------------------------------|------------------------------|---------------------------|
| 0.9mm Buffer | —                                                         | *                               | *                            | *                         |
| 1.5 - 2.2 mm | ML                                                        | *                               | *                            | 1828199-1                 |
| 1.5 - 2.2 mm | MT                                                        | *                               | *                            | 1828200-1                 |

Consult your local Tyco Electronics Sales Representative for additional options.

\* Contact Tyco Electronics for availability.

| Accessories          | Part Number |
|----------------------|-------------|
| Dust Cap (bag of 10) | 1828221-1   |

### LuxCis Cavity Reducers

| Size 8 Quadrax                                                              | Part Number | LuxCis Cavity Reducer                               |
|-----------------------------------------------------------------------------|-------------|-----------------------------------------------------|
| Pin Quadrax adapter for LuxCis Optical Termini in Quadrax FR type cavity    | 1757727-1   | Quadrax cavity reducer (FR/FR) for receptacle shell |
| Pin Quadrax adapter for LuxCis Optical Termini in Quadrax RR type cavity    | 1757710-1   | Quadrax cavity reducer (RR/RR) for receptacle shell |
| Socket Quadrax adapter for LuxCis Optical Termini in Quadrax RR type cavity | 1757711-1   | Quadrax cavity reducer (RR/RR) for plug shell       |

### Cable Structure

|                                        | Loose Structure | Tight Structure | Ultra Tight Structure |
|----------------------------------------|-----------------|-----------------|-----------------------|
| Movement between fiber & 900 µm buffer | Yes             | No              | No                    |
| Movement between 900 µm & cable jacket | Yes             | Yes             | No                    |

### Adapters

| Type                                             | Version                           | Alignment Sleeve | Part Number | Dim.   |
|--------------------------------------------------|-----------------------------------|------------------|-------------|--------|
| LuxCis Optical Termini to LuxCis Optical Termini | Simplex Bulkhead Feedthrough Type | Ceramic Zirconia | 1828996-1   | Fig. 1 |
| LuxCis Optical Termini to LuxCis Optical Termini | Simplex Straight                  | Ceramic Zirconia | 1828997-1   | Fig. 2 |
| LuxCis Optical Termini to LC                     | Simplex LC Panel Cutout           | Ceramic Zirconia | 1828979-1   | Fig. 3 |
| LuxCis Optical Termini to LC                     | Duplex LC Panel Cutout            | Ceramic Zirconia | 1828980-1   | Fig. 4 |
| LuxCis Optical Termini to LC                     | Duplex MIL-DTL-38999 Panel Cutout | Ceramic Zirconia | 1828995-1   | Fig. 5 |

### Tools

| Description/Function                   | Part Number  |
|----------------------------------------|--------------|
| Metal Extraction Tool (M81 969/1-03)   | 91066-3      |
| Plastic Extraction Tool (M81 969/1403) | M81969/14-03 |
| Daniels Right Angle Insertion Tool     | DAK83-16*    |
| Daniels Right Angle Removal Tool       | DRK83-16*    |

\* Contact Daniels Manufacturing

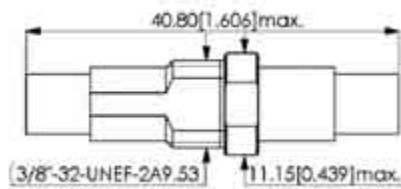
**Note:** All part numbers are RoHS compliant.



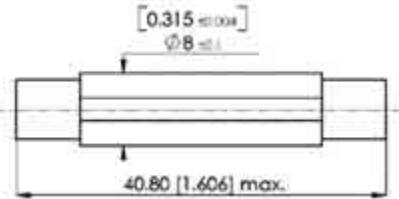
## Rugged Fiber Optic Products (Continued)



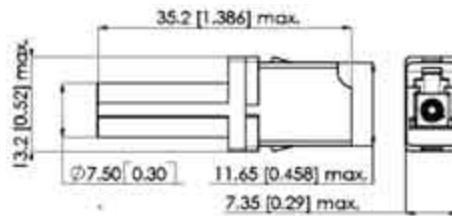
### LuxCis Optical Termini Adapter Dimensions



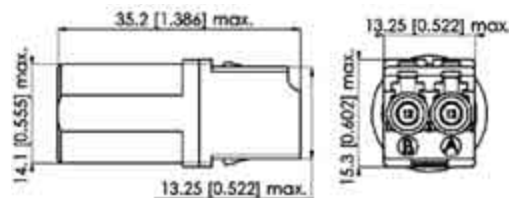
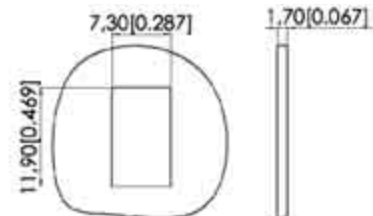
Terminus to Terminus Bulkhead Feedthrough



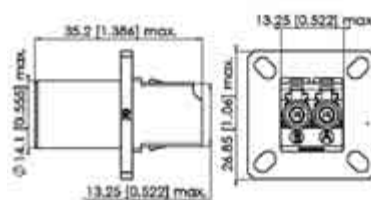
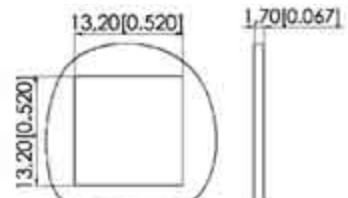
Terminus to Terminus Straight



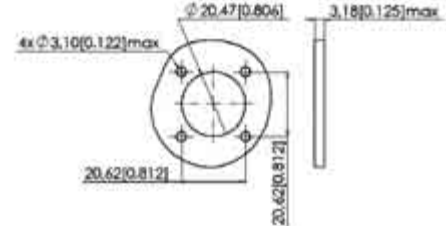
Terminus to LC Simplex



Terminus to LC Duplex, LC Panel



Terminus to LC Duplex, MIL-DTL-38999 Panel Cutout



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**LuxCis Optical Termini  
Termination Kit**  
Part Number 1828644-X



**LuxCis Optical Termini  
Service Tool Kit (Inspection,  
testing & cleaning)**  
Part Number 1828335-1

**LuxCis Optical Termini  
Service Tool Kit  
(Cleaning only)**  
Part Number 1828335-2

**LuxCis Optical Termini  
Service Tool Kit  
(Testing only)**  
Part Number 1828335-3

**LuxCis Optical Termini  
Service Tool Kit  
(Hand Held Digital Probe Kit)**  
Part Number 1828335-4

## Rugged Fiber Optic Products (Continued)

Most of the tools included in the Termination Kit are commonly used in the fiberoptic industry (strippers, cutting pliers and all accessories for fiber and cable preparation). The items in the table below are specially made for the LuxCis Optical Termini System. Their use is highly recommended to achieve mechanical and optical performances.

| Qty -2 | Qty -1 | Description                     | Part Number | Item # |
|--------|--------|---------------------------------|-------------|--------|
| 1      | 1      | Label, Termination Kit          | 1918887-1   | 28     |
| 1      | 1      | Insertion and Extraction Tool   | 91066-3     | 27     |
| 2      | 2      | 1.25 mm Swab                    | 1828355-1   | 26     |
| 1      | 1      | LC Polishing Bushing            | 1754074-1   | 25     |
| 1      | 1      | Polishing Plate                 | 501197-1    | 24     |
| 1      | 1      | Polishing Pad                   | 501523-1    | 23     |
| 10     | 10     | 0.3 µm Polishing Film           | 228433-5    | 22     |
| 5      | 5      | Fine Diamond Polishing Film     | 503887-1    | 21     |
| 10     | 10     | 5 µm Polishing Film             | 228433-8    | 20     |
| 15     | 15     | 9 µm Polishing Film             | 1374484-1   | 19     |
| 1      | 1      | Cleave Tool                     | 504064-1    | 18     |
| 1      | —      | Curing Oven Block               | 1918510-1   | 17     |
| 1      | —      | Curing oven                     | 502130-1    | 16     |
| 1      | 1      | Resin injector tips             | 1918509-2   | 15     |
| 1      | 1      | Resin injector                  | 1918509-1   | 14     |
| 5      | 5      | Epoxy, 353ND                    | 504035-1    | 13     |
| 10     | 10     | Alcohol Fiber Wipe              | 501857-2    | 12     |
| 1      | 1      | Inner Ferrule Shaping Tool      | 1918511-1   | 11     |
| 1      | 1      | Hexagonal key                   | 19840-5     | 10     |
| 1      | 1      | Fiber Stripping tool (125 µm)   | 1754708-1   | 9      |
| 1      | 1      | Handtool                        | 58532-1     | 8      |
| 1      | 1      | Die-set, LuxCis Optical Termini | 1828889-1   | 7      |
| 1      | 1      | KEVLAR Shears                   | 1278637-1   | 6      |
| 1      | 1      | Cable Jacket Strip Tool         | 1278531-1   | 5      |
| 1      | —      | 1.25 mm Microscope Adapter      | 1754765-1   | 4      |
| 1      | —      | 200x Microscope                 | 1754767-1   | 3      |
| 1      | —      | Carrying case, Weekender        | 1918881-1   | 2      |
| —      | 1      | Carrying case, Attache          | 1918834-1   | 1      |

The following tools are necessary for product termination but are not included in the kit:  
Alcohol, canned air, and clean cloth.

Other accessories available include ruler, tweezers, cleaning tip, roller adhesive tape, moss cable support and permanent ink markers.

### Tool Kit Contents

| Item # | Comp Part Number | Description                             | -1 | -2 | -3 | -4 |
|--------|------------------|-----------------------------------------|----|----|----|----|
| 1      | 1278540-1        | Soft Carry Bag                          | 1  | —  | —  | —  |
| 2      | 1754767-1        | 200x Microscope                         | 1  | —  | —  | —  |
| 3      | 1754765-1        | LC Microscope adapter                   | 1  | —  | —  | —  |
| 4      | 6374613-5        | LC - SC 50/125 cable assembly           | 2  | —  | —  | —  |
| 5      | 6374615-5        | LC - SC 62.5/125 cable assembly         | 2  | —  | —  | —  |
| 6      | 1918808-1        | 1.25 mm swab                            | 2  | 2  | —  | —  |
| 7      | 1918810-1        | OPTIPOP C Card Cleaner                  | 2  | 5  | —  | —  |
| 8      | 1828349-1        | Optical Loss Test Set                   | 1  | —  | 1  | —  |
| 9      | 1828350-1        | OLTS 1.25 mm detector cap               | 1  | —  | 1  | —  |
| 10     | 1828352-1        | Visual Fault Locator                    | 1  | —  | 1  | —  |
| 11     | 1828353-1        | VFL 1.25 mm Adapter                     | 1  | —  | 1  | —  |
| 12     | 1828465-1        | Label, Service Kit                      | 1  | —  | 1  | —  |
| 13     | 1918222-1        | Inspection, Hand Held Digital Probe Kit | —  | —  | —  | 1  |
| 14     | 1918223-1        | 1.25 mm Adapter, Digital Probe          | —  | —  | —  | 1  |

-1 inspection, cleaning & testing

-2 cleaning

-3 testing

-4 Hand Held Digital Probe Kit

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

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

LuxCis is a trademark of Radiall, S.A. Product is manufactured under license from Radiall, S.A.

OPTIPOP is a trademark of NTT Advanced Technology Corporation.

## Rugged Fiber Optic 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 Tyco Electronics 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

#### 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]

| 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   |

### Combination LIGHTCRIMP PLUS SC/ST/LC Termination Kit Part Number 1985162-1



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

## Rugged Fiber Optic Products (Continued)

### Sealed Circular LC ODVA Conforming 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 Conforming Plug to X interface on tactical with break out
- ODVA Conforming Plug to Plug on tactical cable
- Build to customer need

#### Applications

The LC ODVA Conforming 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



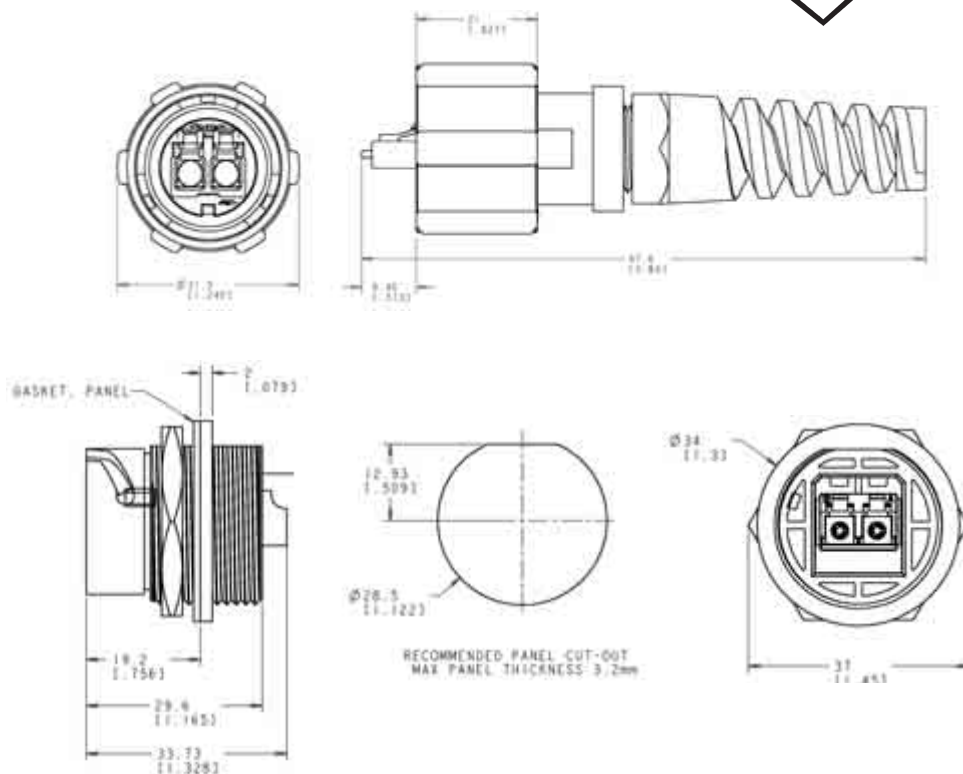
**Plug Part Numbers:**  
1828618-1 (Multimode)  
1828618-2 (Singlemode)

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

**Plug & Receptacle Cap Part Numbers:**  
Plug Cap 1828740-1  
Receptacle Cap 1918177-1

#### ASSEMBLY CAPABILITIES

Tyco Electronics has extensive Rugged Optic Harness capabilities. Please consult your local Tyco Electronics Sales Representative for assistance.



#### Standard Cable Assemblies

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

Note: X = length in meters

**Contact your local Tyco Electronics Sales Representative for information on upcoming product.**

Note: All part numbers are RoHS compliant.

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**Rugged Fiber Optic Products** (Continued)

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**Coming Soon —  
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



## Rugged Fiber Optic Products (Continued)

### Rugged Media Converter & Ethernet Link Extender Solutions

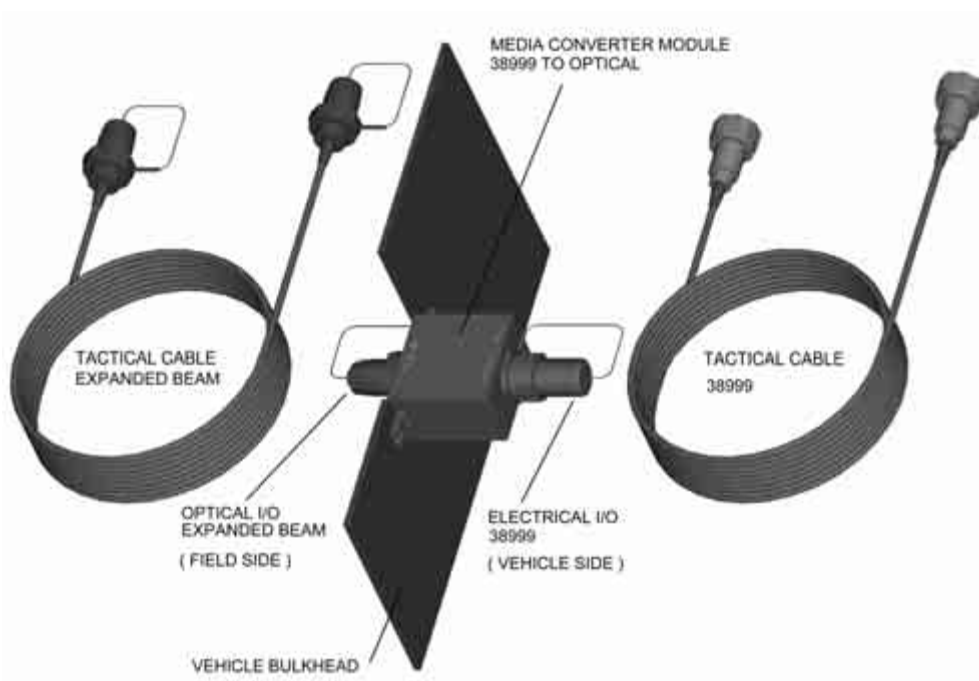
#### Harsh Environment Optical Media Converter Assemblies allowing blind mate field applications over one, two, or four fibers

Tyco Electronics offers solutions for Harsh Environment applications of Ethernet Media Converters.

This page demonstrates Tyco Electronics' capabilities for Advanced Optical Modules. These include Fast, Gigabit, and Ethernet Link Extenders.

For additional Advanced Optical Modules, see Fiber Management & Packaged Solutions, Catalog 1307895, Section 3.

Contact your local Tyco Electronics Sales Representative with your specific design needs.



#### Design Objectives

| Specifications      | Results                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------|
| Standard            | IEEE802.3, IEEE802.3u Ethernet @ 10/100 Mb/s                                                                     |
| Data Rates          | 10 and 100 Mb/s auto negotiation (option to force 10 Mb/s for legacy systems)                                    |
| Duplex Mode         | Full or half-duplex auto-negotiation and N-Way support                                                           |
| Max. Forward Rate   | 14,880 packets per second (pps) @ 10 Mb/s, 148,800 pps @ 100 Mb/s                                                |
| Fiber Connector     | Multimode                                                                                                        |
| Fiber Working Range | TBD                                                                                                              |
| Optical Budget      | TBD                                                                                                              |
| Optical Wavelength  | Multimode                                                                                                        |
| Emissions           | Complies with FCC Class A and CE Class A                                                                         |
| Safety              | UL, CE                                                                                                           |
| Temperature Range   | -40° - 85°C with humidity 10% to 90% non-condensing                                                              |
| Dimensions          | Ø 2.0" (51 mm) X 7.7" (195 mm) from cap to cap<br>Ø 2.0" (51 mm) X 6.6" (168 mm) X 7.6" (194 mm) for 90 assembly |
| Power Consumption   | TBD                                                                                                              |
| Power               | 5VDC                                                                                                             |
| Qualification       | Complies with MIL-STD-810D environmental requirements                                                            |

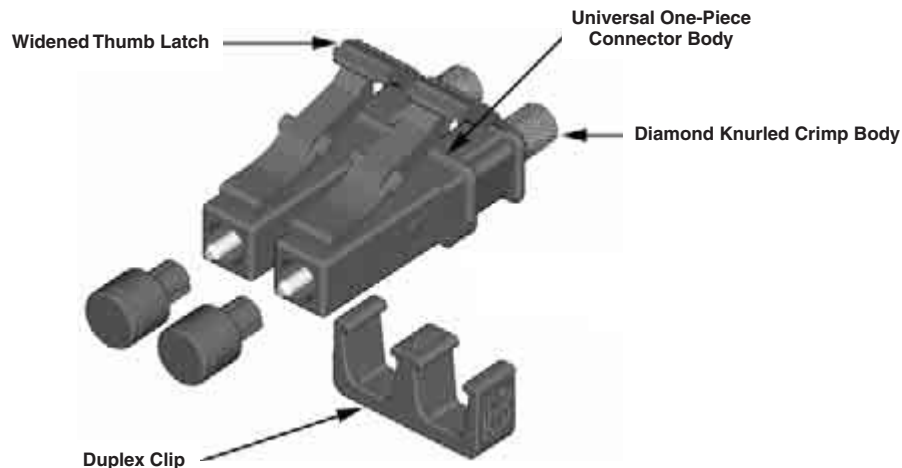


## LC Connectors

### One-Piece LC Connector

#### Product Facts

- Singlemode Telecordia GR-326 tested (Report #501-652)
- Multimode TIA/EIA 568-B.3 tested
- Singlemode and Multimode are compatible with both anaerobic adhesives and heat cure epoxy adhesives
- Universal Connector Body
  - Common body for simplex or duplex
  - Common body for jumper or buffer applications
  - Fewer parts to inventory
- Duplex Clip
  - Field installable
  - Makes simplex assemblies duplex
  - Correct polarity errors
  - Used for both jumpers and buffered fiber applications
- One-Piece Body
  - Improved rigidity
  - Improved side-load strength



- Color coded to comply with 568 C
  - Aqua for 50/125 laser optimized
  - Black for standard 50/125
  - Beige for 62.5/125
  - Blue for singlemode
- Widened Thumb Latch
  - Increased hit area
  - Increased bend strength
  - Ramped front latch for snag resistance
- Diamond Knurled Crimp Body
  - Increased tensile proof strength
  - Identical to Tyco Electronics' SC/FC design

#### Performance Characteristics

**Insertion Loss** — 0.2 dB Typical  
**Reflectance** — -55 dB Typical  
**Operating Temperature** —  
 -40°C to +75°C  
**Durability** — 500 Cycles

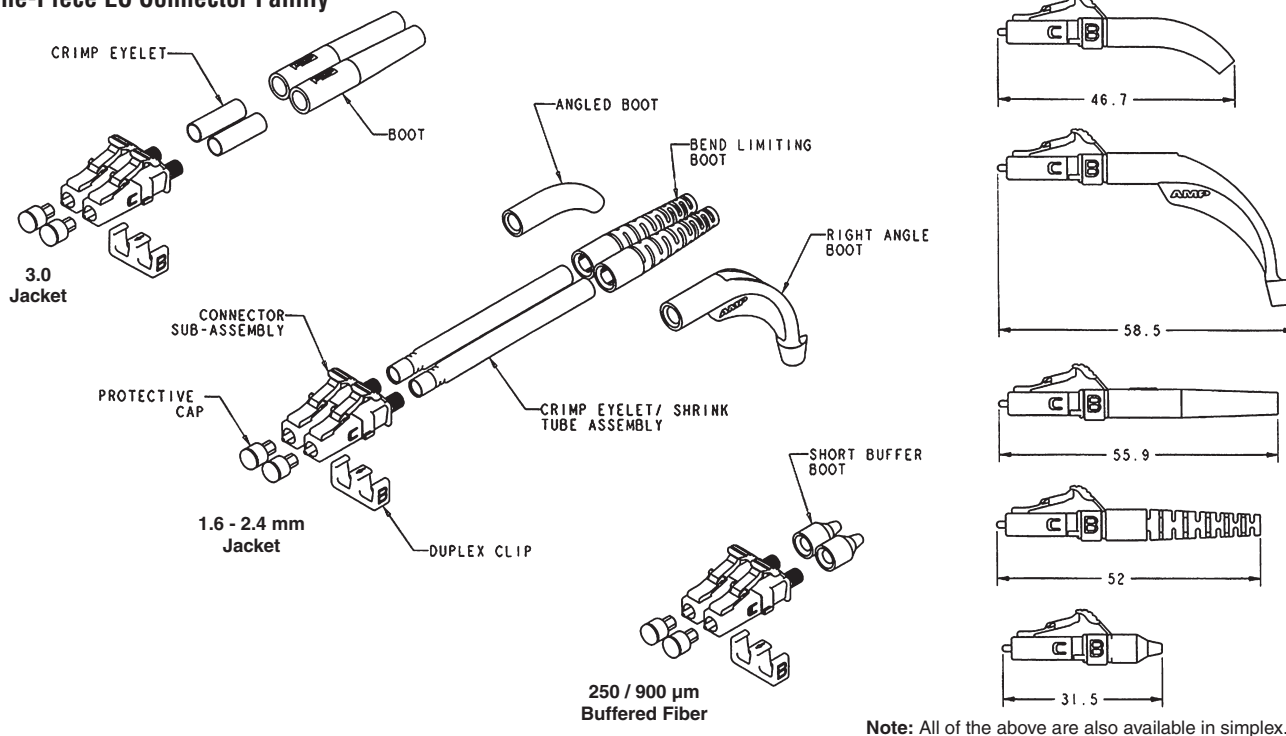
#### LC Connector Kits

| Description | Fiber Type                | Housing Color | Boot Color | Used with           | Individual Pack Part Number | Bulk Pack Part Number |
|-------------|---------------------------|---------------|------------|---------------------|-----------------------------|-----------------------|
| Simplex     | Singlemode                | Blue          | Blue       | 900 µm Buffered     | 1918384-1                   | 1918384-2             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918266-1                   | 1918266-2             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918374-1                   | 1918374-2             |
|             |                           | Beige         | Aqua       | 900 µm Buffered     | 1918385-3                   | 1918385-5             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918267-3                   | 1918267-5             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918375-3                   | 1918375-5             |
|             | Multimode                 | Beige         | Black      | 900 µm Buffered     | 1918385-4                   | 1918385-6             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918267-4                   | 1918267-6             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918375-4                   | 1918375-6             |
|             |                           | Beige         | Beige      | 900 µm Buffered     | 1918385-1                   | 1918385-2             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918267-1                   | 1918267-2             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918375-1                   | 1918375-2             |
| Duplex      | Singlemode                | Blue          | Blue       | 900 µm Buffered     | 1918387-1                   | 1918387-2             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918372-1                   | 1918372-2             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918376-1                   | 1918376-2             |
|             |                           | Beige         | Aqua       | 900 µm Buffered     | 1918388-3                   | 1918388-5             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918373-3                   | 1918373-5             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918377-3                   | 1918377-5             |
|             | Multimode                 | Beige         | Black      | 900 µm Buffered     | 1918388-4                   | 1918388-6             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918373-4                   | 1918373-6             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918377-4                   | 1918377-6             |
|             |                           | Beige         | Beige      | 900 µm Buffered     | 1918388-1                   | 1918388-2             |
|             |                           |               |            | 1.6-2.0 mm Jacketed | 1918373-1                   | 1918373-2             |
|             |                           |               |            | 3.0 mm Jacketed     | 1918377-1                   | 1918377-2             |
| Duplex Clip | For use with Simplex Kits | Black         | —          | —                   | 1754371-1                   | —                     |

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

## LC Connectors (Continued)

### One-Piece LC Connector Family



**Note:** All of the above are also available in simplex.

**LC Connector Component Selection Chart (bulk packaged)**

| Fiber Type             | Simplex Connector Assembly & Dust Cap | Duplex Clip | Cable Size  | Crimp Eyelet with Heat Shrink | Crimp Eyelet | Strain Relief Description | Strain Relief Part Number (see chart below) |
|------------------------|---------------------------------------|-------------|-------------|-------------------------------|--------------|---------------------------|---------------------------------------------|
| Singlemode (blue hsg.) | 1828456-1                             | 1754371-1   | 1.6-2.0 mm  | 6374150-1                     | —            | Straight/Bend Limiting    | 1588153-X                                   |
|                        |                                       |             | 1.6-2.0 mm  | 6374150-1                     | —            | Angled                    | 1374737-X                                   |
|                        |                                       |             | 1.6-2.0 mm  | 6374150-1                     | —            | 50 Degree Angle           | 6457543-X                                   |
|                        |                                       |             | 2.4 mm      | 6588189-1                     | —            | Straight/Bend Limiting    | 1588153-X                                   |
|                        |                                       |             | 2.4 mm      | 6588189-1                     | —            | Angled                    | 1374737-X                                   |
|                        |                                       |             | 2.4 mm      | 6588189-1                     | —            | 50 Degree Angle           | 6457543-X                                   |
|                        |                                       |             | 3.0 mm      | —                             | 5504118-3    | Straight                  | 502716-X                                    |
|                        |                                       |             | 900 $\mu$ m | —                             | —            | 900 $\mu$ m Buffer, 10 mm | 6588612-X                                   |
|                        |                                       |             | 1.6-2.0 mm  | 6374150-1                     | —            | Straight/Bend Limiting    | 1588153-X                                   |
|                        |                                       |             | 1.6-2.0 mm  | 6374150-1                     | —            | Angled                    | 1374737-X                                   |
| Multimode (beige hsg.) | 1754625-1                             | 1754371-1   | 1.6-2.0 mm  | 6374150-1                     | —            | 50 Degree Angle           | 6457543-X                                   |
|                        |                                       |             | 2.4 mm      | 6588189-1                     | —            | Straight/Bend Limiting    | 1588153-X                                   |
|                        |                                       |             | 2.4 mm      | 6588189-1                     | —            | Angled                    | 1374737-X                                   |
|                        |                                       |             | 2.4 mm      | 6588189-1                     | —            | 50 Degree Angle           | 6457543-X                                   |
|                        |                                       |             | 3.0 mm      | —                             | 5504118-3    | Straight                  | 502716-X                                    |
|                        |                                       |             | 900 $\mu$ m | —                             | —            | 900 $\mu$ m Buffer, 10 mm | 6588612-X                                   |



**Crimp Tool Dieset only - 1588175-1**  
**Crimp Tool with Dieset - 1588176-1**  
**Instruction Sheet: 408-8675**  
<http://www.tycoelectronics.com/documents>

**Termination Kit - 1754462-1**  
**Upgrade Kit for Anaerobic terminations - 1754603-1**

### Strain Relief Color

| Base Part Number | Beige | Blue | Black | Red | Aqua |
|------------------|-------|------|-------|-----|------|
| 1588153          | -5    | -2   | -3    | —   | -8   |
| 1374737          | -2    | -1   | -3    | —   | —    |
| 6457543          | -1    | -2   | -4    | —   | —    |
| 502716           | -3    | -4   | -1    | -5  | -11  |
| 6588612          | -1    | -2   | -5    | -4  | -8   |

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

## LC Connectors (Continued)

### Tight Jacketed LC Connectors

#### Product Facts

- Multimode or singlemode
- Simplex or duplex
- Tested using MIL-PRF-85045/16 2.0 mm cable
- LC Commercial Item Description (CID) interim approval by the Naval Surface Warfare Center, Dahlgren Division

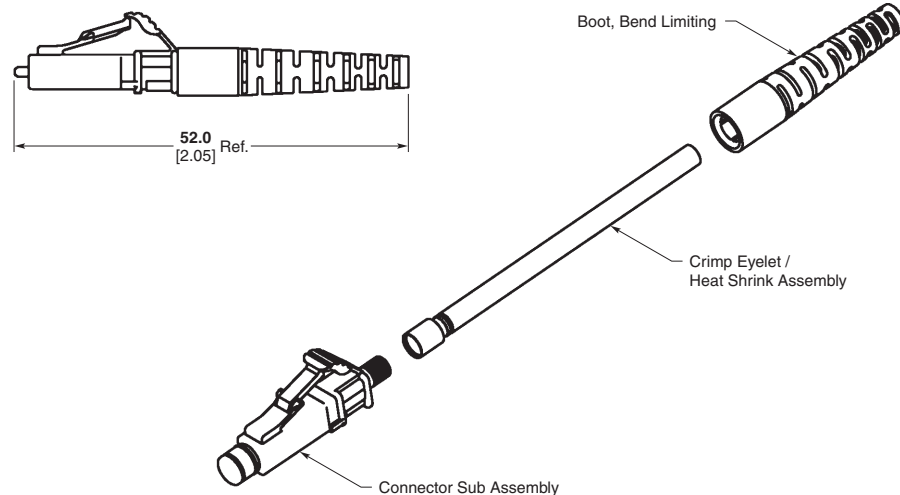
#### Application

- In Flight Networks
- Shipboard Applications
- Aero Market



The tight jacketed LC Connectors are non pull-proof versions of the standard connectors that are designed for use with tight construction cable. Unlike

standard connectors, this design allows the jacket and buffer to move together, reducing the chances of micro-bends and fiber breakage.



| Fiber Type                                | Kit Part Number | Description         |
|-------------------------------------------|-----------------|---------------------|
| Singlemode<br>(blue body & straight boot) | 6828095-X       | Simplex, 1.6–2.0 mm |
|                                           | 6828130-X       | Duplex, 1.6–2.0 mm  |
|                                           | 1918228-X       | Simplex, 2.4 mm     |
| Multimode<br>(beige body & straight boot) | 6828094-X       | Simplex, 1.6–2.0 mm |
|                                           | 6828129-X       | Duplex, 1.6–2.0 mm  |
|                                           | 1918153-X       | Simplex, 2.4 mm     |

**Note:** X = -1 for individual package, -2 for bulk package.  
Instruction Sheet 408-10014. See <http://www.tycoelectronics.com/documents>.  
Duplex Clip Available (Part Number 1754371-1).

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



## Short Boot LC Connector

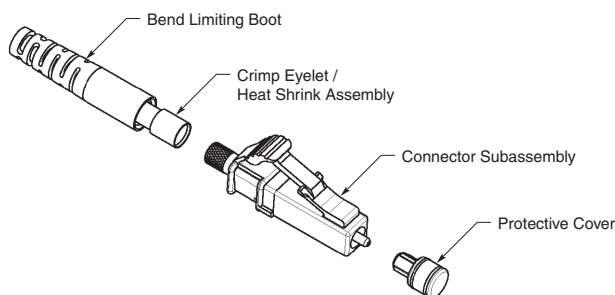
### Product Facts

- Overall LC connector length 42.5 mm (compares to 52 mm standard product)
- Multimode or singlemode
- Simplex or duplex
- Anti-snap rear connector latch
- For 1.6 mm to 2.4 mm cable
- GR-326 Small Form-Factor Performance Requirements



The short boot LC connector provides GR-326 level performance while reducing ferrule tip to boot length to 42.5 mm. The 20% reduction in length is ideal for

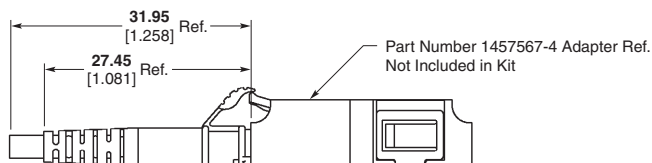
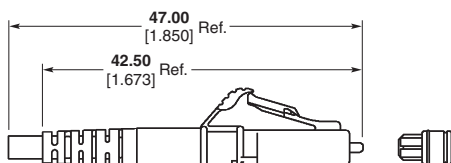
installing in cabinets or other enclosed spaces, protecting against potential mechanical damage from closed cabinet doors.



| Fiber Type                                   | Kit Part Number | Description         |
|----------------------------------------------|-----------------|---------------------|
| Singlemode (blue body & straight blue boot)  | 1918407-X       | Simplex, 1.6-2.0 mm |
|                                              | 1918406-X       | Duplex, 1.6-2.0 mm  |
| Multimode (beige body & straight beige boot) | 1918405-X       | Simplex, 1.6-2.0 mm |
|                                              | 1918404-X       | Duplex, 1.6-2.0 mm  |

**Note:** X = -1 for individual package, -2 for bulk package

The boot (1918403-X) is also sold separately, for use with any Tyco Electronics LC connector.



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

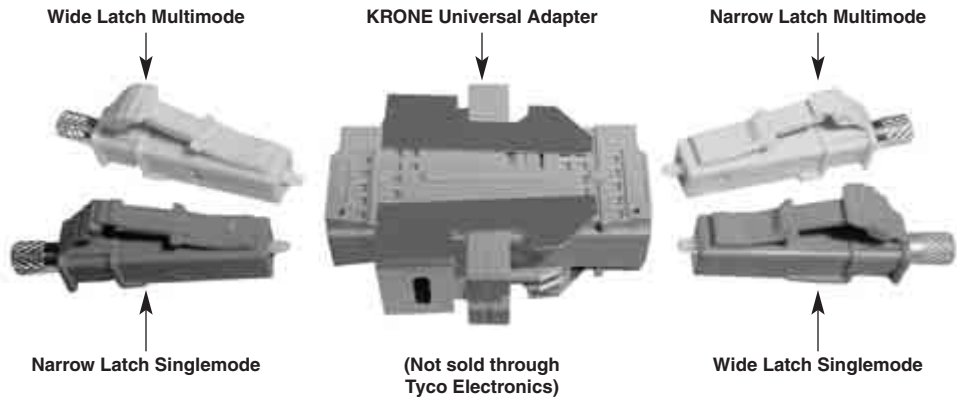
## LC Connectors (Continued)



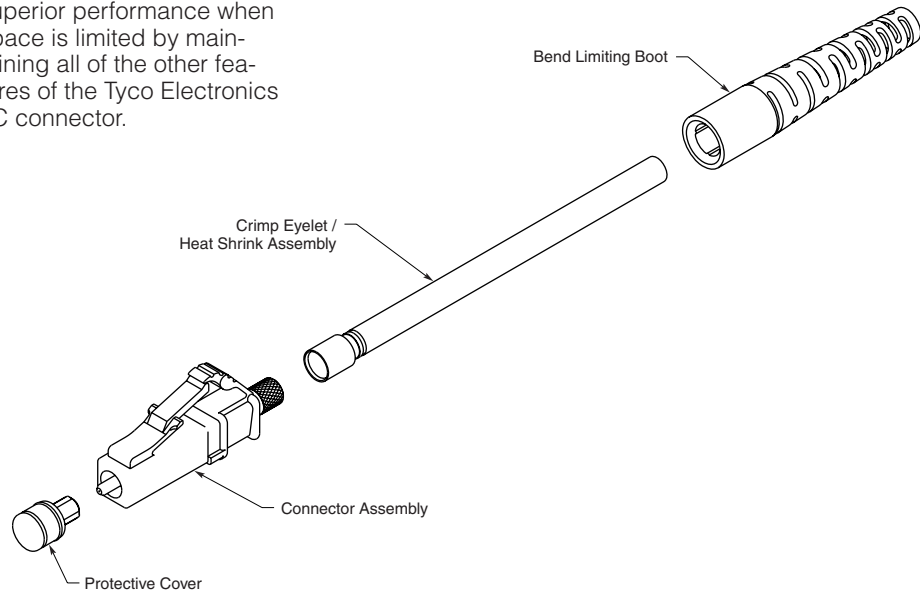
### Narrow Latch LC Connector

#### Product Facts

- One-piece housing
- Reduced thumb latch for tight interconnections
- Mates with Krone universal 1.25 mm adapter
- Multimode or singlemode
- Duplex through use of clip (Part Number 1754371-1)
- Anti-snap rear connector latch
- Subassembly can be used with 900  $\mu$ m to 3.0 mm cable
- GR-326 Small Form Factor Performance

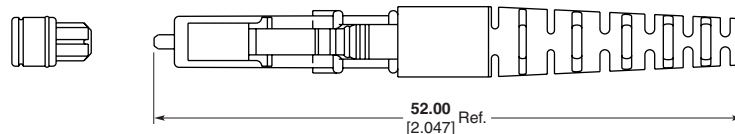


The reduced thumb latch on this connector provides superior performance when space is limited by maintaining all of the other features of the Tyco Electronics LC connector.



| Fiber Type                                   | Kit Part Number | Description         |
|----------------------------------------------|-----------------|---------------------|
| Singlemode (Blue Body & Straight Blue Boot)  | 1918538-X       | Simplex, 1.6-2.0 mm |
| Multimode (Beige Body & Straight Beige Boot) | 1918539-X       | Simplex, 1.6-2.0 mm |

**Note:** X = -1 for individual package, -2 for bulk package



KRONE is a trademark of KRONE Optical Systems, Inc.

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



### LC/SC Flexible Boot

#### Product Facts

- Compatible with any Tyco Electronics LC Connector
- Compatible with Tyco Electronics SC Part Numbers 6588714-3 and 6588715-5
- Controls cable radius in limited space environments
- For use with 1.6 to 2.4 mm multimode or singlemode cable
- Requires crimp eyelet with heat shrink (Part Number 6374150-X or 6588189-1)



| Base Part Number | Beige | Blue | Black | Red |
|------------------|-------|------|-------|-----|
| 1918003          | -5    | -2   | -3    | —   |



### LC/SC 900 $\mu$ m GR-326 Style Boot

#### Product Facts

- Compatible with any Tyco Electronics LC Connector
- Compatible with Tyco Electronics SC parts 6588714-3 and 6588715-5
- Provides bend limiting support
- For use with 900  $\mu$ m multimode or singlemode fiber



| Base Part Number | Beige | Blue | Black | Green |
|------------------|-------|------|-------|-------|
| 1828184          | -4    | -1   | -2    | -3    |

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

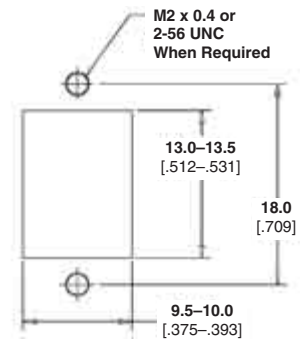


## LC Adapters



### 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  |
| Ceramic                   | Flanged     | Aqua          | 1-6457567-8  |
|                           |             | Beige         | 6457567-5    |
|                           |             | Black         | 1-6457567-7  |
|                           |             | Aqua          | 1-6457567-6  |
|                           | Flangeless  | Blue          | 6457567-4    |
|                           |             | Green         | 6457567-6    |
|                           |             | Beige         | 6457567-2    |
|                           |             | Black         | 1-6457567-5  |
|                           |             | Aqua          | 1-6457567-4  |
|                           |             | Blue          | 6457567-1    |
|                           |             | Green         | 6457567-3    |

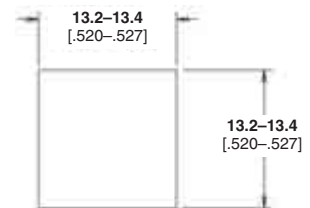


**Recommended Panel Cutout**  
Max. Panel Thk. 1.70 [.067]



### 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    |

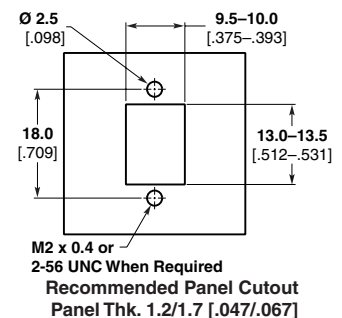


**Recommended Panel Cutout**  
Panel Thk. 1.2/1.7 [.047/.067]



### LC Adapter for SC Cutout — Metal

| Alignment Sleeve Material | Description                 | Housing Color      | Part Numbers |
|---------------------------|-----------------------------|--------------------|--------------|
| Ceramic                   | Flanged                     | Electroless Nickel | 1754683-1    |
|                           | Flangeless                  |                    | 1754682-1    |
|                           | Flangeless w/ EMI Shielding |                    | 1754727-1    |

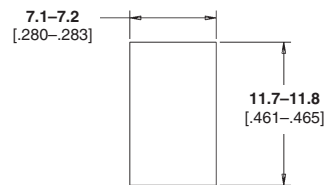


**Recommended Panel Cutout**  
Panel Thk. 1.2/1.7 [.047/.067]



### LC Simplex Adapter — Plastic

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



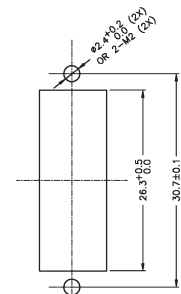
**Recommended Panel Cutout**  
Panel Thk. 1.2/1.7 [.047/.067]



### 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.



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

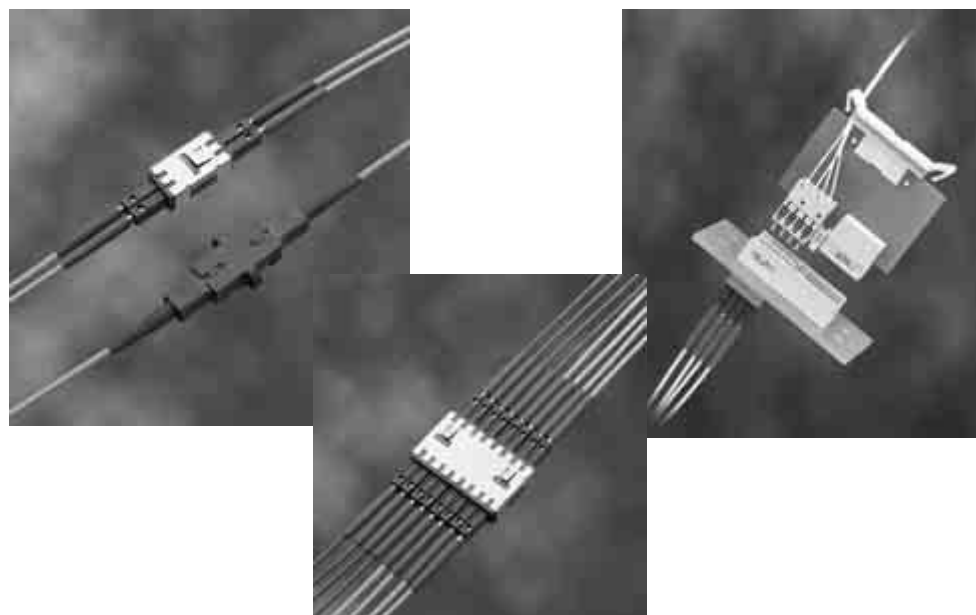
## MU High Density Connectors

### Product Facts

- Singlemode and multimode product range
- For digital network applications PC end face available on both singlemode and multimode connectors
- For analog network applications, APC end face available on singlemode connectors (8°)
- Connector design uses 1.25 mm ceramic ferrule technology
- Polarized for precise insertion
- Factory terminated cable assemblies
- LSZH sheathed cable available
- High optical performance (low insertion, high return loss)
- High density (up to 8 lines per module)

### Performance Characteristics

**Insertion Loss** — 0.1 dB Typical  
**Reflectance** — -55 dB Typical  
**Operating Temperature** —  
 -25°C to +75°C  
**Durability** — 500 Cycles



Tyco Electronics' MU high density fiber optic interconnection system offers a solution for high performance telecommunications networking.

The system centers around the fully standardized MU connector, which is also sometimes known as the Mini SC. The MU connector is at least half the size of the standard SC connector. It can offer twice the port density but all the optical performance of traditional fiber optic connectors.

Featuring a similar latching mechanism to the SC connector, the MU is just as easy to connect and disconnect.

The MU system includes a complete range of multimode and singlemode pre-terminated cable assemblies; bulkhead adapters; backplane housings; system card housings; connector kits; termination tooling and customer polishing processes.

### Key Applications

**Front Panel I/O and High Density Patch Panels for Optical Transmission Equipment, Optical Distribution Frames and Optical Network Units.**

- Full range of simplex, duplex and 8 position bulkhead adapters
- Color coded adapters for ease of identification
- Tuneable versions available to achieve lower insertion losses
- "Push-pull" type latching mechanism

- Fully compliant with relevant IEC standards (IEC 60874-1, CECC 86 305 801)
- Exceeds ETSI performance requirements (ETSI Grade P)

**Back Panel I/O in Optical Transmission and Switching Equipment**

- 8 position Type L optical modules available
- 2.0 mm misalignment pickup tolerance during mating
- Zero force on backplane when fully mated

| Description                   | Part Number |
|-------------------------------|-------------|
| FOKIT MU SM PC 0.9 125/1.0    | 1348982-1 ♦ |
| FOKIT MU SM PC 0.9 126/1.0    | 1348982-2 ♦ |
| FOKIT MU SM PC 125 µm, 2.0 mm | 106875-1 ♦  |
| FOKIT MU SM PC 126 µm, 2.0 mm | 106875-2 ♦  |

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

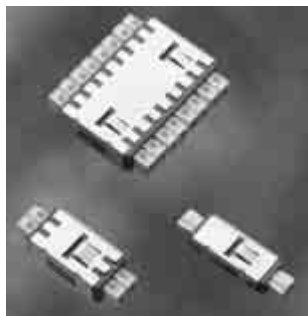
- Zero tensile load on daughter card when fully mated
- Constant mating force during 2.5 mm free float
- Fully compliant with IEC 60917 and IEC 61076-4-101

### MU Standards Compliance

**Product range** —  
 MU cable assembly  
**Applicable standards** —  
 IEC 60874-1  
 CECC 86 305 801 (MU-APC)  
 I-ETS 300 671  
 IEC 61300

**Product range** —  
 Z-PACK 2 mm HM Product  
**Applicable standards** —  
 IEC 60917  
 IEC 61076-4-101

## MU High Density Connectors (Continued)



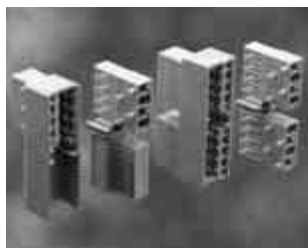
### MU Bulkhead Adapter

The MU bulkhead adapter is designed to help save valuable panel space in high density applications. The adapter enables the interconnection of two MU connectors and features a 1.25 mm ceramic alignment sleeve to ensure precise fiber alignment and low insertion loss, both during and after the interconnection process.

The MU bulkhead adapter is available in PC and APC versions for both digital and ana-

log network applications. It is also available in a choice of simplex, duplex and 8 position versions.

| Description                       | Part Number |
|-----------------------------------|-------------|
| <b>PC finish</b>                  |             |
| Simplex MU Adapter                | 233263-1 ♦  |
| Duplex MU Adapter                 | 233263-3 ♦  |
| Duplex MU Adapter with SC cut-out | 1348840-2   |
| <b>APC finish</b>                 |             |
| Duplex MU Adapter with SC cut-out | 1348840-1   |



### Z-PACK 2 mm HM<sup>1</sup> Type L and M Connector Housings

Z-PACK 2 mm HM connector housings offer a solution to the demand for discrete fiber lines, allowing single disconnects and routing on the backplane.

The 8 position Type L connector housing is fully optical and can accommodate up to 8 fiber lines. These connector housings are available in female configurations and are designed for use on the system card.

The hybrid Type M connector housing combines optical and electrical contacts in one housing, with 55 signal contact positions and 4 fiber optic lines. It allows easy migration from combined optical / electrical to full optical backplane

inter-connections. Female Type M connector housings are suitable for use on the system card while male Type M connector housings are designed for back panel application.

Tyco Electronics also designs and manufactures a range of MT based fiber optic backplane connectors, LIGHTRAY MPX fiber optic backplane connectors. For further information, see Cable Assemblies & Backplane Interconnects Section 2, pages 137-151.

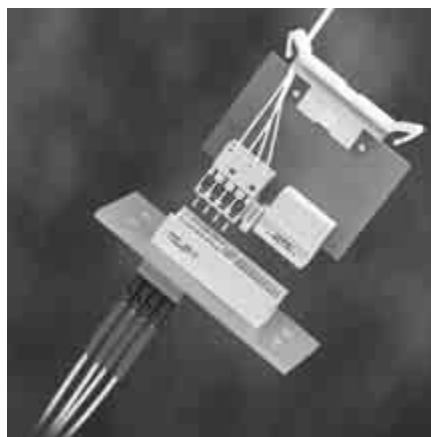
| Description   | Part Number |
|---------------|-------------|
| <b>Type L</b> |             |
| Male          | 106743-1 ♦  |
| Female        | 106744-1    |

<sup>1</sup>HM : Hard Metric

## MU Backplanes

### Product Facts

- Complies to IEC 60917 and IEC 61076-4-101
- Constant mating force during 2.5 mm free float
- Zero tensile load on system card and backplane when fully mated
- Low insertion / extraction forces
- Scalable system allows easy implementation of future upgrades
- Low loss
- High return loss
- APC versions available
- Float in all directions (including x and y)
- Misalignment pick up tolerances 2.0 horizontal, 2.5 mm vertical, and 2 degrees angular



| Description                                   | Part Number |
|-----------------------------------------------|-------------|
| <b>2 Position</b>                             |             |
| Backplane Housing (includes mounting bracket) | 1391160-1 ♦ |
| Systemcard Housing                            | 1391095-1   |
| <b>4 Position</b>                             |             |
| Backplane Housing (includes mounting bracket) | 1391161-1 ♦ |
| Systemcard Housing                            | 1391094-1   |

**Note:** Future product extensions planned: 6 position and 8 position versions. Please contact your local Sales Engineer for additional information.

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

## SC Connectors

### Product Facts

- One-piece connector body:
  - Fastest assembly
  - Field installable
  - Anaerobic adhesive compatible
- Compliant with
  - JIS C-5973
  - Fibre Channel
  - TIA FOCIS-3
- Pre-radiused ceramic ferrules
- For 125 µm cladding diameter
- Instruction Sheet 408-8674  
<http://www.tycoelectronics.com/documents>
- Color coded to comply with 568C
  - Aqua for 50/125 laser optimized
  - Black for standard 50/125
  - Beige for 62.5/125
  - Blue for singlemode

### Performance Characteristics for Singlemode SC Connector Kits — Polymer Crimp Body

- Insertion Loss — <0.2 dB Typical
- Return Loss — <-55 dB Typical
- Durability — 200 Cycles

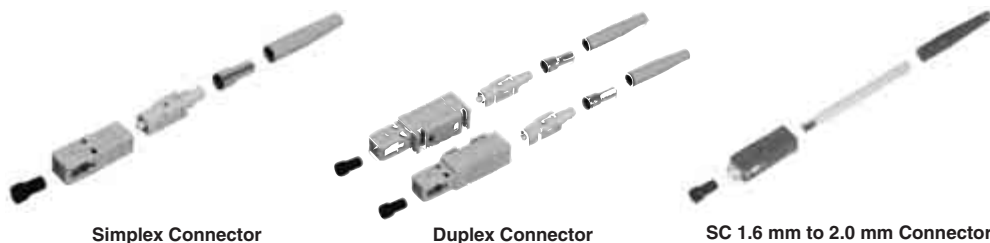
### Performance Characteristics for GR-326 Style Product

- Insertion Loss — <0.2 dB Typical
- Return Loss — <-59 dB Typical
- Durability — 200 Cycles
- Tested to GR-326 (Test Report 501-584)
- Tunable — 6 positions

### Performance Characteristics for Multimode SC Connector Kits

- Insertion Loss — <0.2 dB Typical
- Durability — 500 Cycles
- TIA 586B Compliant

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



### Singlemode SC Connector Kits — Polymer Crimp Body

| Description | Housing Color | Boot Color | Used With                        | Part Numbers    |           |            |
|-------------|---------------|------------|----------------------------------|-----------------|-----------|------------|
|             |               |            |                                  | Individual Pack | Bulk Pack | Crimp Tool |
| Simplex     | Blue          | Blue       | 900 µm Buffered, 3.0 mm Jacketed | 5504646-7       | —         | 503911-1   |
|             |               |            | 3.0 mm Jacketed                  | 5504646-1       | 5504646-2 | 503911-1   |
|             |               |            | 2.4 mm Jacketed                  | 5504933-2       | 5504933-4 | 492026-1   |
|             |               |            | 2.0 mm Jacketed                  | 5503934-2       | 5503934-3 | 492026-1   |
|             |               |            | 900 µm Buffer                    | 5492123-1       | 5492123-2 | N/A        |
| Duplex      | Blue          | Blue       | 3.0 mm Jacketed                  | 5504655-1       | 5504655-2 | 503911-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504936-2       | —         | 492026-1   |

### GR-326 Style Singlemode SC Connector Kits — Metal Crimp Body

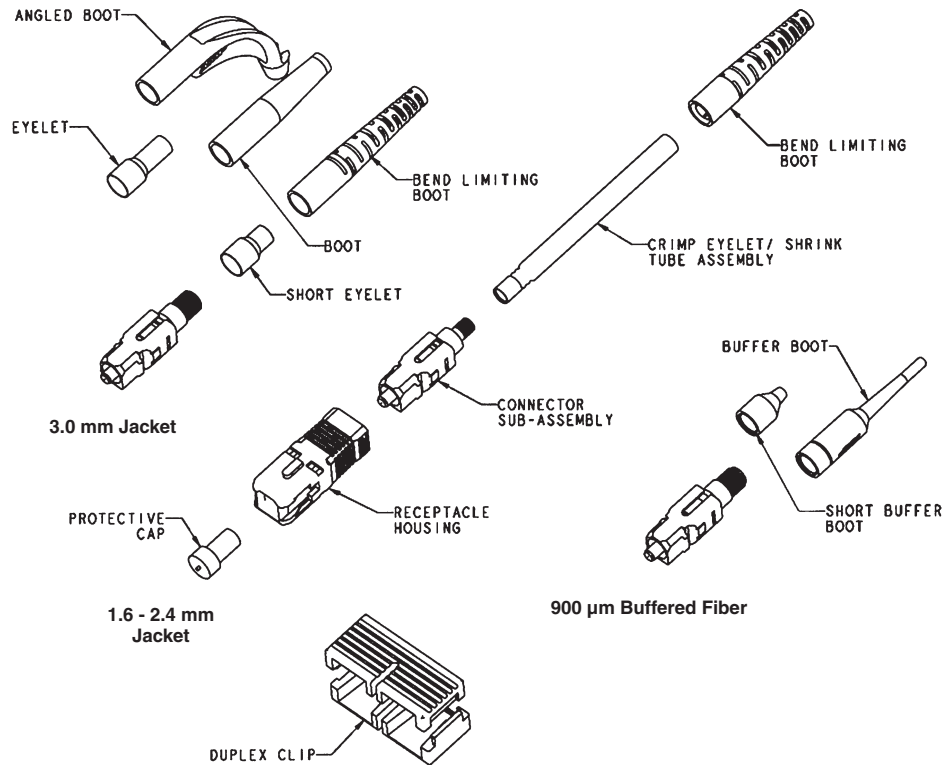
| Description | Housing Color | Boot Color | Used With       | Part Numbers    |           |                             |
|-------------|---------------|------------|-----------------|-----------------|-----------|-----------------------------|
|             |               |            |                 | Individual Pack | Bulk Pack | Crimp Tool                  |
| Simplex     | Blue          | Blue       | 3.0 mm Jacketed | 4-1918861-5     | —         | (1) 492131-1<br>(1) 58532-1 |
|             |               |            | 2.4 mm Jacketed | 6588714-5       | 6588714-6 | 1588176-1                   |
|             |               |            | 2.0 mm Jacketed | 6588714-1       | 6588714-4 | 1588176-1                   |
| Duplex      | Blue          | Blue       | 2.4 mm Jacketed | 6693776-5       | 6693776-6 | 1588176-1                   |
|             |               |            | 2.0 mm Jacketed | 6693776-1       | 6693776-2 | 1588176-1                   |

### Multimode SC Connector Kits

| Description | Housing Color | Boot Color | Used With                        | Part Numbers    |           |            |
|-------------|---------------|------------|----------------------------------|-----------------|-----------|------------|
|             |               |            |                                  | Individual Pack | Bulk Pack | Crimp Tool |
| Simplex     | Beige         | Aqua       | 900 µm Buffered, 3.0 mm Jacketed | 1-5503948-1     | —         | 503911-1   |
|             |               |            | 3.0 mm Jacketed                  | 1-5503948-0     | —         | 503911-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504931-5       | —         | 492026-1   |
|             |               |            | 900 µm Buffer                    | 5504932-5       | —         | N/A        |
|             | Beige         | Black      | 900 µm Buffered, 3.0 mm Jacketed | 1-5503948-2     | —         | 503911-1   |
|             |               |            | 3.0 mm Jacketed                  | 1-5503948-3     | 5503948-8 | 503911-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504931-6       | 5504931-3 | 492026-1   |
|             |               |            | 900 µm Buffer                    | 5504932-1       | 5504932-2 | N/A        |
|             |               |            | 900 µm Buffered, 3.0 mm Jacketed | 5503948-5       | —         | 503911-1   |
|             |               |            | 3.0 mm Jacketed                  | 5503948-1       | 5503948-2 | 503911-1   |
|             |               |            | 2.4 mm Jacketed                  | 5504930-1       | 5504930-2 | 492026-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504931-1       | —         | 492026-1   |
| Duplex      | Beige         | Aqua       | 900 µm Buffer                    | 5504932-6       | —         | N/A        |
|             |               |            | 3.0 mm Jacketed                  | 5504657-8       | —         | 503911-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504928-3       | —         | 492026-1   |
|             |               |            | 3.0 mm Jacketed                  | 5504657-9       | —         | 503911-1   |
|             | Beige         | Black      | 2.0 mm Jacketed                  | 5504928-4       | —         | 492026-1   |
|             |               |            | 3.0 mm Jacketed                  | 5504657-1       | 5504657-2 | 503911-1   |
|             |               |            | 2.4 mm Jacketed                  | 5504927-1       | 5504927-2 | 492026-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504928-1       | —         | 492026-1   |
|             | Beige         | Beige      | 3.0 mm Jacketed                  | 5504927-1       | 5504927-2 | 492026-1   |
|             |               |            | 2.0 mm Jacketed                  | 5504928-1       | —         | 492026-1   |

## SC Connectors (Continued)

### SC Connector Components



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

Use 2 pieces to duplex  
simplex housings



### SC Connector Component Selection Chart (bulk packaged)

| Fiber Type                                       | Simplex Connector Sub-Assembly | Duplex Clip*  | Cable Size | Crimp Eyelet w/ Heat Shrink | Crimp Eyelet | Strain Relief Part Number**           |
|--------------------------------------------------|--------------------------------|---------------|------------|-----------------------------|--------------|---------------------------------------|
| Singlemode - GR-326 Style                        | 6457215-5                      | (2) 6348522-1 | 3.0 mm     | —                           | 504973-3     | 1588491-X                             |
|                                                  |                                |               | 2.4 mm     | 6588189-1                   | —            | 1588153-X                             |
|                                                  | 6588714-3                      | (2) 6348522-1 | 1.6-2.0 mm | 6374150-2                   | —            | 1588153-X                             |
|                                                  |                                |               | 900 µm     | —                           | —            | 1828184-X                             |
| Singlemode - Polymer Crimp Body                  | 5492123-7                      | (2) 6348522-1 | 3.0 mm     | —                           | 503970-3     | 5503971-X                             |
|                                                  |                                |               | 2.4 mm     | —                           | 503970-6     | 5503971-X                             |
|                                                  |                                |               | 2.0 mm     | —                           | 503970-9     | 5503971-X                             |
|                                                  |                                |               | 900 µm     | —                           | —            | 6457493-X (long)<br>6278309-X (short) |
|                                                  | 6588715-5                      | (2) 6348522-1 | 2.4 mm     | 6588189-1                   | —            | 1588153-X                             |
| Multimode - Metal Crimp Body (Ceramic Ferrule)   |                                |               | 1.6-2.0 mm | 6374150-2                   | —            | 1588153-X                             |
|                                                  |                                |               | 900 µm     | —                           | —            | 1828184-X                             |
| Multimode - Polymer Crimp Body (Ceramic Ferrule) | 5503948-7                      | (2) 6348522-1 | 3.0 mm     | —                           | 503970-3     | 5503971-X                             |
|                                                  |                                |               | 2.4 mm     | —                           | 503970-6     | 5503971-X                             |
|                                                  |                                |               | 2.0 mm     | —                           | 503970-9     | 5503971-X                             |
|                                                  |                                |               | 900 µm     | —                           | —            | 6457493-X (long)<br>6278309-X (short) |
|                                                  |                                |               |            |                             |              |                                       |

\* For Fibre Channel compliant assemblies, use one (1) piece each of Part Number 503487-Y and 503488-Y. (Dash refers to color — refer to customer drawing for details).

\*\* Strain relief dash number indicates color - see page 55 for details.

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



## SC Connectors (Continued)

### SC Strain Reliefs — Jacketed Cable

| Description     | GR-326 Style | Part Number |             |           |           |
|-----------------|--------------|-------------|-------------|-----------|-----------|
|                 |              | Color       |             |           |           |
|                 |              | Black       | Red         | Beige     | Blue      |
| 3.0 mm          | No           | 1-5503971-0 | 1-5503971-1 | 5503971-1 | 5503971-2 |
| 2.4 mm          | No           | 1-5503971-2 | 1-5503971-3 | 5503971-3 | 5503971-4 |
| 2.0 mm          | No           | 2-5503971-3 | 2-5503971-7 | 5503971-5 | 5503971-6 |
| 3.0 mm          | Yes          | —           | —           | —         | 1588491-2 |
| 1.6 mm - 2.4 mm | Yes          | 1588153-3   | —           | 1588153-5 | 1588153-2 |



3.0 mm - GR-326 Style



3.0 mm Angled



900 µm Short

### SC Strain Reliefs — Angled

| Description |             | Part Number |           |           |
|-------------|-------------|-------------|-----------|-----------|
|             |             | Color       |           |           |
|             |             | Black       | Beige     | Blue      |
| 3.0 mm      | Simplex     | 1278705-3   | 1278705-2 | 1278705-1 |
| 2.0 mm      | Simplex     | 1374737-3   | 1374737-2 | 1374737-1 |
| 2.0 mm      | 45° Simplex | 6457543-4   | 6457543-1 | 6457543-2 |

### SC Strain Reliefs — 900 micron

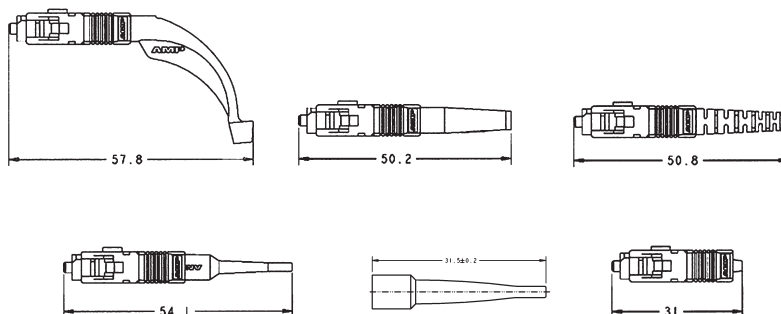
| Description          |  | Part Number |           |           |
|----------------------|--|-------------|-----------|-----------|
|                      |  | Color       |           |           |
|                      |  | Black       | Beige     | Blue      |
| Long (33 mm) 900 µm  |  | 6457493-3   | 6457493-9 | 6457493-1 |
| Short (10 mm) 900 µm |  | 6278309-1   | —         | 6278309-2 |
| GR-326 Style 900 µm  |  | 1828184-2   | 1828184-4 | 1828184-1 |



900 µm



GR-326 Style 900 µm



## SC Low Loss Loopback Connector

Part Number 5503141-1

### Product Facts

- 62.5/125 Multimode
- Use for Equipment Testing
- 0.6 dB Insertion Loss
- 0.5" Ferrule Centerline

Part Number 5503141-2

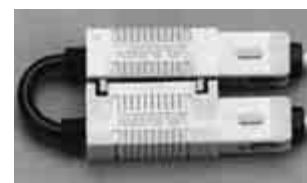
### Product Facts

- 50/125 Multimode
- Use for Equipment Testing
- 0.8 dB Insertion Loss
- 0.5" Ferrule Centerline

Part Number 5504883-1

### Product Facts

- Singlemode
- Use for Equipment Testing
- 1.5 dB Insertion Loss
- 0.5" Ferrule Centerline



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



## SC Connectors (Continued)

### Tight Jacketed SC Connectors

#### Product Facts

- Multimode or singlemode
- Simplex or duplex
- Tested using MIL-PRF-85045/16 2.0 mm cable
- SC Commercial Item Description (CID) interim approval by Naval Surface Warfare Center, Dahlgren Division

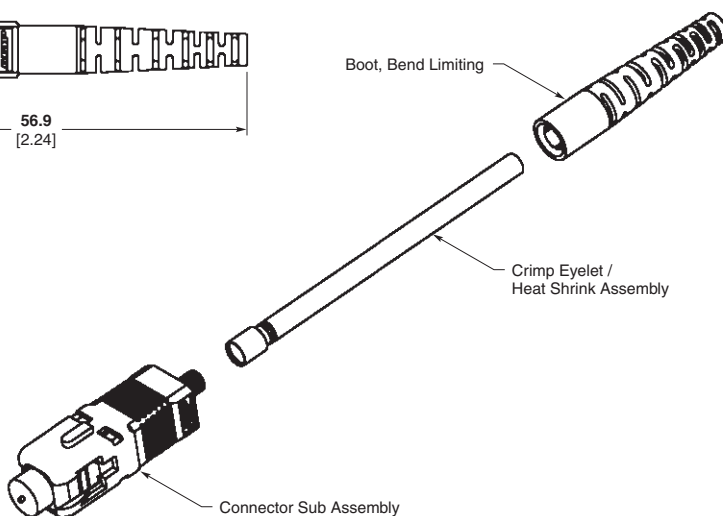
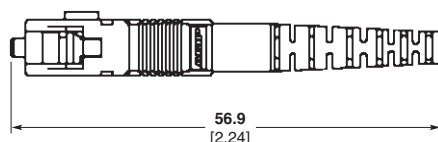
#### Application

- In Flight Networks
- Shipboard Applications
- Aero Market



The tight jacketed SC Connectors are non pull-proof versions of the standard connectors that are designed for use with tight construction cable. Unlike

standard connectors, this design allows the jacket and buffer to move together, reducing the chances of micro-bends and fiber breakage.



#### Tight Jacketed SC Connector Kits

| Fiber Type                                | Kit Part Number | Description         |
|-------------------------------------------|-----------------|---------------------|
| Singlemode<br>(blue body & straight boot) | 6828100-X       | Simplex, 1.6–2.0 mm |
|                                           | 1828573-X       | Duplex, 1.6–2.0 mm  |
|                                           | 1918227-X       | Simplex, 2.4 mm     |
| Multimode<br>(beige body & straight boot) | 6828099-X       | Simplex, 1.6–2.0 mm |
|                                           | 1828574-X       | Duplex, 1.6–2.0 mm  |
|                                           | 1918154-X       | Simplex, 2.4 mm     |

**Note:** X = -1 for individual package, -2 for bulk package.  
Instruction Sheet 408-10015. See <http://www.tycoelectronics.com/documents>.

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

## SC Connectors (Continued)

### SC Adapters

#### Product Facts

- Suitable for any SC connector
- Available with metal or ceramic alignment sleeves
- Choice of housing materials and colors
- Color coded to comply with 568C
  - Aqua for 50/125 laser optimized
  - Black for standard 50/125
  - Beige for 62.5/125
  - Blue for singlemode
- Duplex adapters accept two simplex connectors or one duplex connector
- Assortment of hybrid configurations available
- Mounting screws available  
Part Number 503663-1
- Slide-on cover available
- EMI gasketed parts available



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         | 5504614-3    |
|                                       | Aqua          | 5504614-4    |
| 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    |

### 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    |

### SC Simplex Adapter - Metal

| Alignment Sleeve Material | Housing Color      | Part Numbers |
|---------------------------|--------------------|--------------|
| Metal                     | Electroless Nickel | 6278348-1    |
| Ceramic                   | Electroless Nickel | 6278348-3    |

### Flangeless SC Simplex Adapter - Metal

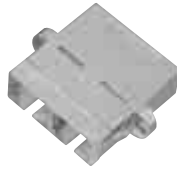
| Alignment Sleeve Material | Housing Color      | Part Numbers |
|---------------------------|--------------------|--------------|
| Metal                     | Electroless Nickel | 6278348-5    |
| Ceramic                   | Electroless Nickel | 6278348-7    |

### 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  |

## SC Connectors (Continued)

### 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    |

- Designed to help prevent EMI leak
- Ideal for high-speed applications

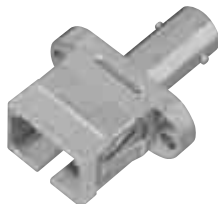
### SC to ST Hybrid Adapters



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    |



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    |

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

## SC to ST Hybrid Adapters

(Continued)



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

### Flangeless SC to ST Simplex Adapter - Metal

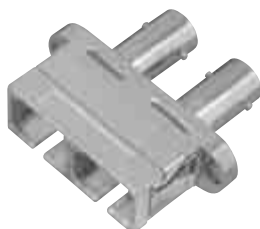
| Alignment Sleeve Material | Housing Color      | Part Numbers |
|---------------------------|--------------------|--------------|
| Metal                     | Electroless Nickel | 6278350-5    |
| Ceramic                   | Electroless Nickel | 6278350-7    |



**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    |



**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



The Tyco Electronics slide-on retractable cover is used for simplex or duplex SC applications. These retractable doors slip onto the end of existing Tyco Electronics adapters and can be mounted after the adapter has already been installed.

- 1693539-1** — Blue Simplex SC
- 1693539-2** — Beige Simplex SC
- 1693539-3** — Green Simplex SC
- 1693540-1** — Blue Duplex SC
- 1693540-3** — Green Duplex SC

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

## ST Connectors — Epoxy Type

### Product Facts

- Epoxy type connector
- Pre-radiused ceramic ferrule
- Available in bulk packages
- Crimp tool  
Part Number 58433-4

### Singlemode Ceramic

#### Performance Characteristics

**Insertion Loss** — 0.3 dB typical

**Back Reflection** — <-40 dB typical

**Durability** — 200 cycles

#### Materials

**Ferrule Material** — Ceramic

**Body Material** — Nickel Plated Brass

**Coupling Nut Material** —  
Plated Die Cast

### Ceramic



### Singlemode ST Connector Kits — Ceramic Ferrule

| Body                | Coupling Nut | Boot Color             | Used With                                        | Individual Pack Part Number | Bulk Pack Part Number | IS Sheet |
|---------------------|--------------|------------------------|--------------------------------------------------|-----------------------------|-----------------------|----------|
| Nickel-plated Brass | Zinc         | Yellow (900 $\mu$ m)   | 900 $\mu$ m and 250 $\mu$ m Fibers               | 5503613-2                   | 5503613-3             | 408-9645 |
|                     | Zinc         | Yellow (Bend-Limiting) | 900 $\mu$ m and 250 $\mu$ m Fibers, 3.0 mm Cable | 5502579-2                   | —                     | 408-9645 |
|                     | Zinc         | Yellow (Short)         | 900 $\mu$ m and 250 $\mu$ m Fibers, 3.0 mm Cable | 5502580-2                   | 5502580-4             | 408-9645 |

### Multimode Ceramic

#### Performance Characteristics

**Insertion Loss** — 0.3 dB typical

**Durability** — 500 cycles

### Ceramic



### Multimode ST Connector Kits — Ceramic Ferrule

| Body                | Coupling Nut | Boot Color                           | Used With                                                 | Individual Pack Part Number | Bulk Pack Part Number | IS Sheet |
|---------------------|--------------|--------------------------------------|-----------------------------------------------------------|-----------------------------|-----------------------|----------|
| Polymer             | Polymer      | Black (Short)                        | 3.0 mm Cable                                              | —                           | 503569-2              | 408-9971 |
|                     |              | Black (Short)                        | 900 $\mu$ m Fiber, 3.0 mm Cable                           | 503571-1                    | —                     | 408-9971 |
|                     |              | Black (Buffer)/Black (Short)         | 900 $\mu$ m and 250 $\mu$ m Fibers, 2.4 mm & 3.0 mm Cable | 5503571-3                   | —                     | 408-9971 |
|                     | Zinc         | Black (Short)                        | 3.0 mm Cable                                              | 503677-2                    | 503677-1              | 408-9971 |
| Nickel-plated Brass | Zinc         | Black (Short)                        | 3.0 mm Cable                                              | —                           | 5492458-2             | 408-9645 |
|                     |              | Black (Buffer)/Black (Short)         | 900 $\mu$ m and 3.0 mm Cable                              | 5492458-1                   | —                     | 408-9645 |
|                     |              | Black (Buffer)/Black (Bend Limiting) | 900 $\mu$ m and 250 $\mu$ m Fibers, 2.4 mm & 3.0 mm Cable | 5501380-1                   | —                     | 408-9645 |
|                     |              | Black (Short)                        | 2.4 mm & 3.0 mm Cable                                     | 1-5501380-6                 | 2-5501380-0           | 408-9645 |
|                     |              | Black (Right Angle)                  | 900 $\mu$ m and 250 $\mu$ m Fibers, 2.4 mm & 3.0 mm Cable | 5502674-1                   | —                     | 408-9645 |

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

## ST Connectors — Epoxy Type (Continued)

### Polymer Composite

#### Multimode Polymer Composite

##### Performance Characteristics

**Insertion Loss** — 0.3 dB Typical

**Durability** — 500 Cycles

**Crimp Tool** — Part Number 58433-4

**Instruction Sheet** — 408-9971

<http://www.tycoelectronics.com/documents>

#### Materials

**Ferrule** — Composite Polymer

**Body** — Polymer

**Coupling Nut** — Polymer



#### Multimode ST Connector Kits — Polymer Ferrule

| Body    | Coupling Nut | Boot Color                       | Used With                                              | Individual Pack Part Number | Bulk Pack Part Number |
|---------|--------------|----------------------------------|--------------------------------------------------------|-----------------------------|-----------------------|
| Polymer | Polymer      | Black (Buffer)/<br>Black (Short) | 900 $\mu$ m and<br>250 $\mu$ m Fibers,<br>3.0 mm Cable | 5503415-1                   | —                     |
|         |              | Black (Short)                    | 3.0 mm Cable                                           | —                           | 503424-3              |

### Stainless Steel

#### Multimode Stainless Steel

##### Performance Characteristics

**Insertion Loss** — 0.3 dB Typical

**Operating Temp. Range** —  
-30°C to +70°C

**Durability** — 500 cycles

**Crimp Tool** — Part Number 58551-1

**Instruction Sheet** — 408-4151

<http://www.tycoelectronics.com/documents>



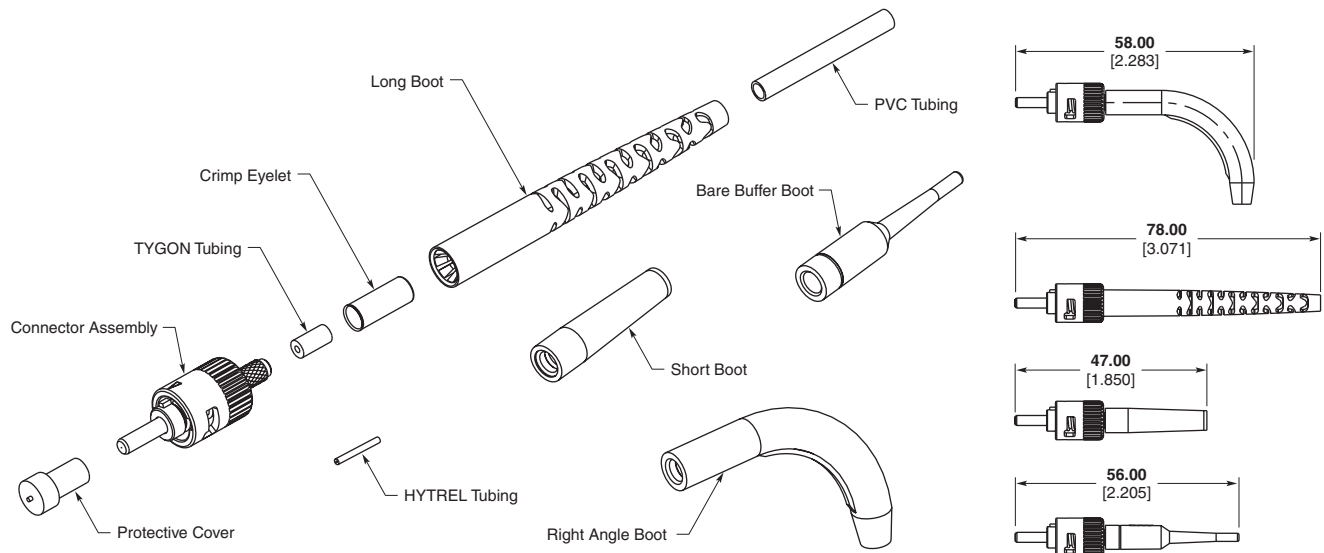
#### Multimode ST Connector Kits — Stainless Steel Ferrule

| Body            | Ferrule Designation | Boot Color            | Used With    | Part Number |
|-----------------|---------------------|-----------------------|--------------|-------------|
| Stainless Steel | 125                 | Black (Bend Limiting) | 3.0 mm Cable | 5504008-3   |
|                 |                     | 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 (Short)         | 3.0 mm Cable | 4-5504008-6 |

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



## ST Connectors — Epoxy Type (Continued)



**ST Connector Component Selection Chart (Bulk Packaged)**

| Fiber Type                                            | Connector Sub-Assembly | Cable Size | Crimp Eyelet | Tubing    | Strain Relief Part Number* |
|-------------------------------------------------------|------------------------|------------|--------------|-----------|----------------------------|
| Singlemode - Ceramic Ferrule Metal Body, Metal Nut    | 5502578-2              | 1.6-2.0 mm | 501971-3     | 5501275-2 | 503219-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 502128-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 501457-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 502128-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 501457-X                   |
|                                                       |                        | 900 µm     | 501971-3     | 502179-7  | 5503628-X                  |
| Multimode - Ceramic Ferrule Metal Body, Metal Nut     | 5492458-5              | 1.6-2.0 mm | 501971-3     | 5501275-2 | 503219-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 502128-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 501457-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 502128-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 501457-X                   |
|                                                       |                        | 900 µm     | 501971-3     | 502179-7  | 5503628-X                  |
| Multimode - Ceramic Ferrule Metal Body, Polymer Nut   | 5501458-8              | 1.6-2.0 mm | 501971-3     | 5501275-2 | 503219-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 502128-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 501457-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 502128-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 501457-X                   |
|                                                       |                        | 900 µm     | 501971-3     | 502179-7  | 5503628-X                  |
| Multimode - Ceramic Ferrule Polymer Body, Metal Nut   | 503676-5               | 1.6-2.0 mm | 501971-3     | 5501275-2 | 503219-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 502128-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 501457-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 502128-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 501457-X                   |
|                                                       |                        | 900 µm     | 501971-3     | 502179-7  | 5503628-X                  |
| Multimode - Ceramic Ferrule Polymer Body, Polymer Nut | 503676-4               | 1.6-2.0 mm | 501971-3     | 5501275-2 | 503219-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 502128-X                   |
|                                                       |                        | 2.4 mm     | 501971-3     | 5501275-1 | 501457-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 502128-X                   |
|                                                       |                        | 3.0 mm     | 501971-3     | —         | 501457-X                   |
|                                                       |                        | 900 µm     | 501971-3     | 502179-7  | 5503628-X                  |

\* Strain relief dash number indicates color - see chart on page 63 for details.

TYGON is a trademark of Saint-Gobain Performance Plastics Corporation.  
HYTREL is a trademark of E.I. du Pont de Nemours and Company.

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

## ST Connectors — Epoxy Type (Continued)



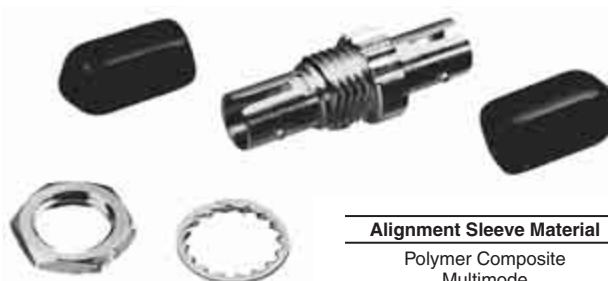
### Strain Relief Bulk packages (100 pcs./package)

| Color | Bend Limiting | Short (3.0 mm) | Right Angle | Buffer      | Short (2.0 mm) | Bend Limiting (2.0 mm) |
|-------|---------------|----------------|-------------|-------------|----------------|------------------------|
| Black | 502128-1      | 501457-1       | 5502667-1   | 5503628-1   | 503219-1       | 233454-4               |
| Blue  | 502128-7      | 501457-5       | 5502667-2   | —           | —              | 233454-2               |
| Beige | —             | 501457-4       | —           | 1-5503628-9 | 503219-4       | 233454-6               |

### Product Facts

- Free-hanging or panel mount design

### ST Coupling Receptacles



| Alignment Sleeve Material   | Packaging   | Part Number |
|-----------------------------|-------------|-------------|
| Polymer Composite Multimode | Single      | 501381-1    |
|                             | Bulk (1000) | 501381-2    |
| Metal Multimode             | Single      | 504021-1    |
|                             | Bulk (50)   | 504021-2    |
| Zirconia Ceramic Singlemode | Single      | 502750-1    |
|                             | Bulk (50)   | 502750-2    |

### ST Polymer Duplex Receptacle



| Alignment Sleeve Material | Color      | Part Number |
|---------------------------|------------|-------------|
| Metal/MM Only             | Beige      | 504662-2    |
| Metal/MM Only             | Lt. Almond | 504662-1    |

## 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 Connectors

### Product Facts

- One-piece connector body:
  - Fastest assembly
- Compliant with:
  - JIS C-5970
- Pre-radiused ferrule

Instruction Sheet — 408-8674  
<http://www.tycoelectronics.com/documents>



### Singlemode FC Connector Kits - Polymer Crimp Body

#### Performance Characteristics

Insertion Loss — <0.2 dB Typical

Return Loss — <-59 dB Typical

Durability — 200 Cycles

### Singlemode FC Connector Kits — Polymer Crimp Body

| Boot Color | Used With       | Individual Pack Part Number | Bulk Pack Part Number | Crimp Tool |
|------------|-----------------|-----------------------------|-----------------------|------------|
| Blue       | 3.0 mm Jacketed | 5504649-1                   | 5504649-8             | 503911-1   |
|            | 2.4 mm Jacketed | 5504914-2                   | —                     | 492026-1   |
|            | 2.0 mm Jacketed | 5504915-2                   | —                     | 492026-1   |
|            | 900 µm Buffer   | —                           | 5492052-5             | N/A        |

### GR-326 Style FC Connector Kits - Metal Crimp Body Singlemode

#### Performance Characteristics

Insertion Loss — <0.2 dB Typical

Return Loss — <-59 dB Typical

Tested to GR-326

Tuning — 6 position

### GR-326 Style Singlemode FC Connector Kits — Metal Crimp Body

| Boot Color | Used With       | Individual Pack Part Number | Bulk Pack Part Number | Crimp Tool                  |
|------------|-----------------|-----------------------------|-----------------------|-----------------------------|
| Blue       | 3.0 mm Jacketed | 4-1918962-2                 | —                     | (1) 492131-1<br>(1) 58532-1 |
|            | 2.4 mm Jacketed | 6754264-5                   | 6754264-6             | 1588176-1                   |
|            | 2.0 mm Jacketed | 6754264-4                   | 6754264-7             | 1588176-1                   |
|            | 900 µm Buffer   | 6754264-2                   | —                     | 1588176-1                   |



3.0 mm - GR-326 Style



3.0 mm Angled



900 µm Short



900 µm



GR-326 Style 900 µm

### FC Strain Reliefs — Jacketed Cable

| Description     | GR-326 Style | Part Number |             |           |           |
|-----------------|--------------|-------------|-------------|-----------|-----------|
|                 |              | Color       |             |           |           |
|                 |              | Black       | Red         | Beige     | Blue      |
| 3.0 mm          | No           | 1-5503971-0 | 1-5503971-1 | 5503971-1 | 5503971-2 |
| 2.4 mm          | No           | 1-5503971-2 | 1-5503971-3 | 5503971-3 | 5503971-4 |
| 2.0 mm          | No           | 2-5503971-3 | 2-5503971-7 | 5503971-5 | 5503971-6 |
| 3.0 mm          | Yes          | —           | —           | —         | 1588491-2 |
| 1.6 mm - 2.4 mm | Yes          | 1588153-3   | —           | 1588153-5 | 1588153-2 |

### FC Strain Reliefs — Angled

| Description |             | Part Number |           |           |
|-------------|-------------|-------------|-----------|-----------|
|             |             | Color       |           |           |
|             |             | Black       | Beige     | Blue      |
| 3.0 mm      | Simplex     | 1278705-3   | 1278705-2 | 1278705-1 |
| 2.0 mm      | Simplex     | 1374737-3   | 1374737-2 | 1374737-1 |
| 2.0 mm      | 45° Simplex | 6457543-4   | 6457543-1 | 6457543-2 |

### FC Strain Reliefs — 900 micron

| Description          |  | Part Number |           |           |
|----------------------|--|-------------|-----------|-----------|
|                      |  | Color       |           |           |
|                      |  | Black       | Beige     | Blue      |
| Long (33 mm) 900 µm  |  | 6457493-3   | 6457493-9 | 6457493-1 |
| Short (10 mm) 900 µm |  | 6278309-1   | —         | 6278309-2 |
| GR-326 Style 900 µm  |  | 1828184-2   | 1828184-4 | 1828184-1 |

Note: All part numbers are RoHS compliant.

## FC Connectors (Continued)

### FC Connector Component Selection Chart (bulk packaged)

| Fiber Type                    | Simplex Connector Sub-Assembly | Cable Size | Crimp Eyelet w/ Heat Shrink | Crimp Eyelet | Strain Relief Part Number*            |
|-------------------------------|--------------------------------|------------|-----------------------------|--------------|---------------------------------------|
| Singlemode - GR-326 Style     | 6754264-8                      | 1.6-2.0 mm | 6374150-1                   | —            | 1588153-X                             |
|                               |                                | 2.4 mm     | 6588189-1                   | —            | 1588153-X                             |
|                               | 6457216-5                      | 3.0 mm     | —                           | 504973-3     | 1588491-X                             |
| Singlemode Polymer Crimp Body | 5504649-9                      | 2.4 mm     | —                           | 503970-6     | 5503971-X                             |
|                               |                                | 3.0 mm     | —                           | 503970-3     | 5503971-X                             |
|                               |                                | 900 µm     | —                           | —            | 6457493-X (long)<br>6278309-X (short) |
| Multimode - Ceramic Ferrule   | 6374778-2                      | 1.6-2.0 mm | 6374150-1                   | —            | 1588153-X                             |
|                               |                                | 2.4 mm     | 6588189-1                   | —            | 1588153-X                             |
|                               | 5504922-3                      | 3.0 mm     | —                           | 503970-3     | 5503971-2                             |
|                               |                                | 900 µm     | —                           | —            | 6457493-9 (long)<br>6278309-1 (short) |

\* Strain relief dash number indicates color - see page 64 for details.

## 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.<br>2.33 mm    | 5501506-2    |
| Ceramic                   | Square Flange | Std.<br>2.33 mm    | 5501506-1    |



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.<br>2.33 mm    | 5504407-1    |
| Ceramic                   | D-Hole        | Std.<br>2.33 mm    | 5504407-3    |
| Ceramic/APC               | D-Hole        | 2.05 mm<br>Type R  | 5504407-8    |
| Ceramic/APC               | D-Hole        | Prec.<br>2.02 mm   | 5504407-7    |



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.<br>2.33 mm    | 5504013-1    |

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

## FC Connectors (Continued)

### Hybrid Adapters - SC/FC/ST



FC to ST Simplex Adapter - Metal

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

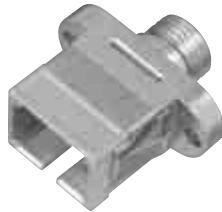
| Alignment Sleeve Material | Housing Color      | Part Numbers |
|---------------------------|--------------------|--------------|
| Metal                     | Electroless Nickel | 5503640-1    |
| Ceramic                   | Electroless Nickel | 5503640-2    |



SC to FC Simplex Adapter - Plastic

#### SC to FC Simplex Adapter - Plastic

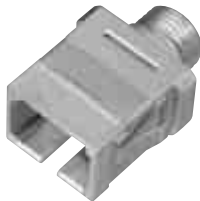
| Alignment Sleeve Material | Housing Color | Part Numbers |
|---------------------------|---------------|--------------|
| Metal                     | Black         | 5502871-1    |
| Ceramic                   | Blue          | 5502871-4    |



SC to FC Simplex Adapter - Metal

#### SC to FC Simplex Adapter - Metal

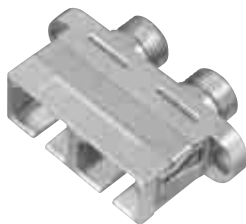
| Alignment Sleeve Material | Housing Color      | Part Numbers |
|---------------------------|--------------------|--------------|
| Metal                     | Electroless Nickel | 6278349-1    |
| Ceramic                   | Electroless Nickel | 6278349-3    |



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    |



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    |

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

## FSD Connector Components — Multimode

### Product Facts

- Meets specifications of FDDI PMD - ANSI X3.166
- Ceramic ferrules available
- Designed in polarization and user defined keying

### Performance Characteristics

**Insertion Loss** — 0.5 dB typical

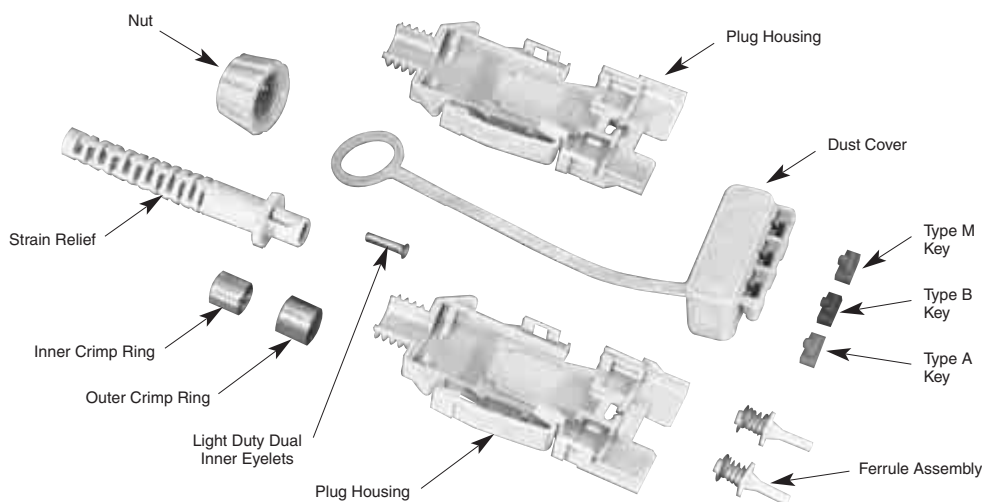
**Durability** —

Ceramic Ferrules 500 cycles

### Ceramic Instruction Sheet

408-9373

<http://www.tycoelectronics.com/documents>



### FSD

| Diameter<br>(µm) | Part Number   |             |                         |             | Replacement<br>Ferrules |
|------------------|---------------|-------------|-------------------------|-------------|-------------------------|
|                  | Cable Type    |             |                         |             |                         |
|                  | DUALAN Cable  |             | Light Duty DUALAN Cable |             |                         |
|                  | Single Packed | Bulk Packed | Single Packed           | Bulk Packed |                         |
| Ceramic Ferrules |               |             |                         |             |                         |
| 125              | 5501780-1     | 5501780-3*  | 5502015-1               | 5502015-3*  | 5501779-1               |

Termination Kit: 503746-6

\* Bulk packed, 200 per package.

Assembly Fixtures: with Polishing Tool: 501795-1; without Polishing Tool: 502023-1

### Field Keyable FSD Receptacles and Adapters



### Multimode Receptacles

| Description | Sleeve Material |          |
|-------------|-----------------|----------|
|             | Metal           | Ceramic  |
| FSD to FSD  | 502806-2        | 502806-4 |
| FSD to ST   | 502808-2        | 502808-4 |

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



## 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.tycoelectronics.com/documents>



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

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

### ESCON Receptacles

#### Product Facts

- Multimode



| Description    | Part Number<br>Black |
|----------------|----------------------|
| ESCON to ESCON | 502825-2             |
| ESCON to ST    | 502826-2             |

### ESCON Assembly Fixture Kit

Used to hold ferrules during assembly, epoxy curing, and polishing. Allows simultaneous polishing of both ferrules.



| Description               | Part Number<br>Black |
|---------------------------|----------------------|
| Without Polishing Bushing | 492236-2             |
| Polishing Bushing         | 492269-1             |

ESCON is a trademark of IBM Corporation.

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

## 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

### Performance Characteristics

Insertion Loss — 1.3 dB Typical

Temperature Range —  
-55°C to +105°C

Durability — 200 cycles

### Documentation

#### Product Specification

108-45106

#### Instruction Sheet

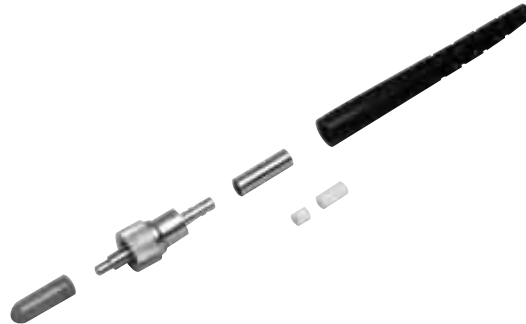
408-9863

FSMA 905 & 906

#### Test Report

501-359

<http://www.tycoelectronics.com/documents>



### 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         | —           | —           |
|                  |                         | 720                 | —                   | —           | 3-5504567-9 |
|                  |                         | 1000                | 3-5504566-0         | —           | —           |
|                  |                         | 1050                | 3-5504566-1         | —           | 2-5504567-9 |
|                  |                         | 2050                | —                   | —           | 3-5504567-3 |

### Adapter

#### Product Facts

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



| Description                                      | Part Number |
|--------------------------------------------------|-------------|
| <b>FSMA Adapters</b>                             |             |
| 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, Nickel-Plated Brass, Counterbore        | 5504030-1   |
| 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



| Description                                  | Part Number |
|----------------------------------------------|-------------|
| <b>FSMA Active Device Mounts</b>             |             |
| PC Mount Receptacle, Die Cast                | 5502136-1   |
| PC Mount Receptacle, Die Cast, Bulk Packaged | 5502136-2   |
| PC Mount Receptacle, Stainless Steel         | 501055-1    |

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

## MT-RJ 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
- SECURE Connector Kits

#### Performance Characteristics

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

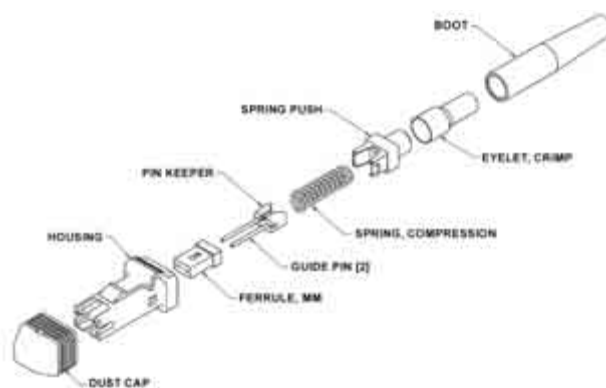
**Operating Temperature** —  
-10°C to 60°C

**Durability** — 500 Cycles

#### Instruction Sheet

408-4540

<http://www.tycoelectronics.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   |

#### SECURE MT-RJ 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

**Simplex Part Number:**  
1278017-1 (light almond)

**Duplex Part Number:**  
6374906-1 (Almond)

### MT-RJ to MT-RJ Simplex Adapter



### MT-RJ to MT-RJ Duplex Adapter



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

## MT-RJ Connectors (Continued)

### SL Series Outlets

#### Product Facts

- Front-loading modules snap in and out for easy access
- Modular approach for flexibility
- “Invisible” icon holes stay hidden until used
- Individual jacks and inserts increase configuration and color-coding options
- MT-RJ SL Series housing accepts one MT-RJ Jack sold separately (See pages 119-122)

### MT-RJ SL Series Housing

| Color            | Part Number |
|------------------|-------------|
| Almond           | 1374416-1   |
| Black            | 1374416-2   |
| White            | 1374416-3   |
| Gray             | 1374416-4   |
| Orange           | 1374416-5   |
| Blue             | 1374416-6   |
| Red              | 1374416-7   |
| Yellow           | 1374416-8   |
| Green            | 1374416-9   |
| Violet           | 1-1374416-0 |
| Electrical Ivory | 1-1374416-1 |
| Rose             | 2-1374416-3 |
| Aqua             | 2-1374416-4 |
| Brown            | 2-1374416-5 |
| Slate            | 2-1374416-6 |



### MT-RJ Optical Patch Panel

Tyco Electronics' MT-RJ optical patch panels feature 24-port (48 fiber) capacity in a 1U high rack mounted enclosure and offer twice the fiber density of conventional patch panels. Features include pre-installed cable management, rugged cable entry

strain relief, and a sliding, tilt-out drawer for easy termination of tight buffer or loose tube cable. Adjustable mounting brackets allow the user to mount the enclosure in forward, flush or recessed positions. The patch panel is supplied ready for MT-RJ jack installation.



| Description                                                                                                                                                                     | Part Number |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1U Patch Panel with four, six-position MT-RJ interface housing Cable Management Rings (2 pieces), Cable Glands PG16, PG13.5, Dust Caps (24 pieces). (Jack modules not included) | 1206704-4   |

### MT-RJ Snap-In Adapter Plate

The MT-RJ snap-in adapter plate manages six MT-RJ Patch panel jacks (ordered separately, see page 73). The adapter plate is designed to fit into existing rack and wall mount enclosures with the benefit of industry standard labels and icons for port identification.

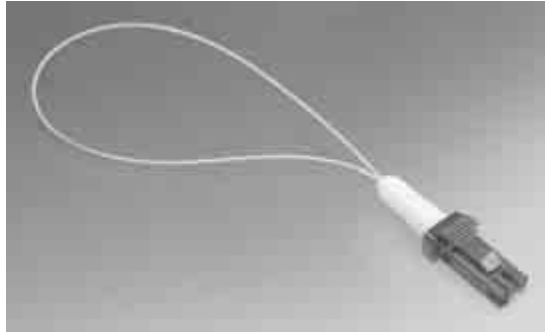


| Description                                              | Part Number |
|----------------------------------------------------------|-------------|
| MT-RJ Snap-In Adapter Plates (Jack modules not included) | 1278328-3   |

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

## MT-RJ Connectors (Continued)

### MT-RJ Loopbacks



| Description                                   | Part Number |
|-----------------------------------------------|-------------|
| MT-RJ to Singlemode Loopback                  | 6278358-1   |
| MT-RJ to Multimode Loopback, 50/125 $\mu$ m   | 6278357-1   |
| MT-RJ to Multimode Loopback, 62.5/125 $\mu$ m | 6278153-1   |

### MT-RJ Cable Assemblies

See Cable Assemblies & Backplane Interconnects Section.

### MT-RJ Bend Limiting Boots Part Number 6374208-X



#### Product Facts

- Compatible with all MT-RJ Jacks (see pages 119-122)

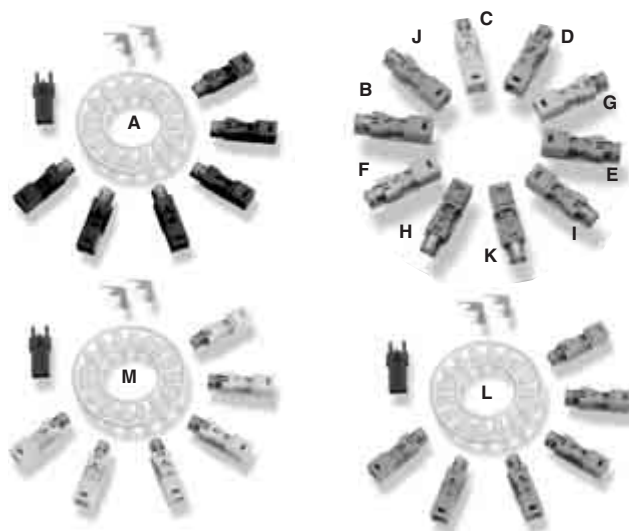
| Color | Part Number |
|-------|-------------|
| Black | 6374208-4   |
| Beige | 6374208-5   |

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

## MT-RJ Patch Panel Jacks, No Epoxy, No Polish

### Product Facts

- Patch panel jacks terminate either two 900  $\mu$ m tight-buffered fibers or two 250  $\mu$ m coated fibers (select appropriate part number):
  - No epoxy, no polishing, no crimping
  - Two (2) fibers in one ferrule
  - Re-terminatable – improves yield
  - Tunable
  - No bench tool required
- Each part number includes:
  - Six (6) patch panel jacks
  - Two (2) actuation tools
  - Fiber guide
  - Icon wheel
- Jack design eliminates need for MT-RJ Coupler
- Match fiber type of cable to fiber type of MT-RJ Jack
- Small form factor design is half the size of SC duplex
- Six (6) patch panel jacks fit in the MT-RJ Snap-in Adapter Plate (see page 72)
- SL Series Housings and bend-limiting boots sold separately (see pages 70, 72 and 78)
- MT-RJ Cable Assemblies on pages 121 and 122
- MT-RJ SECURE Jacks feature color-coded, keyed designs to limit improper connections in segregated or SECURE networks
- MT-RJ SECURE Plug only mates with same color MT-RJ SECURE Jack
- MT-RJ SECURE Cable Assemblies on pages 121 and 122
- Singlemode MT-RJ pigtail jacks on page 123



Easy 3-Step Termination



| Fiber Type                                                          | Jack Color | Figure | Part Number              |                                  |
|---------------------------------------------------------------------|------------|--------|--------------------------|----------------------------------|
|                                                                     |            |        | 250 $\mu$ m Coated Fiber | 900 $\mu$ m Tight-buffered Fiber |
| 50/125 $\mu$ m Multimode                                            | Standard   | Black  | A                        | 6278303-1                        |
|                                                                     |            | RED    | B                        | 6278807-1                        |
|                                                                     |            | YELLOW | C                        | 6278807-2                        |
|                                                                     | SECURE     | GREEN  | D                        | 6278807-3                        |
|                                                                     |            | BLUE   | E                        | 6278807-4                        |
|                                                                     |            | ROSE   | F                        | 6278807-5                        |
|                                                                     |            | AQUA   | G                        | 6278807-6                        |
|                                                                     |            | BROWN  | H                        | 6278807-7                        |
|                                                                     |            | VIOLET | I                        | 6278807-8                        |
|                                                                     |            | ORANGE | J                        | 6278807-9                        |
|                                                                     |            | SLATE  | K                        | 1-6278807-0                      |
|                                                                     |            |        |                          | 1-6588879-0                      |
|                                                                     |            |        |                          | 6588880-3                        |
|                                                                     |            |        |                          | 6588879-1                        |
| Laser Optimized (10 Gig)<br>(850 nm LO 50/125 $\mu$ m)<br>Multimode | Standard   | Gray   | L                        | 6278303-4                        |
|                                                                     |            | RED    | B                        | 6693951-1                        |
|                                                                     |            | YELLOW | C                        | 6693951-2                        |
|                                                                     | SECURE     | GREEN  | D                        | 6693951-3                        |
|                                                                     |            | BLUE   | E                        | 6693951-4                        |
|                                                                     |            | ROSE   | F                        | 6693951-5                        |
|                                                                     |            | AQUA   | G                        | 6693951-6                        |
|                                                                     |            | BROWN  | H                        | 6693951-7                        |
|                                                                     |            | VIOLET | I                        | 6693951-8                        |
|                                                                     |            | ORANGE | J                        | 6693951-9                        |
|                                                                     |            | SLATE  | K                        | 1-6693951-0                      |
|                                                                     |            |        |                          | 1-6693949-0                      |
|                                                                     |            |        |                          | 6693949-1                        |
|                                                                     |            |        |                          | 6693949-2                        |
| 62.5/125 $\mu$ m Multimode                                          | Standard   | Beige  | M                        | 6278303-2                        |
|                                                                     |            | RED    | B                        | 6278808-1                        |
|                                                                     |            | YELLOW | C                        | 6278808-2                        |
|                                                                     | SECURE     | GREEN  | D                        | 6278808-3                        |
|                                                                     |            | BLUE   | E                        | 6278808-4                        |
|                                                                     |            | ROSE   | F                        | 6278808-5                        |
|                                                                     |            | AQUA   | G                        | 6278808-6                        |
|                                                                     |            | BROWN  | H                        | 6278808-7                        |
|                                                                     |            | VIOLET | I                        | 6278808-8                        |
|                                                                     |            | ORANGE | J                        | 6278808-9                        |
|                                                                     |            | SLATE  | K                        | 1-6278808-0                      |
|                                                                     |            |        |                          | 1-6588878-0                      |
|                                                                     |            |        |                          | 6588880-2                        |
|                                                                     |            |        |                          | 6588878-1                        |
|                                                                     |            |        |                          | 6588878-2                        |

**Note:** Highlighted part numbers are routinely stocked for shortest lead times.

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



## MT-RJ Outlet Jacks, No Epoxy, No Polish

### Product Facts

- Outlet jacks terminate two 900  $\mu$ m tight-buffered fibers
  - No epoxy, no polishing, no crimping
  - Two fibers in one ferrule
  - Re-terminatable - improves yield
  - Tunable
  - No bench tool required
- Each part number includes:
  - One (1) outlet jack
  - Actuation tool
  - Bend-limiting boot
  - SL Series Housing
- Match fiber type of cable to fiber type of MT-RJ Jack
- Jack design eliminates need for MT-RJ Coupler
- Small form factor design is half the size of SC duplex
- SL Series Housing allows use in any faceplate or outlet that accepts SL Series Jacks
- MT-RJ Cable Assemblies on pages 121 and 122
- MT-RJ SECURE Jacks feature ten color-coded, keyed designs to limit improper connections in segregated or SECURE networks
  - MT-RJ SECURE plug only mates with same color MT-RJ SECURE Jack
- MT-RJ SECURE Cable Assemblies on page 121

### Easy 3-Step Termination



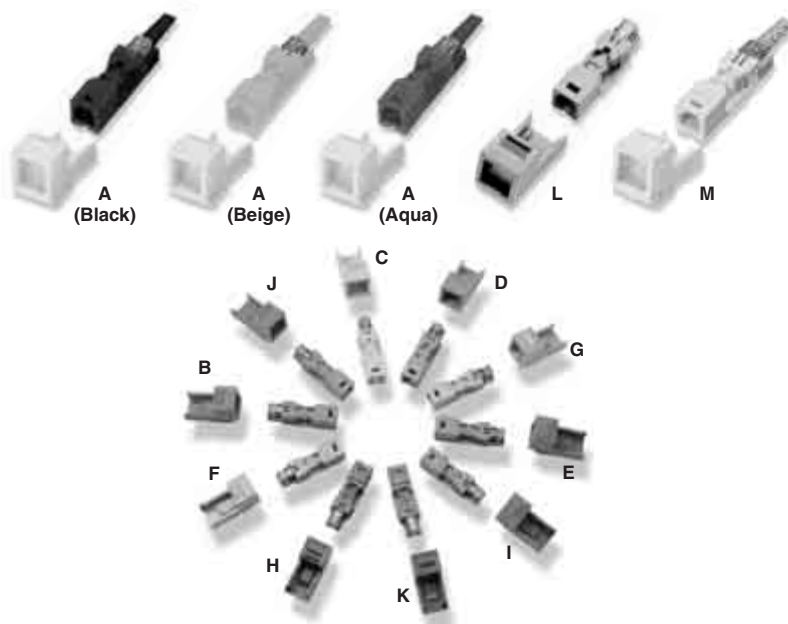
Strip



Cleave



Lock



| Fiber Type                                                          |          | Jack Color | Housing Color | Figure | Part Number |
|---------------------------------------------------------------------|----------|------------|---------------|--------|-------------|
| 50/125 $\mu$ m Multimode                                            | Standard | Black      | —             | A      | 6278414-X   |
|                                                                     |          | RED        | RED           | B      | 6278811-1   |
|                                                                     | SECURE   | YELLOW     | YELLOW        | C      | 6278811-2   |
|                                                                     |          | GREEN      | GREEN         | D      | 6278811-3   |
|                                                                     |          | BLUE       | BLUE          | E      | 6278811-4   |
|                                                                     |          | ROSE       | ROSE          | F      | 6278811-5   |
|                                                                     |          | AQUA       | AQUA          | G      | 6278811-6   |
|                                                                     |          | BROWN      | BROWN         | H      | 6278811-7   |
|                                                                     |          | VIOLET     | VIOLET        | I      | 6278811-8   |
|                                                                     |          | ORANGE     | ORANGE        | J      | 6278811-9   |
|                                                                     |          | SLATE      | SLATE         | K      | 1-6278811-0 |
|                                                                     | Standard | Gray       | —             | L      | 1-6278414-2 |
|                                                                     |          | RED        | RED           | B      | 6754252-1   |
| Laser Optimized (10 Gig)<br>(850 nm LO 50/125 $\mu$ m)<br>Multimode | Standard | RED        | RED           | B      | 6754252-1   |
|                                                                     |          | YELLOW     | YELLOW        | C      | 6754252-2   |
|                                                                     | SECURE   | GREEN      | GREEN         | D      | 6754252-3   |
|                                                                     |          | BLUE       | BLUE          | E      | 6754252-4   |
|                                                                     |          | ROSE       | ROSE          | F      | 6754252-5   |
|                                                                     |          | AQUA       | AQUA          | G      | 6754252-6   |
|                                                                     |          | BROWN      | BROWN         | H      | 6754252-7   |
|                                                                     |          | VIOLET     | VIOLET        | I      | 6754252-8   |
|                                                                     |          | ORANGE     | ORANGE        | J      | 6754252-9   |
|                                                                     |          | SLATE      | SLATE         | K      | 1-6754252-0 |
|                                                                     | Standard | Beige      | —             | M      | 6278415-X   |
|                                                                     |          | RED        | RED           | B      | 6278810-1   |
| 62.5/125 $\mu$ m Multimode                                          | Standard | YELLOW     | YELLOW        | C      | 6278810-2   |
|                                                                     |          | GREEN      | GREEN         | D      | 6278810-3   |
|                                                                     | SECURE   | BLUE       | BLUE          | E      | 6278810-4   |
|                                                                     |          | ROSE       | ROSE          | F      | 6278810-5   |
|                                                                     |          | AQUA       | AQUA          | G      | 6278810-6   |
|                                                                     |          | BROWN      | BROWN         | H      | 6278810-7   |
|                                                                     |          | VIOLET     | VIOLET        | I      | 6278810-8   |
|                                                                     |          | ORANGE     | ORANGE        | J      | 6278810-9   |
|                                                                     |          | SLATE      | SLATE         | K      | 1-6278810-0 |
|                                                                     |          | SLATE      | SLATE         | K      | 1-6278810-0 |

X denotes housing color: -1 = Almond, -2 = Black, -3 = White, -4 = Gray, -5 = Orange, -6 = Blue, -7 = Red, -8 = Yellow, -9 = Green, 1- - 0 = Violet, 1- -1 = Electrical Ivory

**Note:** Highlighted part numbers are routinely stocked for shortest lead times.

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

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

### Product Facts

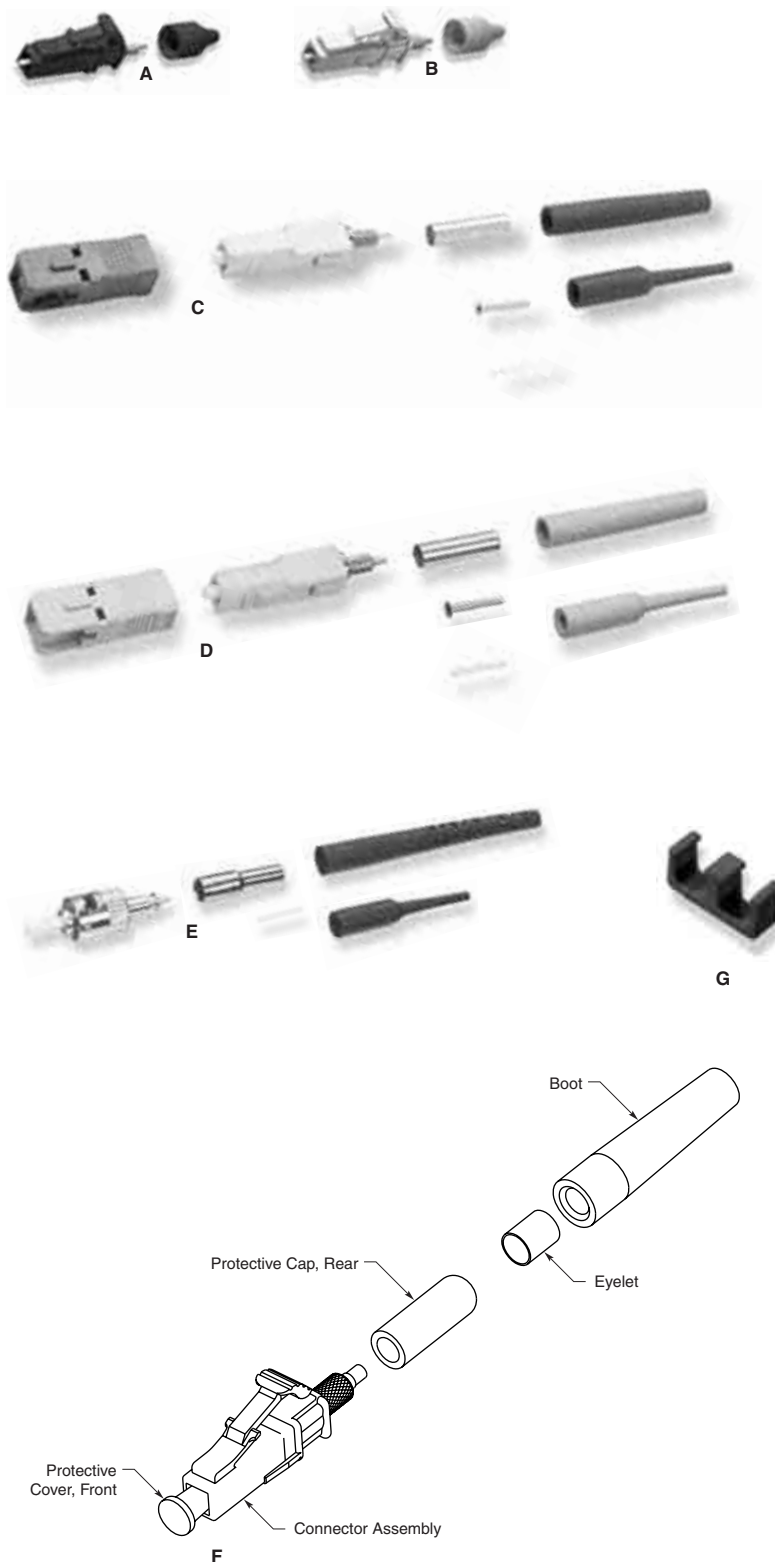
- Multimode connector kits come with accessories needed to terminate to 250  $\mu$ m fiber, 900  $\mu$ m tight-buffered fiber, and 900  $\mu$ m easy-strip
- SC and ST kits also terminate 3 mm cables
- Singlemode connector kits terminate to 250  $\mu$ m fiber, 900  $\mu$ m tight-buffered fiber, 900  $\mu$ m 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 Gb/s) is aqua — 10 Gb/s applications
  - 62.5/125  $\mu$ m is beige
  - 50/125  $\mu$ m is black
- Match fiber type of cable to fiber type of LIGHTCRIMP PLUS
- Mates with standard couplers, adapters and adapter plates
- LC small form factor design is half the size of SC
- Tested to and meets TIA/EIA 568-B.3
- Termination tool kits on page 86

### 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



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

| Connector Type         | Fiber Type                                                        | Housing Color | Boot Color | Used With                                          | Figure | Part Number            | IS Sheet |
|------------------------|-------------------------------------------------------------------|---------------|------------|----------------------------------------------------|--------|------------------------|----------|
| Simplex LC             | Singlemode                                                        | Blue          | Blue       | 900 µm & 250 µm Fibers                             | A      | 6754482-1              | 408-8925 |
|                        | 50/125 µm Multimode                                               | Beige         | Black      | 900 µm & 250 µm Fibers                             | B      | 6754483-2              | 408-8925 |
|                        | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode          | Beige         | Aqua       | 900 µm & 250 µm Fibers                             | —      | 6754483-4              | 408-8925 |
|                        | 62.5/125 µm Multimode                                             | Beige         | Beige      | 900 µm & 250 µm Fibers                             | B      | 6754483-1              | 408-8925 |
| Simplex LC Jacketed    | Singlemode Jacketed                                               | Blue          | Blue       | 1.6 - 2.0 mm Cable                                 | F      | 1918626-1              | 408-8925 |
|                        | 62.5/125 µm Multimode Jacketed                                    | Beige         | Beige      | 1.6 - 2.0 mm Cable                                 | F      | 1918627-1              | 408-8925 |
|                        | 50/125 µm Multimode Jacketed                                      | Beige         | Black      | 1.6 - 2.0 mm Cable                                 | F      | 1918627-2              | 408-8925 |
|                        | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode Jacketed | Gray          | Aqua       | 1.6 - 2.0 mm Cable                                 | F      | 1918627-3              | 408-8925 |
| Simplex SECURE LC      | 50/125 µm Multimode Jacketed                                      | Various       | Various    | 1.6 - 2.0 mm Cable                                 | F      | 1828857-X <sup>1</sup> | 408-8925 |
|                        | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode Jacketed | Various       | Various    | 1.6 - 2.0 mm Cable                                 | F      | 1828858-X <sup>1</sup> | 408-8925 |
|                        | 62.5/125 µm Multimode Jacketed                                    | Various       | Various    | 1.6 - 2.0 mm Cable                                 | F      | 1828859-X <sup>1</sup> | 408-8925 |
|                        | Singlemode Jacketed                                               | Various       | Various    | 1.6 - 2.0 mm Cable                                 | F      | 1828860-X <sup>1</sup> | 408-8925 |
| Duplex LC              | Singlemode                                                        | Blue          | Blue       | 900 µm & 250 µm Fibers                             | —      | 6754484-1              | 408-8725 |
|                        | 50/125 µm Multimode                                               | Beige         | Black      | 900 µm & 250 µm Fibers                             | —      | 6754485-2              | 408-8725 |
|                        | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode          | Beige         | Aqua       | 900 µm & 250 µm Fibers                             | —      | 6754485-4              | 408-8725 |
|                        | 62.5/125 µm Multimode                                             | Beige         | Beige      | 900 µm & 250 µm Fibers                             | —      | 6754485-1              | 408-8725 |
| Simplex SC             | Singlemode*                                                       | Blue          | Blue       | 900 µm & 250 µm Fibers                             | C      | 6693276-1              | 408-4471 |
|                        | 50/125 µm Multimode                                               | Beige         | Black      | 900 µm & 250 µm Fibers, 3 mm Cable                 | D      | 6278079-2              | 408-4471 |
|                        | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode          | Beige         | Aqua       | 900 µm & 250 µm Fibers, 3 mm Cable                 | —      | 6588291-2              | 408-4471 |
|                        | 62.5/125 µm Multimode                                             | Beige         | Beige      | 900 µm & 250 µm Fibers, 3 mm Cable                 | D      | 5492643-1              | 408-4471 |
| Duplex SC              | Singlemode                                                        | Blue          | Blue       | 900 µm & 250 µm Fibers                             | —      | 6693278-1              | 408-8603 |
|                        | 50/125 µm Multimode                                               | Beige         | Black      | 900 µm & 250 µm Fibers, 3 mm Cable                 | —      | 6278080-2              | 408-8603 |
|                        | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode          | Beige         | Aqua       | 900 µm & 250 µm Fibers, 3 mm Cable                 | —      | 6588292-2              | 408-8603 |
|                        | 62.5/125 µm Multimode                                             | Beige         | Beige      | 900 µm & 250 µm Fibers, 3 mm Cable                 | —      | 6278009-1              | 408-8603 |
| ST                     | 50/125 µm Multimode                                               | Metallic      | Black      | 900 µm & 250 µm Fibers, 3 mm Cable                 | E      | 6278082-1              | 408-4457 |
|                        | 62.5/125 µm Multimode                                             | Metallic      | Beige      | 900 µm & 250 µm Fibers, 3 mm Cable                 | E      | 5492642-2              | 408-4457 |
| Duplex LC Clip         |                                                                   | Black         | —          | Package of 6 clips (for use with Simplex kits)     | G      | 1754371-2              | —        |
| Duplex SC Clip (Use 2) |                                                                   | Black         | —          | 2 pieces make one clip (for use with Simplex kits) | G      | 6348522-1              | —        |

**Note:** Highlighted part numbers are routinely stocked for shortest lead times.

\* Able to terminate up to 3 mm jacket.

<sup>1</sup> Dash denotes housing color: -1 Red, -2 Yellow, -3 Green, -4 Blue, -5 Rose, -6 Aqua, -7 Brown, -8 Violet, -9 Orange, 1- -0 Slate.

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

## LIGHTCRIMP No Epoxy, Polish SC and ST Connectors

### Product Facts

- No epoxy needed
- Easy installation: strip, crimp, cleave and polish
- Each connector kit comes with accessories needed to terminate to 250  $\mu$ m fiber, 900  $\mu$ m tight-buffered fiber, and 3 mm cables
  - Duplex part numbers contain two connectors
- Multimode connectors are suitable for use with 50/125  $\mu$ m, Laser Optimized (10 Gig) (850 nm LO 50/125  $\mu$ m) and 62.5/125  $\mu$ m fibers
- Mates with standard couplers, adapters and adapter plates
- Meets TIA/EIA 568-B.3

### Performance Characteristics

**Insertion Loss** — 0.4 dB typical

**Temperature Range** —  
-40°C to 65°C

**Durability** — 500 cycles



| Description |            |                         | Figure | Part Number | IS Sheet |
|-------------|------------|-------------------------|--------|-------------|----------|
| Simplex SC  | Multimode  | Ceramic Ferrule         | A      | 5503692-1   | 408-4066 |
| Duplex SC   | Multimode  | Ceramic Ferrule         | —      | 5503693-1   | 408-4066 |
|             | Singlemode | Ceramic Ferrule         | B      | 5504000-1   | 408-9860 |
| ST          | Multimode  | Stainless Steel Ferrule | C      | 5504034-1   | 408-9860 |
|             |            | Ceramic Ferrule         | B      | 5504001-1   | 408-9860 |
|             |            | Polymer                 | —      | 5492168-1   | 408-9860 |

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

## CORELINK Optical Fiber Splices

### Product Facts

- Each CORELINK splice mates two 900 µm tight-buffered fibers or two 250 µm coated fibers
- Easy to install
- Reusable
- No bench tool required
- Splices sold in packs of 12
  - Includes 2 actuator keys
- Optional CORELINK installation tool shown below
- Designed to TIA/EIA 568-B.3



Replacement Keys

### Performance Characteristics

Mean Splice Loss — < 0.3 dB

Mean Return Loss — -26 dB

Temperature Range —  
-0°C to 60°C

| Description                         |            |       | Part Number |
|-------------------------------------|------------|-------|-------------|
| CORELINK Splice                     | Singlemode | Clear | 503577-1    |
| 2 Replacement keys<br>in key holder |            | —     | 503681-1    |

**Note:** Highlighted part number is routinely stocked for shortest lead times.

### Instruction Sheet

408-4019

<http://www.tycoelectronics.com/documents>

### CORELINK Splice Workstation

Part Number 503605-1

### Product Facts

- Optional tool for installing CORELINK mechanical splices
- Convenient fiber and splice holder for easy installation
- Works with singlemode and multimode CORELINK mechanical splices



### Instruction Sheet

408-4131

<http://www.tycoelectronics.com/documents>

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



## Optical Fiber Cable Performance

### Product Facts

- **AMP NETCONNECT Optical Fiber Cables are tested and designed to the most recent applicable industry standards for premise cabling, network and telecommunications applications, including:**
  - IEEE 802.3
    - Ethernet
    - Fast Ethernet
    - Gigabit Ethernet
    - 10 Gigabit Ethernet
  - FDDI
  - ATM
  - Fibre Channel
  - Token Ring
  - TIA/EIA-568
  - ISO 11801
  - ICEA-596
  - ICEA-640
  - ICEA-696
  - IEC 793-1
  - IEC 794-1
  - Telecordia GR-409-CORE
  - Telecordia GR-20-CORE

## AMP NETCONNECT Optical Fiber Cables

AMP NETCONNECT optical fiber cables contain the highest quality optical fiber and offer the best performance for LED-based, laser-based, and VCSEL-based (ex: Gigabit Ethernet and 10 Gigabit Ethernet) applications. AMP NETCONNECT multimode optical fibers offer performance guaranteed to go beyond the IEEE 802.3z distances for Gigabit Ethernet, and are guaranteed

to support IEEE 802.3ae distances for Ten Gigabit Ethernet while still supporting slower protocols such as Fast Ethernet and FDDI.

The AMP NETCONNECT Laser Optimized 10 Gig Optical Fiber System is a high performance cabling system which has been designed to meet or exceed the requirements of the 10 Gigabit Ethernet application while still supporting all legacy LED and VCSEL applications. The system

fulfills the specifications of IEEE 802.3ae for 10GBASE-SR (10 Gigabit Ethernet serial transmission on MMF at 850 nm) and complies to the OM-3 fiber type and link class definitions of the 2nd edition of ISO 11801. All AMP NETCONNECT Laser Optimized 10 Gig Optical Fiber System components have been designed and optimized to offer a complete, end-to-end system to support today's applications and provide an easy migration to higher data rates.

| Fiber                                                               | Gigabit Ethernet @ 850 nm | Gigabit Ethernet @ 1300 nm | 10 Gigabit Ethernet Serial @ 850 nm | 10 Gigabit Ethernet WDM @ 1300 nm |
|---------------------------------------------------------------------|---------------------------|----------------------------|-------------------------------------|-----------------------------------|
| Multimode 62.5/125 µm                                               | 300 m                     | 550 m                      | 33 m                                | 300 m                             |
| Multimode 50/125 µm                                                 | 600 m                     | 600 m                      | 82 m                                | 300 m                             |
| Laser Optimized 10 Gig (850 nm Laser Optimized 50/125 µm) Multimode | 1000 m                    | 600 m                      | 300 m                               | 300 m                             |

## Optical Fiber Cable Specifications

|                             | Singlemode (1300/1550 nm) | Laser Optimized 10 Gig (850 nm LO 50/125 µm) Multimode (850/1300 nm) | Multimode 50/125 µm (850/1300 nm) | Multimode 62.5/125 µm (850/1300 nm) |
|-----------------------------|---------------------------|----------------------------------------------------------------------|-----------------------------------|-------------------------------------|
| <b>Indoor Cables</b>        |                           |                                                                      |                                   |                                     |
| Maximum Attenuation (dB/km) | 0.7/0.7                   | 3.5/1.5                                                              | 3.5/1.5                           | 3.5/1.5                             |
| OFL Bandwidth (MHz*km)      | —/—                       | 1500/500                                                             | 500/500                           | 200/500                             |
| Laser Bandwidth (MHz*km)    | —/—                       | 2000/—                                                               | —/—                               | —/—                                 |

## Optical Fiber Cable Temperature Ranges

|                                                     |              | Riser                                | Plenum                               |
|-----------------------------------------------------|--------------|--------------------------------------|--------------------------------------|
| <b>Interconnect (Tight Buffered) Cables</b>         | Storage      | -40° C to +65° C (-40° F to +149° F) | -40° C to +65° C (-40° F to +149° F) |
|                                                     | Operating    | -20° C to +50° C (-4° F to +122° F)  | -20° C to +50° C (-4° F to +122° F)  |
|                                                     | Installation | -20° C to +50° C (-4° F to +122° F)  | -20° C to +50° C (-4° F to +122° F)  |
| <b>Indoor, Distribution (Tight Buffered) Cables</b> | Storage      | -40° C to +65° C (-40° F to +149° F) | -40° C to +65° C (-40° F to +149° F) |
|                                                     | Operating    | -20° C to +50° C (-4° F to +122° F)  | 0° C to +50° C (32° F to +122° F)    |
|                                                     | Installation | -20° C to +50° C (-4° F to +122° F)  | 0° C to +50° C (32° F to +122° F)    |

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



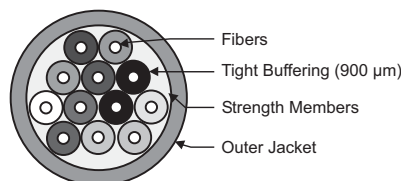
## Optical Fiber Cables (Continued)



Distribution, 6-12 Fiber

### Product Facts

- Suitable for horizontal and in-building backbone cabling and for direct termination with epoxy/polish, LIGHTCRIMP, LIGHTCRIMP PLUS and MT-RJ jacks
- Suitable for inter-building cabling if buried in conduit, below the frost line
- Strippable 900 µm tight buffer coating allows for easy connectorization
- TIA color-coded fibers for easy identification
- UL and cUL listed OFNR (Riser) and OFNP(Plenum)
- Interlocking armor available



Distribution Cables

| Fiber Count | Unit Count Unit (Fibers/Unit) | Fiber Type                                 | UL/NEC Ratings | Part Number | Weight kg/km (lb/kft) | Diameter mm (in) | Tensile Load N (lbf) |           | Bending Radius mm (in) |           |
|-------------|-------------------------------|--------------------------------------------|----------------|-------------|-----------------------|------------------|----------------------|-----------|------------------------|-----------|
|             |                               |                                            |                |             |                       |                  | Installation         | Long Term | Installation           | Long Term |
| 6           | 1 (6)                         | Singlemode                                 | Riser          | 1664036-6   | 22 (15)               | 4.8 (0.19)       | 667 (150)            | 167 (38)  | 96 (3.8)               | 48 (1.9)  |
|             |                               |                                            | Plenum         | 1664037-6   | 24 (16)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Multimode 50/125 µm                        | Riser          | 2-1664038-1 | 22 (15)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 2-1664039-1 | 24 (16)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Laser Optimized 10 Gig Multimode 50/125 µm | Riser          | 8-1664038-9 | 22 (15)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 8-1664039-9 | 24 (16)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Multimode 62.5/125 µm                      | Riser          | 1-1664040-1 | 22 (15)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 1-1664041-1 | 24 (16)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Singlemode                                 | Riser          | 1664042-6   | 24 (16)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 1664043-6   | 26 (18)               |                  | 445 (100)            | 111 (25)  |                        |           |
| 8           | 1 (8)                         | Multimode 50/125 µm                        | Riser          | 2-1664044-1 | 24 (16)               | 4.9 (0.19)       | 667 (150)            | 167 (38)  | 108 (4.2)              | 54 (2.1)  |
|             |                               |                                            | Plenum         | 2-1664045-1 | 26 (18)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Laser Optimized 10 Gig Multimode 50/125 µm | Riser          | 8-1664044-9 | 24 (16)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 8-1664045-9 | 26 (18)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Multimode 62.5/125 µm                      | Riser          | 1-1664046-1 | 24 (16)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 1-1664047-1 | 26 (18)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Singlemode                                 | Riser          | 1664048-6   | 36 (24)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 1664049-6   | 46 (31)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Multimode 50/125 µm                        | Riser          | 2-1664050-1 | 36 (24)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 2-1664051-1 | 46 (31)               |                  | 445 (100)            | 111 (25)  |                        |           |
| 12          | 1 (12)                        | Laser Optimized 10 Gig Multimode 50/125 µm | Riser          | 8-1664050-9 | 36 (24)               | 6.2 (0.24)       | 667 (150)            | 167 (38)  | 124 (4.8)              | 62 (2.4)  |
|             |                               |                                            | Plenum         | 8-1664051-9 | 46 (31)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Multimode 62.5/125 µm                      | Riser          | 1-1664052-1 | 36 (24)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 1-1664053-1 | 46 (31)               |                  | 445 (100)            | 111 (25)  |                        |           |
|             |                               | Singlemode                                 | Riser          | 1664054-6   | 36 (24)               |                  | 667 (150)            | 167 (38)  |                        |           |
|             |                               |                                            | Plenum         | 1664055-6   | 46 (31)               |                  | 445 (100)            | 111 (25)  |                        |           |

**Notes:** All of these cables are available with interlocking armor. Call for more information.  
Highlighted part numbers are routinely stocked for shortest lead times.

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

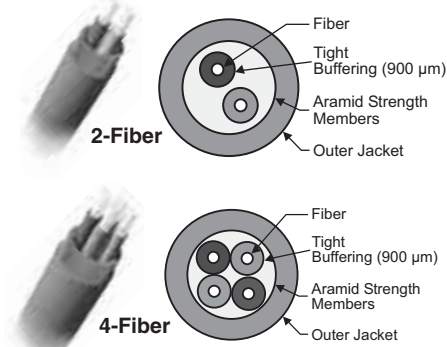


Horizontal, 2-4 Fiber

## Optical Fiber Cables (Continued)

### Product Facts

- Suitable for direct termination with epoxy/polish, **LIGHTCRIMP**, **LIGHTCRIMP PLUS** and MT-RJ jacks
- Blue, green, red and yellow Dual and Quad multimode cables for MT-RJ **SECURE** Networks or network segregation
- Aramid yarn reinforcement
- UL and cUL listed OFNR (Riser) and OFNP(Plenum)



### 2-Fiber (Dual)

| Fiber Count | Unit Count<br>Unit (Fibers/Unit) | Fiber Type                                 | UL/NEC Ratings      | Jacket Color | Part Number | Weight<br>kg/km (lb/kft) | Diameter<br>mm (in) | Tensile Load N (lbf) |           | Bending Radius mm (in) |           |
|-------------|----------------------------------|--------------------------------------------|---------------------|--------------|-------------|--------------------------|---------------------|----------------------|-----------|------------------------|-----------|
|             |                                  |                                            |                     |              |             |                          |                     | Installation         | Long Term | Installation           | Long Term |
| 2           | 1(2)                             | Singlemode                                 | Riser               | Yellow       | 1664024-6   | 19 (13)                  | 4.8 (0.19)          | 220 (50)             | 55 (12.5) | 95 (3.8)               | 48 (1.9)  |
|             |                                  |                                            | Plenum              | Yellow       | 1664025-6   | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  | Riser                                      | Orange              | 2-1664026-1  | 19 (13)     |                          |                     |                      |           |                        |           |
|             |                                  |                                            | Blue                | 2-1664026-0  | 19 (13)     |                          |                     |                      |           |                        |           |
|             |                                  |                                            | Green               | 2-1664026-2  | 19 (13)     |                          |                     |                      |           |                        |           |
|             |                                  |                                            | Red                 | 2-1664026-4  | 19 (13)     |                          |                     |                      |           |                        |           |
|             |                                  |                                            | Multimode 50/125 µm | Yellow       | 2-1664026-6 | 19 (13)                  |                     |                      |           |                        |           |
|             |                                  |                                            |                     | Orange       | 2-1664027-1 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  | Blue                                       |                     | 2-1664027-0  | 23 (16)     |                          |                     |                      |           |                        |           |
|             |                                  | Plenum                                     |                     | Green        | 2-1664027-2 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  |                                            |                     | Red          | 2-1664027-4 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  | Laser Optimized 10 Gig Multimode 50/125 µm |                     | Yellow       | 2-1664027-6 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  |                                            | Riser               | Aqua         | 8-1664026-9 | 19 (13)                  |                     |                      |           |                        |           |
|             |                                  |                                            | Plenum              | Aqua         | 8-1664027-9 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  |                                            | Riser               | Orange       | 1-1664028-1 | 19 (13)                  |                     |                      |           |                        |           |
|             |                                  |                                            |                     | Blue         | 1-1664028-0 | 19 (13)                  |                     |                      |           |                        |           |
|             |                                  |                                            |                     | Green        | 1-1664028-2 | 19 (13)                  |                     |                      |           |                        |           |
|             |                                  | Red                                        |                     | 1-1664028-4  | 19 (13)     |                          |                     |                      |           |                        |           |
|             |                                  | Multimode 62.5/125 µm                      |                     | Yellow       | 1-1664028-6 | 19 (13)                  |                     |                      |           |                        |           |
|             |                                  |                                            |                     | Orange       | 1-1664029-1 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  |                                            | Blue                | 1-1664029-0  | 23 (16)     |                          |                     |                      |           |                        |           |
|             |                                  |                                            | Plenum              | Green        | 1-1664029-2 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  |                                            |                     | Red          | 1-1664029-4 | 23 (16)                  |                     |                      |           |                        |           |
|             |                                  |                                            | Yellow              | 1-1664029-6  | 23 (16)     |                          |                     |                      |           |                        |           |

### 4-Fiber (Quad)

|   |      |                                                  |                          |        |             |             |            |          |           |          |          |         |
|---|------|--------------------------------------------------|--------------------------|--------|-------------|-------------|------------|----------|-----------|----------|----------|---------|
| 4 | 1(4) | Singlemode                                       | Riser                    | Yellow | 1664030-6   | 21 (14)     | 4.8 (0.19) | 220 (50) | 55 (12.5) | 95 (3.8) | 48 (1.9) |         |
|   |      |                                                  | Plenum                   | Yellow | 1664031-6   | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  | Multimode<br>50/125 μm   | Riser  | Orange      | 2-1664032-1 |            |          |           |          |          | 21 (14) |
|   |      |                                                  |                          |        | Blue        | 2-1664032-0 |            |          |           |          |          | 21 (14) |
|   |      |                                                  |                          |        | Green       | 2-1664032-2 |            |          |           |          |          | 21 (14) |
|   |      |                                                  |                          |        | Red         | 2-1664032-4 |            |          |           |          |          | 21 (14) |
|   |      | Plenum                                           |                          | Yellow | 2-1664032-6 | 21 (14)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Orange | 2-1664033-1 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Blue   | 2-1664033-0 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Green  | 2-1664033-2 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Red    | 2-1664033-4 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Yellow | 2-1664033-6 | 25 (17)     |            |          |           |          |          |         |
|   |      | Laser Optimized<br>10 Gig Multimode<br>50/125 μm | Riser                    | Aqua   | 8-1664032-9 | 21 (14)     |            |          |           |          |          |         |
|   |      |                                                  | Plenum                   | Aqua   | 8-1664033-9 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  | Multimode<br>62.5/125 μm | Riser  | Orange      | 1-1664034-1 |            |          |           |          |          | 21 (14) |
|   |      |                                                  |                          |        | Blue        | 1-1664034-0 |            |          |           |          |          | 21 (14) |
|   |      |                                                  |                          |        | Green       | 1-1664034-2 |            |          |           |          |          | 21 (14) |
|   |      |                                                  |                          |        | Red         | 1-1664034-4 |            |          |           |          |          | 21 (14) |
|   |      | Plenum                                           |                          | Yellow | 1-1664034-6 | 21 (14)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Orange | 1-1664035-1 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Blue   | 1-1664035-0 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Green  | 1-1664035-2 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Red    | 1-1664035-4 | 25 (17)     |            |          |           |          |          |         |
|   |      |                                                  |                          | Yellow | 1-1664035-6 | 25 (17)     |            |          |           |          |          |         |

**Note:** Highlighted part numbers are routinely stocked for shortest lead times.

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

## Optical Fiber Cables (Continued)



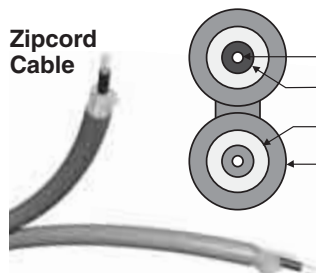
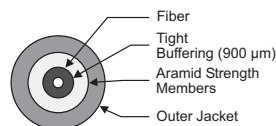
Interconnect, 1-2 Fiber

### Product Facts

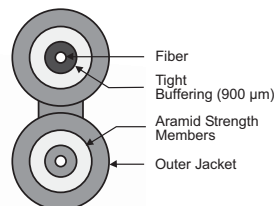
- Suitable for pigtails, patch cords and internal equipment connections
- Aramid yarn reinforcement
- UL and cUL listed OFNR (Riser) and OFNP(Plenum)



Simplex Cable



Zipcord Cable



### Simplex (2.0 mm)

| Fiber Count | Unit Count Unit (Fibers/Unit) | Fiber Type                                 | UL/NEC Ratings | Part Number | Weight kg/km (lb/kft) | Diameter mm (in) | Tensile Load N (lbf) |           | Bending Radius mm (in) |           |
|-------------|-------------------------------|--------------------------------------------|----------------|-------------|-----------------------|------------------|----------------------|-----------|------------------------|-----------|
|             |                               |                                            |                |             |                       |                  | Installation         | Long Term | Installation           | Long Term |
| 1           | 1 (1)                         | Singlemode                                 | Riser          | 1664006-6   | 5 (3)                 | 2.0 (0.08)       | 220 (50)             | 55 (12.5) | 40 (1.6)               | 20 (0.8)  |
|             |                               |                                            | Plenum         | 1664007-6   | 6 (4)                 |                  |                      |           |                        |           |
|             |                               | Multimode 50/125 μm                        | Riser          | 2-1664008-1 | 5 (3)                 |                  |                      |           |                        |           |
|             |                               |                                            | Plenum         | 2-1664009-1 | 6 (4)                 |                  |                      |           |                        |           |
|             |                               | Laser Optimized 10 Gig Multimode 50/125 μm | Riser          | 8-1664008-9 | 5 (3)                 |                  |                      |           |                        |           |
|             |                               |                                            | Plenum         | 8-1664009-9 | 6 (4)                 |                  |                      |           |                        |           |
|             |                               | Multimode 62.5/125 μm                      | Riser          | 1-1664010-1 | 5 (3)                 |                  |                      |           |                        |           |
|             |                               |                                            | Plenum         | 1-1664011-1 | 6 (4)                 |                  |                      |           |                        |           |

### Simplex (2.9 mm)

|   |       |                                            |        |             |       |            |          |           |          |          |
|---|-------|--------------------------------------------|--------|-------------|-------|------------|----------|-----------|----------|----------|
| 1 | 1 (1) | Singlemode                                 | Riser  | 1664000-6   | 8 (5) | 2.9 (0.11) | 220 (50) | 55 (12.5) | 58 (2.8) | 29 (1.1) |
|   |       |                                            | Plenum | 1664001-6   | 9 (6) |            |          |           |          |          |
|   |       | Multimode 50/125 μm                        | Riser  | 2-1664002-1 | 8 (5) |            |          |           |          |          |
|   |       |                                            | Plenum | 2-1664003-1 | 9 (6) |            |          |           |          |          |
|   |       | Laser Optimized 10 Gig Multimode 50/125 μm | Riser  | 8-1664002-9 | 8 (5) |            |          |           |          |          |
|   |       |                                            | Plenum | 8-1664003-9 | 9 (6) |            |          |           |          |          |
|   |       | Multimode 62.5/125 μm                      | Riser  | 1-1664004-1 | 8 (5) |            |          |           |          |          |
|   |       |                                            | Plenum | 1-1664005-1 | 9 (6) |            |          |           |          |          |

### Zipcord (2.0 mm)

|   |       |                                            |        |             |       |                         |          |           |          |          |
|---|-------|--------------------------------------------|--------|-------------|-------|-------------------------|----------|-----------|----------|----------|
| 2 | 2 (1) | Singlemode                                 | Riser  | 1664018-6   | 6 (4) | 2.0 x 4.0 (0.08 x 0.16) | 220 (50) | 55 (12.5) | 40 (2.2) | 20 (0.8) |
|   |       |                                            | Plenum | 1664019-6   | 8 (5) |                         |          |           |          |          |
|   |       | Multimode 50/125 μm                        | Riser  | 2-1664020-1 | 6 (4) |                         |          |           |          |          |
|   |       |                                            | Plenum | 2-1664021-1 | 8 (5) |                         |          |           |          |          |
|   |       | Laser Optimized 10 Gig Multimode 50/125 μm | Riser  | 8-1664020-9 | 6 (4) |                         |          |           |          |          |
|   |       |                                            | Plenum | 8-1664021-9 | 8 (5) |                         |          |           |          |          |
|   |       | Multimode 62.5/125 μm                      | Riser  | 1-1664022-1 | 6 (4) |                         |          |           |          |          |
|   |       |                                            | Plenum | 1-1664023-1 | 8 (5) |                         |          |           |          |          |

### Zipcord (2.9 mm)

|   |       |                                            |        |             |         |                         |          |           |          |          |
|---|-------|--------------------------------------------|--------|-------------|---------|-------------------------|----------|-----------|----------|----------|
| 2 | 2 (1) | Singlemode                                 | Riser  | 1664012-6   | 15 (10) | 2.9 x 5.8 (0.11 x 0.22) | 220 (50) | 55 (12.5) | 58 (2.2) | 29 (1.1) |
|   |       |                                            | Plenum | 1664013-6   | 18 (12) |                         |          |           |          |          |
|   |       | Multimode 50/125 μm                        | Riser  | 2-1664014-1 | 15 (10) |                         |          |           |          |          |
|   |       |                                            | Plenum | 2-1664015-1 | 18 (12) |                         |          |           |          |          |
|   |       | Laser Optimized 10 Gig Multimode 50/125 μm | Riser  | 8-1664014-9 | 15 (10) |                         |          |           |          |          |
|   |       |                                            | Plenum | 8-1664015-9 | 18 (12) |                         |          |           |          |          |
|   |       | Multimode 62.5/125 μm                      | Riser  | 1-1664016-1 | 15 (10) |                         |          |           |          |          |
|   |       |                                            | Plenum | 1-1664017-1 | 18 (12) |                         |          |           |          |          |

**Note:** Highlighted part numbers are routinely stocked for shortest lead times.

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

## MPO Connectors

### 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

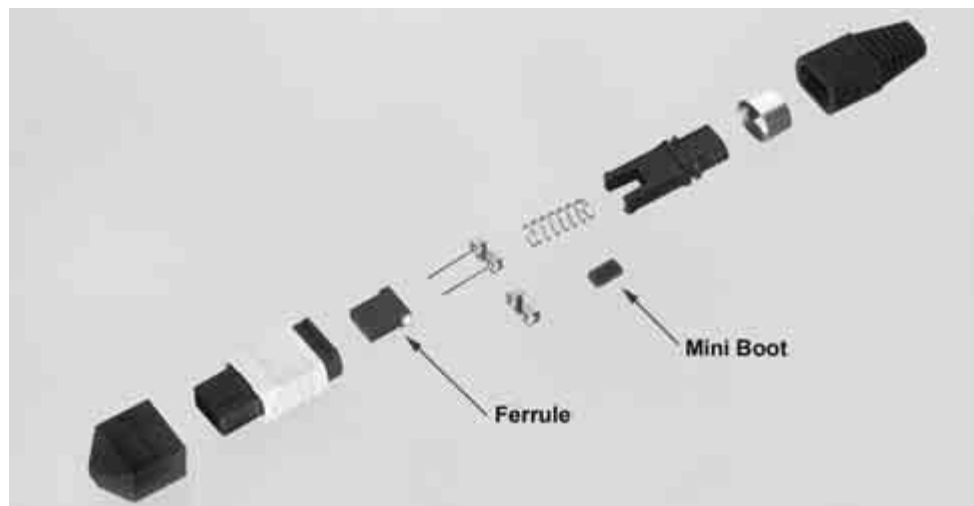
Return Loss — > 55 dB

#### Multimode

Insertion Loss (Typ) — 0.2 dB

Insertion Loss (Max) — 0.5 dB

Return Loss — > 20 dB



### 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 Adapters

| Adapter Type                  | Single Pack | 50 pc Bulk Pack |
|-------------------------------|-------------|-----------------|
| Adapter w/flange              | 1588172-1   | 1588172-5       |
| Adapter w/flange and clip     | 1588172-2   | 1588172-6       |
| Adapter w/o flange            | 1588172-3   | 1588172-7       |
| Adapter w/o flange and w/clip | 1588172-4   | 1588172-8       |

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

## Tooling

### Powermeter Launch Lead Kits for Optical Testing and Certification



Today testing of fiber optic links is more sensitive than ever. AMP NETCONNECT test kits guarantee precise and replicable fiber testing. All kits contain connectors with controlled end faces and support testing with 3 jumper test method in accordance to ISO/IEC 14763-3.

Each kit contains:

- Test leads for simplex and duplex IL test
- Test leads for CPR tests
- Fiber coupling bushes
- Two mandrels (Multimode only)
- Cleaning aides
- Instruction manual
- Data sheet of end face geometry

| Description                    | Part Number |
|--------------------------------|-------------|
| 50 µm, Multimode Launch Lead   | Y-6695241-X |
| 62.5 µm, Multimode Launch Lead | Y-6695243-X |
| 9 µm, Singlemode Launch Lead   | Y-6695245-X |

| Y- -X | Connector Type |
|-------|----------------|
| -1    | SC/PC to SC/PC |
| -2    | SC/PC to ST/PC |
| -3    | SC/PC to LC/PC |
| -4    | SC/PC to FC/PC |
| -5    | SC/PC to MT-RJ |

| Y- -X | Connector Type |
|-------|----------------|
| -6    | ST/PC to SC/PC |
| -7    | ST/PC to ST/PC |
| -8    | ST/PC to LC/PC |
| -9    | ST/PC to FC/PC |
| 1- -0 | ST/PC to MT-RJ |

| Y- -X | Connector Type |
|-------|----------------|
| 1- -1 | LC/PC to SC/PC |
| 1- -2 | LC/PC to ST/PC |
| 1- -3 | LC/PC to LC/PC |
| 1- -4 | LC/PC to FC/PC |
| 1- -5 | LC/PC to MT-RJ |

| Y- -X | Connector Type |
|-------|----------------|
| 1- -6 | FC/PC to SC/PC |
| 1- -7 | FC/PC to ST/PC |
| 1- -8 | FC/PC to LC/PC |
| 1- -9 | FC/PC to FC/PC |
| 2- -0 | FC/PC to MT-RJ |

Explanation: Connector 1 — to test equipment  
Connector 2 — under test

### OTDR Launch Lead Kits for Optical Testing and Certification

Each kit contains:

- Launch and tail lead
- Length 400 m Multimode and 500 m Singlemode
- Data sheet of end face geometry
- Coupling bushings
- Cleaning aides
- Instruction manual



| Description                    | Part Number |
|--------------------------------|-------------|
| 50 µm, Multimode Launch Lead   | Y-6695240-X |
| 62.5 µm, Multimode Launch Lead | Y-6695242-X |
| 9 µm, Singlemode Launch Lead   | Y-6695244-X |

| Y- -X | Connector Type |
|-------|----------------|
| -1    | SC/PC to SC/PC |
| -2    | SC/PC to ST/PC |
| -3    | SC/PC to LC/PC |
| -4    | SC/PC to FC/PC |
| -5    | SC/PC to MT-RJ |

| Y- -X | Connector Type |
|-------|----------------|
| -6    | ST/PC to SC/PC |
| -7    | ST/PC to ST/PC |
| -8    | ST/PC to LC/PC |
| -9    | ST/PC to FC/PC |
| 1- -0 | ST/PC to MT-RJ |

| Y- -X | Connector Type |
|-------|----------------|
| 1- -1 | LC/PC to SC/PC |
| 1- -2 | LC/PC to ST/PC |
| 1- -3 | LC/PC to LC/PC |
| 1- -4 | LC/PC to FC/PC |
| 1- -5 | LC/PC to MT-RJ |

| Y- -X | Connector Type |
|-------|----------------|
| 1- -6 | FC/PC to SC/PC |
| 1- -7 | FC/PC to ST/PC |
| 1- -8 | FC/PC to LC/PC |
| 1- -9 | FC/PC to FC/PC |
| 2- -0 | FC/PC to MT-RJ |

Explanation: Connector 1 — to test equipment  
Connector 2 — under test

### Consumables for Power Meter and OTDR Launch Lead Kits

| Description            | Part Number |
|------------------------|-------------|
| Cleaning Lens Book     | 434376-1    |
| Compressed Air Bottle  | 1206860-1   |
| Cleaning Stick 2.50 mm | 1918807-1   |
| Cleaning Stick 1.25 mm | 1918808-1   |
| Cleaning Stick MT-RJ   | 1391089-1   |

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

## Tooling (Continued)

### Tool Kit Compatibility Chart

|                                                                | Part Number | MT-RJ<br>Jacks | MT-RJ SECURE<br>Jacks | MT-RJ<br>Plugs | LIGHTCRIMP PLUS |    |    | LIGHTCRIMP |    | Epoxy/Polish   |    |    |    |     |      |
|----------------------------------------------------------------|-------------|----------------|-----------------------|----------------|-----------------|----|----|------------|----|----------------|----|----|----|-----|------|
|                                                                |             |                |                       |                | LC              | SC | ST | SC         | ST | LC             | SC | ST | FC | FSD | FSMA |
| Deluxe Premises Termination Tool Kit                           | 1278949-2   | X              | X                     |                | X               | X  | X  | X          | X  |                |    |    |    |     |      |
|                                                                | 1278949-3*  | X              | X                     |                | X               | X  | X  | X          | X  |                |    |    |    |     |      |
| MT-RJ Jack Tool Kit                                            | 1278346-1   | X              | X                     |                |                 |    |    |            |    |                |    |    |    |     |      |
|                                                                | 1278346-2*  | X              | X                     |                |                 |    |    |            |    |                |    |    |    |     |      |
| LIGHTCRIMP PLUS No Epoxy/<br>No Polish Universal Tool Kit      | 1278118-4   | X              | X                     |                | X               | X  | X  |            |    |                |    |    |    |     |      |
|                                                                | 1278118-5*  | X              | X                     |                | X               | X  | X  |            |    |                |    |    |    |     |      |
| MT-RJ Plug Termination Kit                                     | 1278745-1   |                |                       | X              |                 |    |    |            |    |                |    |    |    |     |      |
|                                                                | 1278745-2*  |                |                       | X              |                 |    |    |            |    |                |    |    |    |     |      |
| LIGHTCRIMP PLUS No Epoxy/<br>No Polish LC Tool Kit             | 1754845-1   |                |                       |                | X               |    |    |            |    |                |    |    |    |     |      |
|                                                                | 1754845-2*  |                |                       |                | X               |    |    |            |    |                |    |    |    |     |      |
| LIGHTCRIMP PLUS No Epoxy/<br>No Polish SC Tool Kit             | 1278022-1   |                |                       |                |                 | X  |    |            |    |                |    |    |    |     |      |
|                                                                | 1278022-2*  |                |                       |                |                 | X  |    |            |    |                |    |    |    |     |      |
| LIGHTCRIMP PLUS No Epoxy/<br>No Polish ST Tool Kit             | 492697-1    |                |                       |                |                 |    | X  |            |    |                |    |    |    |     |      |
|                                                                | 492697-2*   |                |                       |                |                 |    | X  |            |    |                |    |    |    |     |      |
| LIGHTCRIMP SC/ST<br>No Epoxy/Polish Tool Kits                  | 503957-1    |                |                       |                |                 |    |    | X          | X  |                |    |    |    |     |      |
|                                                                | 503957-3    |                |                       |                |                 |    |    | X          | X  |                |    |    |    |     |      |
|                                                                | 492543-1    |                |                       |                |                 |    |    | X          | X  |                |    |    |    |     |      |
| LIGHTCRIMP SC No Epoxy/<br>Polish Tool Kits                    | 503706-1    |                |                       |                |                 |    |    | X          |    |                |    |    |    |     |      |
|                                                                | 503706-2    |                |                       |                |                 |    |    | X          |    |                |    |    |    |     |      |
| LIGHTCRIMP ST No Epoxy/<br>Polish Tool Kits                    | 503330-1    |                |                       |                |                 |    |    |            | X  |                |    |    |    |     |      |
|                                                                | 503330-3    |                |                       |                |                 |    |    |            | X  |                |    |    |    |     |      |
|                                                                | 492322-1    |                |                       |                |                 |    |    |            | X  |                |    |    |    |     |      |
| Pro-installer Epoxy/<br>Polish Tool Kits                       | 501258-7    |                |                       |                |                 |    |    |            |    | X <sup>1</sup> | X  | X  | X  | X   | X    |
|                                                                | 501258-8    |                |                       |                |                 |    |    |            |    | X <sup>1</sup> | X  | X  | X  | X   | X    |
|                                                                | 501258-9    |                |                       |                |                 |    |    |            |    | X <sup>1</sup> | X  | X  | X  | X   | X    |
| Epoxy/Polish SC/FC Tool Kit<br>(no microscope, no curing oven) | 503746-7    |                |                       |                |                 |    |    |            |    | X <sup>2</sup> | X  |    | X  |     |      |
| Epoxy/Polish ST Tool Kit<br>(no microscope, no curing oven)    | 503746-1    |                |                       |                |                 |    |    |            |    | X <sup>2</sup> |    | X  |    |     |      |
| Epoxy/Polish FSMA Tool Kit<br>(no microscope, no curing oven)  | 503746-2    |                |                       |                |                 |    |    |            |    | X <sup>2</sup> |    |    |    |     | X    |
| Epoxy/Polish FSD Tool Kit<br>(no microscope, no curing oven)   | 503746-6    |                |                       |                |                 |    |    |            |    | X <sup>2</sup> |    |    |    | X   |      |

<sup>1</sup> For LC terminations, also order Part Number 1754462-1.

<sup>2</sup> For LC terminations, also order Part Number 1754603-1.

\*Includes Precision Cleaver and Microscope.

### Epoxy/Polish Connector Consumables/Compatibility Chart

|               | Epoxies (Part Number) |                       |                     | Polishing Films (Part Number) |                    |                            |                      |                                    | Consumable<br>Package*<br>Part Number |
|---------------|-----------------------|-----------------------|---------------------|-------------------------------|--------------------|----------------------------|----------------------|------------------------------------|---------------------------------------|
|               | EPO-TEK<br>(504035-1) | TRA-CON<br>(501195-4) | HYSOL<br>(502418-1) | 9 µm<br>(1374484-1)           | 5 µm<br>(228433-8) | Diamond Film<br>(503887-1) | 0.3 µm<br>(228433-5) | Final Polishing Film<br>(502748-2) |                                       |
| LC Singlemode | X                     | X                     | X                   | X                             | X                  | X                          | X                    | —                                  | 502306-4                              |
| LC Multimode  | X                     | X                     | X                   | X                             | X                  | X                          | X                    | —                                  | 502306-4                              |
| SC Singlemode | X                     | X                     | X                   | —                             | X                  | —                          | X                    | X                                  | 502306-2                              |
| SC Multimode  | X                     | X                     | X                   | —                             | X                  | —                          | X                    | X                                  | 502306-2                              |
| ST Singlemode | —                     | X                     | X                   | —                             | X                  | —                          | X                    | X                                  | 502306-2                              |
| ST Multimode  | —                     | X                     | X                   | —                             | X                  | —                          | X                    | —                                  | 502306-1                              |

\*Epoxy &amp; film for » 100 connectors.

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



## Tooling (Continued)

### Deluxe Premises Termination Tool Kit

Part Number 1278949-2

Part Number 1278949-3  
(Includes Precision Cleaver and Microscope)

#### Product Facts

- Includes all tools need for installing popular field-installable connectors
  - MT-RJ and MT-RJ SECURE Jacks
  - LIGHTCRIMP PLUS SC, LC and ST connectors
  - LIGHTCRIMP SC and ST connectors
- Convenient carrying case
- Includes consumables for LIGHTCRIMP connector terminations
  - For additional LIGHTCRIMP connector terminations, order additional polishing films 228433-9, 228433-8, 228433-7 and 228433-5 (page 93)
- Includes instructional CD-ROM video



### MT-RJ Jack Termination Tool Kit

Part Number 1278346-1

Part Number 1278346-2  
(Includes Precision Cleaver and Microscope)

#### Product Facts

- Includes all tools needed for installing MT-RJ and MT-RJ SECURE Jacks



### MT-RJ Plug Termination Tool Kit

Part Number 1278745-1

Part Number 1278745-2  
(Includes Precision Cleaver and Microscope)

#### Product Facts

- Includes all tools needed to terminate MT-RJ Plug in handy plastic case
- Contents: Cleave pen, Jacket/Buffer/Coating Stripper, KEVLAR Shears, Strip Template, Cable Clamps, Cure Fixtures, Crimp Tool, Die Sets, Epoxy Dispensers

### 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 <sup>1</sup> |
| LIGHTCRIMP PLUS LC Connector Termination Tool Kit                                 | 1754845-1   | 1754845-2 <sup>1</sup> |
| LIGHTCRIMP PLUS SC Connector Termination Tool Kit                                 | 1278022-1   | 1278022-2 <sup>1</sup> |
| LIGHTCRIMP PLUS ST Connector Termination Tool Kit                                 | 492697-1    | 492697-2 <sup>1</sup>  |

<sup>1</sup> Includes Precision Cleaver and Microscope.

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

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

## Tooling (Continued)

### No Epoxy/No Polish Upgrade and Adaptive Termination Tool Kits

#### Product Facts

- Upgrade Tool Kit supplements existing LIGHTCRIMP PLUS Tool Kits with tools needed to install LC connectors

- Adaptive Tool Kits supplements existing fiber optic tool kits with the tools needed to terminate

#### LIGHTCRIMP PLUS connectors

- Saves money on full tool kit by reusing tools from currently owned tool kits

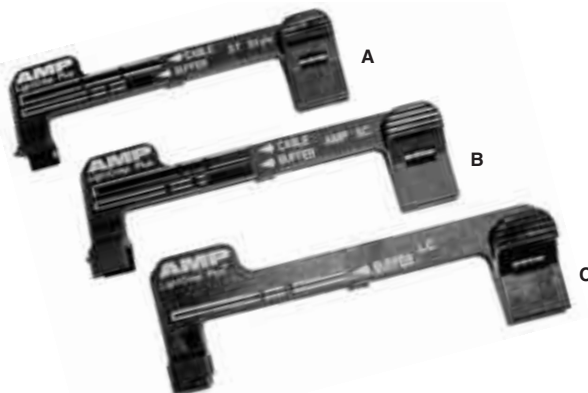
| Description                              | Terminates                | Includes                                                                                    | Cost Savings                                  | Part Number             |
|------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------|
| LC LIGHTCRIMP PLUS Upgrade Kit           | LIGHTCRIMP PLUS LC        | LC Die Set and Cable Holder                                                                 | Low Cost Upgrade for Current Tool Kit         | 1754847-2               |
| LC LIGHTCRIMP PLUS Adaptive Kit          | LIGHTCRIMP PLUS LC        | Crimp Tool, LC Die Set, LC Cable Holder, Cleave Tool and Instruction Sheet                  | Fiber and Cable Strippers in Current Tool Kit | 1754846-1<br>1754846-2* |
| SC LIGHTCRIMP PLUS Adaptive Kit          | LIGHTCRIMP PLUS SC        | Crimp Tool, SC Die Set, SC Cable Holder, Cleave Tool and Instruction Sheet                  | Fiber and Cable Strippers in Current Tool Kit | 1754737-1<br>1754737-2* |
| Combination LIGHTCRIMP PLUS Adaptive Kit | LIGHTCRIMP PLUS SC and ST | Crimp Tool, SC and ST Die Sets, SC and ST Cable Holders, Cleave Tool and Instruction Sheets | Fiber and Cable Strippers in Current Tool Kit | 1754739-1<br>1754739-2* |
| ST LIGHTCRIMP PLUS Adaptive Kit          | LIGHTCRIMP PLUS ST        | Crimp Tool, ST Die Set, ST Cable Holder, Cleave Tool and Instruction Sheet                  | Fiber and Cable Strippers in Current Tool Kit | 1754738-1<br>1754738-2* |

\*Includes microscope and precision cleaver

### 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   |

### Fiber Optic Cleave Tool Part Number 492674-1

#### Product Facts

- Cleave fibers for LIGHTCRIMP PLUS connectors
- One is included in basic tool kits for MT-RJ Jacks and LIGHTCRIMP PLUS connectors (not the LC Upgrade Kit)
- Easy to use: clamp, score and bend
- Blade life-span is » 1000 cleaves



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

**Tooling** (Continued)



**“New” Hand Held Precision Cleaver**

**Part Number 1871696-1  
Hand Held Precision Cleaver**

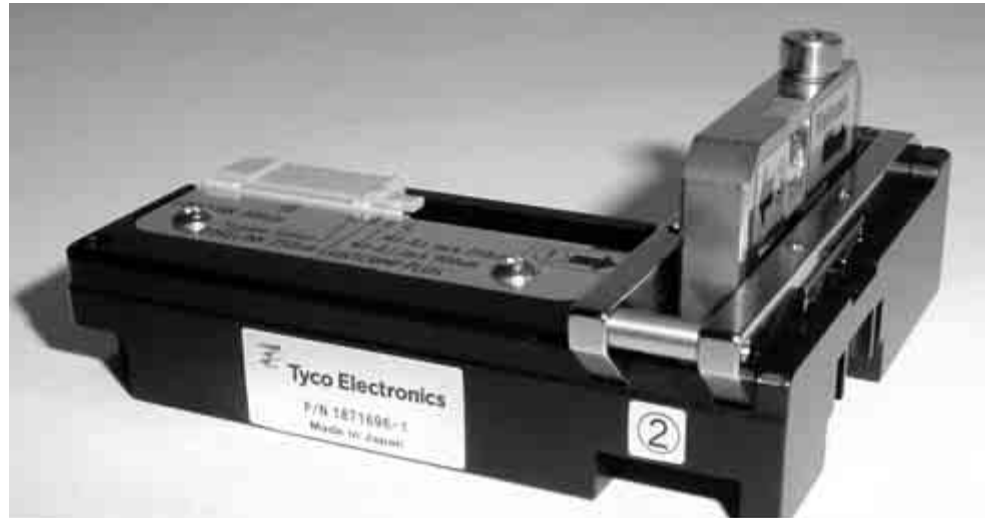
**Part Number 1871696-2  
Hand Held Precision Cleaver  
with Trash Can**  
(not a stocked item)

**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

**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.]



Tyco Electronics' 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 10,000 cleave blade life far exceeds that of any other hand held cleaver currently on the market. The detailed scale markings indicate

proper cleave lengths for popular Tyco Electronics 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

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

## Tooling (Continued)

### LIGHTCRIMP Termination Tool Kits

#### Product Facts

- Includes all tools needed for installing the listed type LIGHTCRIMP no epoxy/polish connectors
- Convenient carrying case
- Includes consumables for installing 60 LIGHTCRIMP connectors
  - For additional LIGHTCRIMP terminations, order additional polishing films 228433-9, 228433-8, 228433-7 and 228433-5 (page 93)
- Note: photo is representative of kits — contents may vary by Part Number



| Description          |                 | Microscope (if listed) | Part Number |
|----------------------|-----------------|------------------------|-------------|
| LIGHTCRIMP SC        | Termination Kit | —                      | 503706-1    |
|                      |                 | Premium Microscope     | 503706-2    |
| LIGHTCRIMP ST        | Termination Kit | —                      | 503330-1    |
|                      |                 | Premium Microscope     | 503330-3    |
|                      | Mini Tool Kit   | —                      | 492322-1    |
| LIGHTCRIMP SC and ST | Termination Kit | —                      | 503957-1    |
|                      |                 | Premium Microscope     | 503957-2    |
|                      | Mini Tool Kit   | —                      | 492543-1    |

### 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.

## Tooling (Continued)

### Pro-Installer Epoxy/Polish Connector Termination Tool Kits

#### Product Facts

- Includes all tools necessary to install SC, ST, and FC Connectors
  - For LC terminations, also order Part Number 1754462-1
- Tool kits include:
  - Pro-Crimper II Hand Tool and crimping dies
  - Polishing bushings
  - Polishing film (also sold separately, page 93)
  - Cable and fiber strippers
  - Scissors
  - Scribe tool
- Includes polishing films to install 60 epoxy/polish connectors
  - Epoxy is sold separately (see page 92)
- Kits available with curing oven and microscope or without
- Convenient carrying case
- Photo is representative of kits — contents vary by Part Number



#### Professional Installer Kit

| Description                           | Part Number |
|---------------------------------------|-------------|
| With 110 V Curing Oven and Microscope | 501258-7    |
| With 220 V Curing Oven and Microscope | 501258-8    |
| Without Curing Oven or Microscope     | 501258-9    |

### 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, page 93)
  - Cable and fiber strippers
  - Scissors
  - Scribe tool
- Includes polishing films to install » 60 epoxy/polish connectors
  - Epoxy is sold separately (see page 92)
- 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    |

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

## Tooling (Continued)

### Cable Stripper

Part Number 1375317-1

#### Product Facts

- Cyclops Stripper ideal for stripping twisted pair (UTP and STP) and fiber optic cables up to 10.92 [0.43] diameter



### 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 90 with these components to terminate LC Epoxy/Polish Connectors

- Different polishing films are required for LC polishing (see table on page 85 and films on page 93)

| 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

### QC Quick Cure Adhesive

#### Product Facts

- One-part adhesive eliminates the hassle and mess of mixing
- Applies easily and cures in minutes without heat or UV light
- Works with standard multimode epoxy-style connectors without performance degradation
- Faster procedure for time-saving productivity and lower installed costs
- Not for use with singlemode terminations



| Tube Size | Typical Connector Terminations Per Tube* | Part Number |
|-----------|------------------------------------------|-------------|
| 3 grams   | 100                                      | 492508-1    |

\*Your individual termination techniques will affect the number of terminations per tube.

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

## Tooling (Continued)

### Epoxy Applicator Syringe Part Number 501473-3

#### Product Facts

- 3 cc capacity



### Epoxy Curing Oven

#### Product Facts

- Reduces time required to cure epoxy
- Provides a uniform, controlled curing environment
- Used for all epoxy/polish connectors
- Comes equipped to cure up to four Duplex Connectors and 12 Simplex Connectors at once
  - Optional blocks reconfigure to 8 Duplex or 24 Simplex Connectors
- Variable temperature control (60°C to 125°C)
- Includes thermometer and cable support bracket
- Two voltage options
- Curing sleeves on page 98



| Description                                                                         | Part Number |
|-------------------------------------------------------------------------------------|-------------|
| 110 VAC                                                                             | 502134-1    |
| 220 VAC                                                                             | 502134-2    |
| Adapter Block for 8 Duplex Connectors                                               | 502222-1    |
| Adapter Block for 24 Single Connectors                                              | 502129-1    |
| Block Assembly for 1.6, 2.0 & 2.4 mm SC and FC (metal crimp body) and LC Connectors | 1457528-1   |

### Polishing Films

#### Product Facts

- Used to install LIGHTCRIMP and epoxy/polish connectors

| Description                          | Part Number |              |               |          |          |          |                |                        |
|--------------------------------------|-------------|--------------|---------------|----------|----------|----------|----------------|------------------------|
|                                      | FSMA        | Multimode ST | Singlemode ST | FC       | FSD/RSD  | SC       | LIGHTCRIMP XTC | LC                     |
| <b>Hand Polishing Film:</b>          |             |              |               |          |          |          |                |                        |
| 15 µm <sup>4</sup>                   | —           | —            | —             | —        | —        | —        | 228433-9       | —                      |
| 9 mm                                 | —           | —            | —             | —        | —        | —        | —              | 1374484-1 <sup>3</sup> |
| 5 µm <sup>4</sup>                    | 228433-8    | 228433-8     | 228433-8      | 228433-8 | 228433-8 | 228433-8 | 228433-8       | 228433-8               |
| 1 µm <sup>4</sup>                    | 228433-7    | 228433-7     | —             | —        | 228433-7 | —        | 228433-7       | —                      |
| <b>Fine Diamond Film<sup>1</sup></b> |             |              |               |          |          |          |                |                        |
| 0.3 µm <sup>4</sup>                  | 228433-5    | 228433-5     | 228433-5      | 228433-5 | 228433-5 | 228433-5 | 228433-5       | 228433-5               |
| <b>Final Polish Film<sup>1</sup></b> |             |              |               |          |          |          |                |                        |
| —                                    | —           | —            | 502748-2      | 502748-2 | —        | 502748-2 | —              | —                      |
| <b>Consumables Kit<sup>2</sup></b>   |             |              |               |          |          |          |                |                        |
| —                                    | 502306-1    | 502306-1     | 502306-2      | 502306-2 | 502306-1 | 502306-2 | —              | 502306-4               |

<sup>1</sup> Pack of 5.

<sup>2</sup> Contains all consumable supplies for at least 100 connectors.

<sup>3</sup> Pack of 15.

<sup>4</sup> Pack of 100.

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

## Tooling (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 Tyco Electronics 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

#### 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]

| 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   |

**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
  - 500um 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
  - MPX
  - MPX APC



Tyco Electronics' hand held microscope incorporates high quality glass optics and dual illumination lighting for unsurpassed 200X magnification. With a 500  $\mu$ m 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 Tyco Electronics 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



The OPTIPOP R dry cloth cassette cleaners offered by Tyco Electronics 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 plug 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   |

OPTIPOP is a trademark of  
NTT Advanced Technology Corporation.

**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



Card Cleaner Refill (Ten per Pack)  
Part Number 1918811-1

The compact OPTIPOP C dry cloth card cleaner offered by Tyco Electronics 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, 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.]

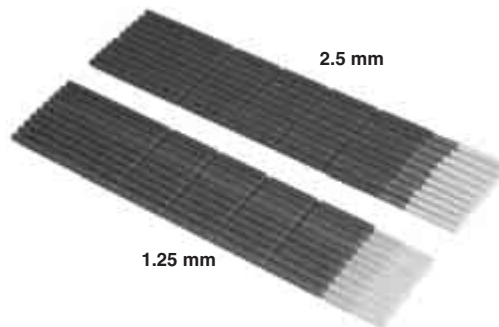
| Description                        | Part Number |
|------------------------------------|-------------|
| Fiber connector card cleaner       | 1918810-1   |
| Card cleaner refill (ten per pack) | 1918811-1   |

OPTIPOP is a trademark of  
NTT Advanced Technology Corporation.

### 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



The NEOCLEAN dry cloth stick cleaners offered by Tyco Electronics 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, 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.]



NEOCLEAN is a trademark of  
NTT Advanced Technology Corporation.

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



## Tooling (Continued)

### Hand Tools



#### PRO-CRIMPER III Hand Tool

Instruction Sheet 408-4020

<http://www.tycoelectronics.com/documents>

#### PRO-CRIMPER III Hand Tool

| Connector                               | Cable Jacket Diameter (mm) | Part Number          |                |                   |
|-----------------------------------------|----------------------------|----------------------|----------------|-------------------|
|                                         |                            | Hand Tool w/ Die Set | Hand Tool Only | Die Set Only      |
| FSMA                                    | 3.0                        | 58551-1              | 58532-1        | 58552-1 (hex die) |
| ST Ceramic                              | 3.0                        | 58433-4              | 58532-1        | 58424-1           |
| ST Stainless Steel                      | 3.0                        | 58433-4              | 58532-1        | 58424-1           |
| ST Polymer Composite                    | 3.0                        | 58433-4              | 58532-1        | 58424-1           |
| ST Ceramic Used with Loose Tube         | 3.8                        | —                    | 58532-1        | 503890-1          |
| ST Stainless Steel (504XXX series only) | 3.0                        | 58551-1              | 58532-1        | 58552-1           |
| SC/FC (Polymer crimp body)              | 3.0                        | 503911-1             | 58532-1        | 503910-1          |
|                                         | 2.4 & 3.0                  | 492026-1             | 58532-1        | 492025-1          |
| SC, FC (Metal crimp body)               | 1.6-2.0, 2.4               | 1588176-1            | 58532-1        | 1588175-1         |
| SC/FC (Metal crimp body)                | 3.0                        | —                    | 58532-1        | 492131-1          |
| FSD - Ceramic                           | DUALAN & LDD               | 58519-1              | 58532-1        | 58510-1           |
| FSD - Polymer                           | DUALAN & LDD               | 58519-1              | 58532-1        | 58510-1           |
| FSD/MC - Ceramic                        | DUALAN & LDD               | 58519-1              | 58532-1        | 58510-1           |
| FSD Breakout Kit                        | DUALAN & Protection Kit    | 58519-1              | 58532-1        | 58510-1           |
| LIGHTCRIMP Plus and LIGHTCRIMP ST       | 3.0                        | 492623-1             | 58532-2        | 492622-1          |
| LIGHTCRIMP Plus and LIGHTCRIMP SC       | 3.0                        | 492782-1             | 58532-2        | 492783-1          |
| LIGHTCRIMP Plus LC                      | 1.6 – 2.0                  | 1754137-1            | 58532-2        | 1754136-1         |
| MT-RJ Plug                              | 1.8                        | 1278632-1            | 58532-1        | 1278627-1         |
| LC                                      | 3.0, 2-4, 1.6-2.0          | 1588176-1            | 58532-1        | 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)<br>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)<br>1918196-1 (Black Polymer) | 1457630-X <sup>1</sup> (12 pcs.) | 1588756-1      |
| FSD - Ceramic & Polymer  | DUALAN & LDD               | 501795-1*                                      | 502023-1**                       | 501818-1       |

\* Curing Assembly Kit with polishing bushing.

\*\* Curing Assembly Kit without polishing bushing.

<sup>1</sup> -1 LC 900 µm

-2 LC jacketed cable

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

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#### LIGHTRAY OFX Optical Fiber Circuit

*(See Fiber Management, Packages Solutions, Sub Systems, and Laser Process Section 3, pages 155, 156)*

## Active Optical Cable Assemblies



### InfiniBand 4x DDR Active Optical Cable Assemblies

#### Product Facts

- 4 transmit and 4 receive channels at up to 5 Gb/s per channel)
- Industry standard (SFF-8470) electrical connector (aka InfiniBand 4x, CX-4)
- 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
- <1 Watt power consumption
- Small diameter cable (2 mm)
- Light weight
- Tight bend radius



Tyco Electronics' active optical cables use state-of-the-art technology to provide cost effective high data throughput 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 850nm VCSELS, it can be operated from 2.5 Gb/s to 5 Gb/s per channel. At 5 Gb/s this provides aggregate full duplex throughput of 20 Gb/s. They are available in lengths up to 100 meters using 50 micron MM fiber<sup>1</sup>. The OEO circuitry is designed for use with 8B/10B encoded data streams, such as InfiniBand, Fibre Channel, and XAUI.

3.3 Volt power is supplied through a pin (G8) dedicated for this purpose as described in InfiniBand Specification Version 1.2.1. Pin G7 is the voltage sense pin and is tied internally to ground through a 5K ohm resistor

<sup>1</sup> Short lengths use standard multi-mode fiber, longer lengths use laser optimized (OM3) fiber

#### Applications

- High Performance Computing Clusters
- Supercomputers
- High end servers
- Mass storage
- Metro network switch/cross connect
- High end carrier class routers
- DDR InfiniBand
- Other 2.5–5.0 Gb/s Applications (e.g. 10 Gb Fibre Channel or 10 Gig Ethernet XAUI on ports providing InfiniBand pinout 3.3 V power

#### Electrical/Optical

- 20 Gb/s bidirectional — 40 Gb/s offered in future
- Compatible with InfiniBand SDR and DDR
- Power consumption per end 1 watt

#### Mechanical/Environmental

- Up to 200 meters
- 25 mm bend radius
- Operating temperature 0°C to 60°C
- Storage Temperature -25°C to 70°C
- 4 channels each direction
- FCC Class B

#### Materials

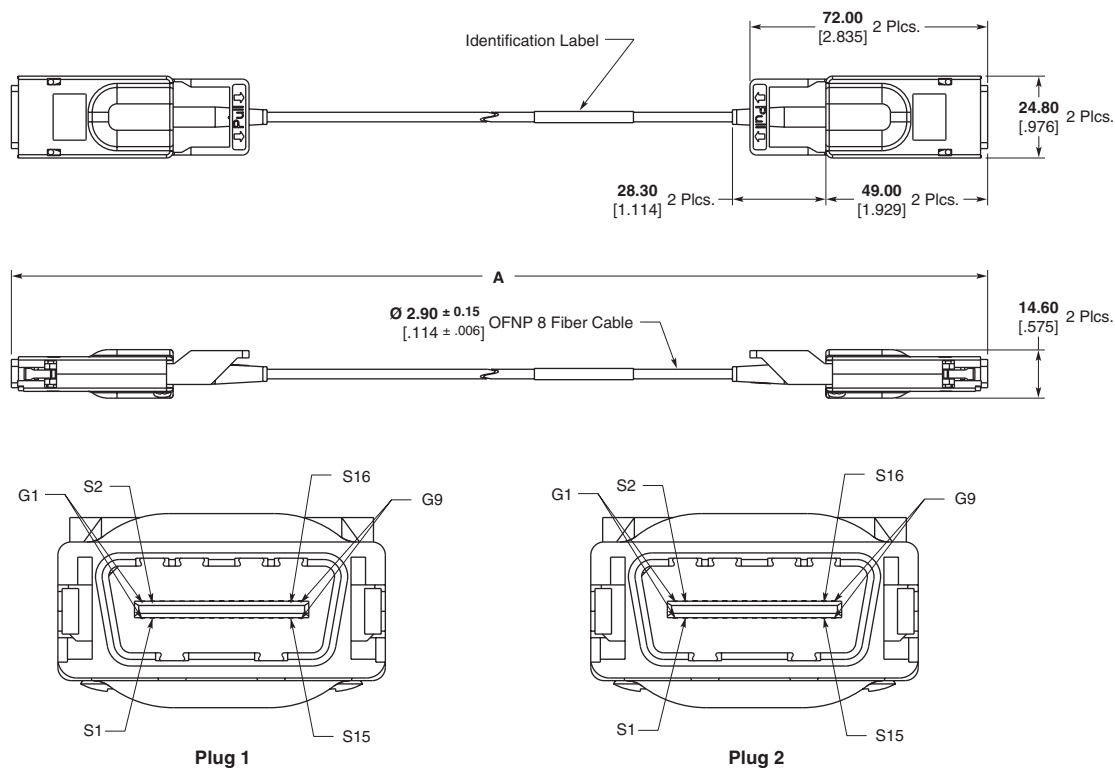
- OFNR/CSA-FT-6 (plenum) cable
- OFN-LS (LSZH rated) cable

#### Standards

- InfiniBand SDR and DDR

INFINIBAND is a trademark of the InfiniBand Trade Association.

## Active Optical Cable Assemblies (Continued)



| Part Number | Length (meters) | Style                               |
|-------------|-----------------|-------------------------------------|
| 1985427-1   | 3               | Standard                            |
| 1985427-2   | 5               |                                     |
| 1985427-3   | 10              |                                     |
| 1985427-4   | 20              |                                     |
| 1985427-5   | 30              |                                     |
| 1985427-6   | 40              |                                     |
| 1985427-7   | 50              |                                     |
| 1985427-8   | 100             |                                     |
| 1984462-1   | 3               | Low Smoke<br>Zero Halogen<br>(LSZH) |
| 1984462-2   | 5               |                                     |
| 1984462-3   | 10              |                                     |
| 1984462-4   | 20              |                                     |
| 1984462-5   | 30              |                                     |
| 1984462-6   | 40              |                                     |
| 1984462-7   | 50              |                                     |
| 1984462-8   | 100             |                                     |

**Note:** Longer lengths available upon request.

## LC Cable Assemblies

### Product Facts

- For high performance applications/high density
- 125  $\mu$ m Ceramic Ferrule Technology
- Small size — 1/2 size of standard SC and FC products
- Singlemode and multimode
- Tuned singlemode assemblies
- High performance small size cable
  - 900  $\mu$ m buffered fiber assemblies
  - 2.0 mm cable assemblies
- Hybrid assemblies available with all standard connectors
- Hybrid SC's and FC's terminated to 2.0 mm cable and 900  $\mu$ m buffered fiber
- Factory terminated/factory tested



LC Cable Assembly

### Performance Characteristics

#### Insertion Loss —

Singlemode — .25 dB max.; < .1 dB typ.

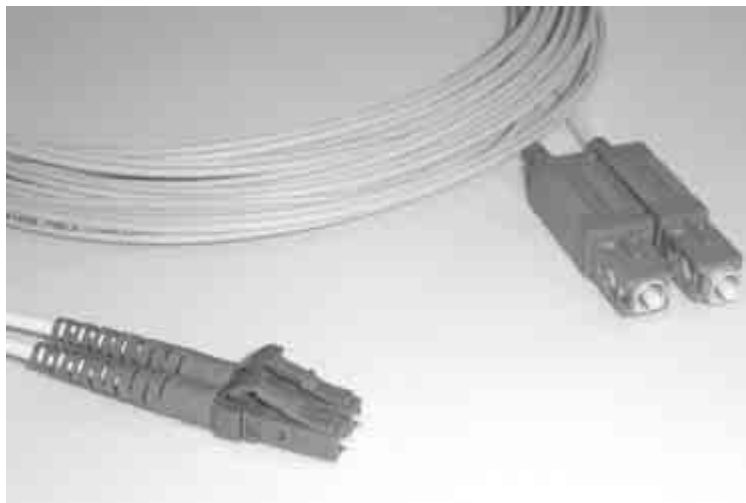
Multimode — .1 dB typ.;

.1 dB typ.  $\sigma$

#### Return Loss —

Singlemode — 55 dB; PC endface

Multimode — 20 dB

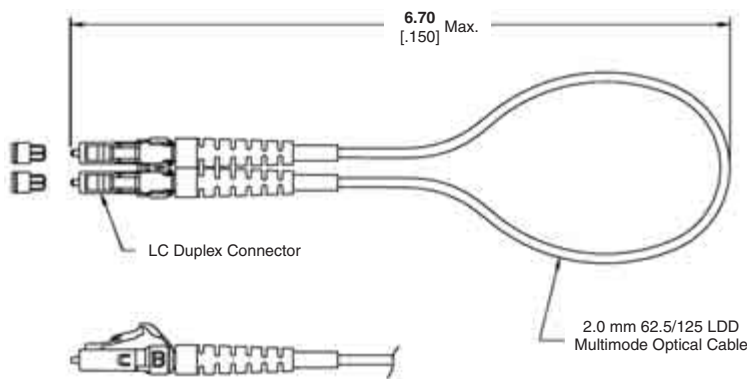


Hybrid LC-SC Cable Assembly

## LC Cable Assemblies (Continued)

| Description                                           |                              | Cable Type                   | Part Numbers/Lengths (m) |           |           |           |           |             |
|-------------------------------------------------------|------------------------------|------------------------------|--------------------------|-----------|-----------|-----------|-----------|-------------|
|                                                       |                              |                              | 1                        | 2         | 3         | 4         | 5         | 10          |
| Simplex                                               |                              |                              |                          |           |           |           |           |             |
| Singlemode                                            | LC to LC                     | 900 micron                   | 6374518-1                | 6374518-2 | 6374518-3 | 6374518-4 | 6374518-5 | 1-6374518-0 |
|                                                       |                              | 2.0 mm Jacketed Riser        | 6374110-1                | 6374110-2 | 6374110-3 | 6374110-4 | 6374110-5 | 1-6374110-0 |
|                                                       | LC to SC                     | 900 micron                   | 6374610-1                | 6374610-2 | 6374610-3 | 6374610-4 | 6374610-5 | 1-6374610-0 |
|                                                       |                              | 2.0 mm Jacketed Riser        | 6374611-1                | 6374611-2 | 6374611-3 | 6374611-4 | 6374611-5 | 1-6374611-0 |
| 50/125 μm Multimode                                   | LC to LC                     | 2.0 mm Jacketed Riser        | 6374656-1                | 6374656-2 | 6374656-3 | 6374656-4 | 6374656-5 | 1-6374656-0 |
|                                                       | LC to SC                     | 2.0 mm Jacketed Riser        | 6374612-1                | 6374612-2 | 6374612-3 | 6374612-4 | 6374612-5 | 1-6374612-0 |
| 62.5/125 μm Multimode                                 | LC to LC                     | 900 micron                   | 6374108-1                | 6374108-2 | 6374108-3 | 6374108-4 | 6374108-5 | 1-6374108-0 |
|                                                       |                              | 2.0 mm Jacketed Riser        | 6374109-1                | 6374109-2 | 6374109-3 | 6374109-4 | 6374109-5 | 1-6374109-0 |
|                                                       | LC to SC                     | 2.0 mm Jacketed Riser        | 6374614-1                | 6374614-2 | 6374614-3 | 6374614-4 | 6374614-5 | 1-6374614-0 |
| Duplex                                                |                              |                              |                          |           |           |           |           |             |
| Singlemode                                            | LC to LC                     | 2.0 mm Jacketed Riser        | 6374657-1                | 6374657-2 | 6374657-3 | 6374657-4 | 6374657-5 | 6374657-6   |
|                                                       | LC Duplex to SC Duplex       | 2.0 mm Jacketed Riser        | 6457072-1                | 6457072-2 | 6457072-3 | 6457072-4 | 6475072-5 | 1-6457072-0 |
|                                                       | 2 LC Simplex to 2 SC Simplex | 2.0 mm Jacketed Riser        | 6374515-1                | 6374515-2 | 6374515-3 | 6374515-4 | 6374515-5 | 1-6374515-0 |
|                                                       | LC to ST                     | 2.0 mm Jacketed Riser        | 6457207-1                | 6457207-2 | 6457207-3 | —         | 6457207-5 | 1-6457207-0 |
|                                                       | LC to MT-RJ                  | 1.8 mm Jacketed Riser        | 6374645-1                | 6374645-2 | 6374645-3 | 6374645-4 | 6374645-5 | 1-6374645-0 |
| 50/125 μm Multimode                                   | LC to LC                     | 2.0 mm Jacketed Riser        | 6374658-1                | 6374658-2 | 6374658-3 | 6374658-4 | 6374658-5 | 1-6374658-2 |
|                                                       | LC to SC                     | 2.0 mm Jacketed Riser        | 6374613-1                | 6374613-2 | 6374613-3 | 6374613-4 | 6374613-5 | 1-6374613-0 |
|                                                       | LC to ST                     | 2.0 mm Jacketed Riser        | 1906822-1                | 1906822-2 | 1906822-3 | 1906822-4 | 1906822-5 | 1-1906822-0 |
|                                                       | LC to MT-RJ                  | 1.8 mm Jacketed Riser        | 6374647-1                | 6374647-2 | 6374647-3 | 6374647-4 | 6374647-5 | 1-6374647-0 |
| Laser Optimized (10 Gig) (850 nm 50/125 μm) Multimode | LC to LC                     | 2.0 mm Aqua Jacketed Riser   | 6828317-1                | 6828317-2 | 6828317-3 | 6828317-4 | 6828317-5 | 1-6828317-0 |
|                                                       |                              | 2.0 mm Aqua Jacketed Riser   | 6828318-1                | 6828318-2 | 6828318-3 | —         | 6828318-5 | 1-6828318-0 |
|                                                       | LC to SC                     | 2.0 mm Orange Jacketed Riser | 6754384-1                | 6754384-2 | 6754384-3 | 6754384-4 | 6754384-5 | 1-6754384-0 |
| 62.5/125 μm Multimode                                 | LC to LC                     | 2.0 mm Jacketed Riser        | 6374659-1                | 6374659-2 | 6374659-3 | 6374659-4 | 6374659-5 | 1-6374659-0 |
|                                                       | LC to SC                     | 2.0 mm Jacketed Riser        | 6374615-1                | 6374615-2 | 6374615-3 | 6374615-4 | 6374615-5 | 1-6374615-0 |
|                                                       | LC to ST                     | 2.0 mm Jacketed Riser        | 6457104-1                | 6457104-2 | 6457104-3 | —         | 6457104-5 | 1-6457104-0 |
|                                                       | LC to MT-RJ                  | 1.8 mm Jacketed Riser        | 6374646-1                | 6374646-2 | 6374646-3 | 6374646-4 | 6374646-5 | 1-6374646-0 |

### LC Loopbacks



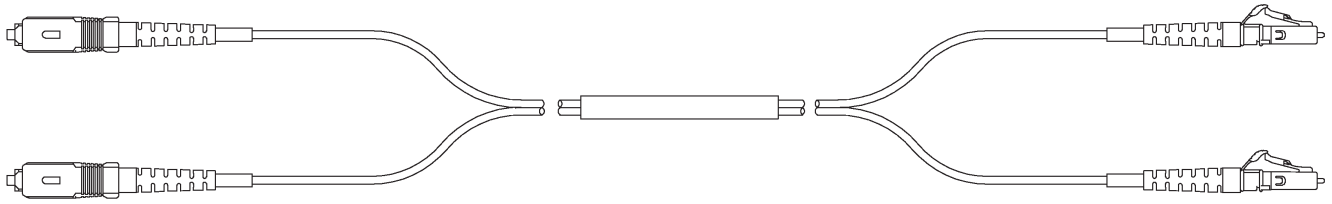
| Description |                            | Part Number |
|-------------|----------------------------|-------------|
| LC Loopback | Singlemode                 | 6457047-1   |
|             | Multimode 62.5/125 $\mu$ m | 6457048-1   |
|             | Multimode 50/125 $\mu$ m   | 6457049-1   |

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



## LC Cable Assemblies (Continued)

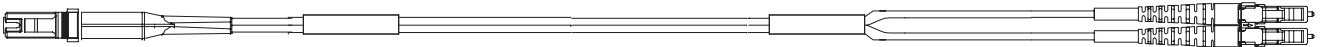
### 2.0 mm ZIPCORD, Singlemode LC Simplex to SC Simplex



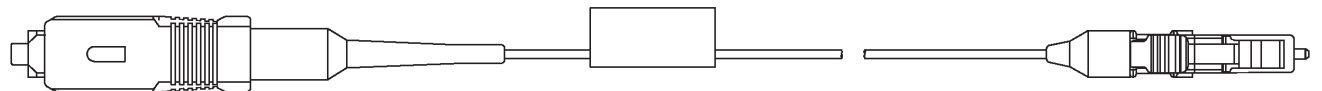
### LC to Simplex SC 2.0 mm cable



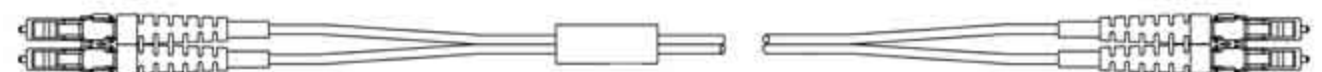
### LC Duplex to MT-RJ



### LC Simplex to SC on 900 µm buffered fiber



### LC Duplex to LC Duplex



## LC SECURE Cable Assemblies

### Product Facts

- LC SECURE Plugs mate with like-colored LC SECURE adapters only (see page 10)
- Ten exclusive connector variants
- Color coded assemblies match MT-RJ and MPO SECURE offerings (see pages 107 and 108)
- Distinct keyway geometry on plug nose and color coding assures identifiable key-type
- Black boots for 50/125 standard, beige for 62.5/125 multimode, blue for singlemode, and aqua for 50/125 Laser Optimized (10 Gig)
- Standard cable is 2 mm zipcord
- Standard jacket color is yellow for singlemode, orange for multimode, and aqua for Laser Optimized (10 Gig) multimode (850 nm 50/125  $\mu\text{m}$ )
- Other configurations are available



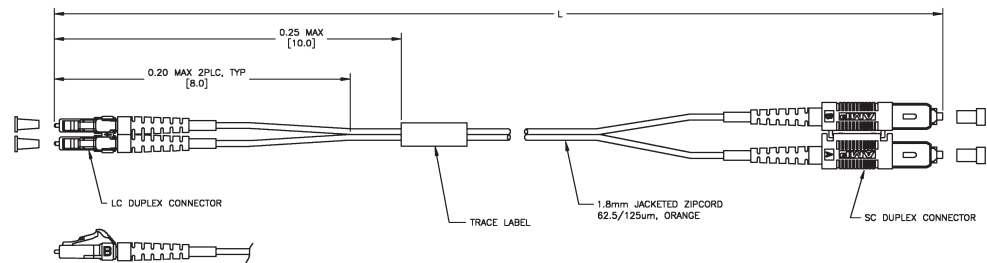
| LC SECURE Color | Fiber Type                                                        | Part Numbers |           |           |           |
|-----------------|-------------------------------------------------------------------|--------------|-----------|-----------|-----------|
|                 |                                                                   | MT-RJ        | SC        | LC        | ST        |
| Red             | 50/125 $\mu\text{m}$ Multimode                                    | 1907114-X    | 1905992-X | 1906012-X | 1906002-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907134-X    | 1906070-X | 1906090-X | 1905079-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907124-X    | 1828872-X | 1906051-X | 1906080-X |
|                 | Singlemode                                                        | 1906904-X    | 1905089-X | 1905109-X | 1905099-X |
| Yellow          | 50/125 $\mu\text{m}$ Multimode                                    | 1907116-X    | 1905994-X | 1906014-X | 1906004-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907136-X    | 1906072-X | 1906092-X | 1906082-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907126-X    | 1828871-X | 1906053-X | 1906043-X |
|                 | Singlemode                                                        | 1906906-X    | 1905091-X | 1905111-X | 1905101-X |
| Green           | 50/125 $\mu\text{m}$ Multimode                                    | 1907117-X    | 1905995-X | 1906015-X | 1906005-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907137-X    | 1906073-X | 1906093-X | 1906083-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907127-X    | 1828870-X | 1906054-X | 1906044-X |
|                 | Singlemode                                                        | 1906907-X    | 1905092-X | 1905112-X | 1905102-X |
| Blue            | 50/125 $\mu\text{m}$ Multimode                                    | 1907115-X    | 1905993-X | 1906013-X | 1906003-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907135-X    | 1906071-X | 1906091-X | 1906081-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907125-X    | 1828875-X | 1906052-X | 1906042-X |
|                 | Singlemode                                                        | 1906905-X    | 1905090-X | 1905110-X | 1905100-X |
| Orange          | 50/125 $\mu\text{m}$ Multimode                                    | 1907118-X    | 1906996-X | 1906016-X | 1906006-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907138-X    | 1906074-X | 1906094-X | 1906084-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907128-X    | 1906035-X | 1906055-X | 1906045-X |
|                 | Singlemode                                                        | 1906908-X    | 1905093-X | 1905113-X | 1905103-X |
| Brown           | 50/125 $\mu\text{m}$ Multimode                                    | 1907121-X    | 1906999-X | 1906019-X | 1906009-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907141-X    | 1906077-X | 1906097-X | 1906087-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907131-X    | 1906038-X | 1906058-X | 1906048-X |
|                 | Singlemode                                                        | 1906911-X    | 1905096-X | 1905116-X | 1905106-X |
| Slate           | 50/125 $\mu\text{m}$ Multimode                                    | 1907123-X    | 1906001-X | 1906021-X | 1906011-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907143-X    | 1906079-X | 1906099-X | 1906089-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907133-X    | 1828283-X | 1906060-X | 1906050-X |
|                 | Singlemode                                                        | 1906913-X    | 1906040-X | 1905118-X | 1905108-X |
| Violet          | 50/125 $\mu\text{m}$ Multimode                                    | 1907120-X    | 1905998-X | 1906018-X | 1906008-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907140-X    | 1906076-X | 1906096-X | 1906086-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907130-X    | 1906037-X | 1906057-X | 1906047-X |
|                 | Singlemode                                                        | 1906910-X    | 1905095-X | 1905115-X | 1905105-X |
| Rose            | 50/125 $\mu\text{m}$ Multimode                                    | 1907119-X    | 1905997-X | 1906017-X | 1906007-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907139-X    | 1906075-X | 1906095-X | 1906085-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907129-X    | 1906036-X | 1906056-X | 1906046-X |
|                 | Singlemode                                                        | 1906909-X    | 1905094-X | 1905114-X | 1905104-X |
| Aqua            | 50/125 $\mu\text{m}$ Multimode                                    | 1907122-X    | 1906000-X | 1906020-X | 1906010-X |
|                 | Laser Optimized (10 Gig) (850 nm 50/125 $\mu\text{m}$ ) Multimode | 1907142-X    | 1906078-X | 1906098-X | 1906088-X |
|                 | 62.5/125 $\mu\text{m}$ Multimode                                  | 1907132-X    | 1906039-X | 1906059-X | 1906049-X |
|                 | Singlemode                                                        | 1906912-X    | 1905097-X | 1905117-X | 1905107-X |

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

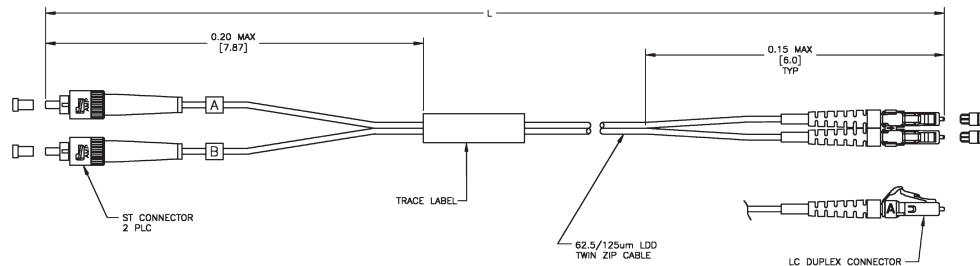
**Note:** X denotes length in meters: -1 = 1, -2 = 2, -3 = 3, -5 = 5, 1 -0 = 10

## LC SECURE Cable Assemblies (Continued)

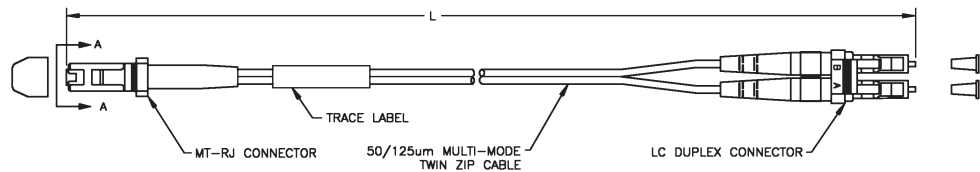
### LC SECURE Duplex to SC Duplex



### LC SECURE Duplex to Dual ST



### LC SECURE Duplex to MT-RJ



## MT-RJ SECURE Cable Assemblies



### Product Facts

- MT-RJ SECURE plugs only mate with same-colored MT-RJ SECURE jacks
- MT-RJ SECURE Cable Assemblies have one MT-RJ SECURE plug on one end and a standard MT-RJ plug on the other end; other constructions are available (Contact your local Tyco Electronics sales representative for part numbers)
- Each assembly is a duplex (two-fiber) assembly
- Cable assemblies are riser-rated, other constructions are available (Contact your local Tyco Electronics sales representative for details)
- SC and LC connectors feature ceramic ferrules
- Jacket of cable assemblies comes in orange for multimode and yellow for singlemode, other color options are available

### MT-RJ SECURE Cable Assemblies and Patch Cord Part Numbers

| MT-RJ SECURE Color | Fiber Type                                               | Part Numbers |           |           |           |
|--------------------|----------------------------------------------------------|--------------|-----------|-----------|-----------|
|                    |                                                          | MT-RJ        | SC        | LC        | ST        |
| Red                | 50/125 µm Multimode                                      | 6278873-X    | 6278126-X | 1907396-X | 6278881-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6754406-X    | 6754410-X | 1918667-X | 1918701-X |
|                    | 62.5/125 µm Multimode                                    | 6278890-X    | 6278894-X | 6828104-X | 6278898-X |
|                    | Singlemode                                               | 6918733-X    | 6918734-X | 1918668-X | 1918702-X |
| Yellow             | 50/125 µm Multimode                                      | 6278874-X    | 6278878-X | 1918669-X | 6278882-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6754407-X    | 6754411-X | 1918670-X | 1918703-X |
|                    | 62.5/125 µm Multimode                                    | 6278891-X    | 6278895-X | 6828923-X | 6278899-X |
|                    | Singlemode                                               | 6918735-X    | 6918736-X | 1918671-X | 1918704-X |
| Green              | 50/125 µm Multimode                                      | 6278875-X    | 6278879-X | 1907398-X | 6278883-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6754408-X    | 6754412-X | 1918672-X | 1918705-X |
|                    | 62.5/125 µm Multimode                                    | 6278892-X    | 6278896-X | 1918673-X | 6278900-X |
|                    | Singlemode                                               | 6918737-X    | 6918738-X | 1918674-X | 1918706-X |
| Blue               | 50/125 µm Multimode                                      | 6278876-X    | 6278880-X | 1907394-X | 6278884-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6754409-X    | 6754413-X | 1918675-X | 1918707-X |
|                    | 62.5/125 µm Multimode                                    | 6278893-X    | 6278897-X | 1907395-X | 6278901-X |
|                    | Singlemode                                               | 6918739-X    | 6918740-X | 1918676-X | 1918708-X |
| Orange             | 50/125 µm Multimode                                      | 6828263-X    | 6828269-X | 1918677-X | 1918709-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6828251-X    | 6828257-X | 1918678-X | 1918710-X |
|                    | 62.5/125 µm Multimode                                    | 6828275-X    | 6828281-X | 1918679-X | 1918711-X |
|                    | Singlemode                                               | 6828239-X    | 6828245-X | 1918680-X | 1918712-X |
| Brown              | 50/125 µm Multimode                                      | 6828264-X    | 6828270-X | 1918681-X | 1918713-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6828252-X    | 6828258-X | 1918682-X | 1918714-X |
|                    | 62.5/125 µm Multimode                                    | 6828276-X    | 6828282-X | 1918683-X | 1918715-X |
|                    | Singlemode                                               | 6828240-X    | 6828246-X | 1918684-X | 1918716-X |
| Slate              | 50/125 µm Multimode                                      | 6828265-X    | 6828271-X | 1918685-X | 1918717-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6828253-X    | 6828259-X | 1918686-X | 1918718-X |
|                    | 62.5/125 µm Multimode                                    | 6828277-X    | 6828283-X | 1918687-X | 1918719-X |
|                    | Singlemode                                               | 6828241-X    | 6828247-X | 1918688-X | 1918720-X |
| Violet             | 50/125 µm Multimode                                      | 6828266-X    | 6828272-X | 1918689-X | 1918721-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6828254-X    | 6828260-X | 1918690-X | 1918722-X |
|                    | 62.5/125 µm Multimode                                    | 6828278-X    | 6828284-X | 1918691-X | 1918723-X |
|                    | Singlemode                                               | 6828242-X    | 6828248-X | 1918692-X | 1918724-X |
| Rose               | 50/125 µm Multimode                                      | 6828267-X    | 6828273-X | 1918693-X | 1918725-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6828255-X    | 6828261-X | 1918694-X | 1918726-X |
|                    | 62.5/125 µm Multimode                                    | 6828279-X    | 6828285-X | 1918695-X | 1918727-X |
|                    | Singlemode                                               | 6828243-X    | 6828249-X | 1918696-X | 1918728-X |
| Aqua               | 50/125 µm Multimode                                      | 6828268-X    | 6828274-X | 1918697-X | 1918729-X |
|                    | Laser Optimized (10 Gig) (850 nm LO 50/125 µm) Multimode | 6828256-X    | 6828262-X | 1918698-X | 1918730-X |
|                    | 62.5/125 µm Multimode                                    | 6828280-X    | 6828286-X | 1918699-X | 1918731-X |
|                    | Singlemode                                               | 6828244-X    | 6828250-X | 1918700-X | 1918732-X |

**Note:** X denotes length in meters: -1 = 1, -2 = 2, -3 = 3, -5 = 5, 1 -0 = 10

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

## MPO SECURE Cable Assemblies



### Product Facts

- For use with MT-RJ SECURE System MPO Cassettes on page 12 only
- Feature colored/keyed MPO connectors which only mate with like colored MPO couplers to limit access to secure networks
- 12-Fibers per MPO connector
- Pulling socks protect connectors during installation
- Available in 50  $\mu$ m, Laser Optimized (10 Gig), and 62.5  $\mu$ m Multimode as listed



### MPO SECURE Trunk Cable Assemblies

| MPO SECURE Color | Fiber Type                                                    | Part Numbers |           |
|------------------|---------------------------------------------------------------|--------------|-----------|
|                  |                                                               | 12 Fiber     | 24 Fiber  |
| Red              | 50/125 $\mu$ m Multimode                                      | 6754273-X    | 6754281-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 6754420-X    | 6754424-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 6754269-X    | 6754277-X |
| Yellow           | 50/125 $\mu$ m Multimode                                      | 6754276-X    | 6754284-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 6754421-X    | 6754425-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 6754272-X    | 6754280-X |
| Green            | 50/125 $\mu$ m Multimode                                      | 6754274-X    | 6754282-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 6754422-X    | 6754426-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 6754270-X    | 6754278-X |
| Blue             | 50/125 $\mu$ m Multimode                                      | 6754275-X    | 6754283-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 6754423-X    | 6754427-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 6754271-X    | 6754279-X |
| Rose             | 50/125 $\mu$ m Multimode                                      | 1918741-X    | 1918759-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 1918753-X    | 1918771-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 1918747-X    | 1918765-X |
| Aqua             | 50/125 $\mu$ m Multimode                                      | 1918742-X    | 1918760-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 1918754-X    | 1918772-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 1918748-X    | 1918766-X |
| Brown            | 50/125 $\mu$ m Multimode                                      | 1918743-X    | 1918761-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 1918755-X    | 1918773-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 1918749-X    | 1918767-X |
| Violet           | 50/125 $\mu$ m Multimode                                      | 1918744-X    | 1918762-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 1918756-X    | 1918774-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 1918750-X    | 1918768-X |
| Orange           | 50/125 $\mu$ m Multimode                                      | 1918745-X    | 1918763-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 1918758-X    | 1918775-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 1918751-X    | 1918769-X |
| Slate            | 50/125 $\mu$ m Multimode                                      | 1918746-X    | 1918764-X |
|                  | Laser Optimized (10 Gig) (850 nm LO 50/125 $\mu$ m) Multimode | 1918759-X    | 1918776-X |
|                  | 62.5/125 $\mu$ m Multimode                                    | 1918752-X    | 1918770-X |

**Note:** X denotes length in feet: -1 = 10, -2 = 20, -3 = 30, -4 = 40, -5 = 50, -6 = 60, -7 = 70, -8 = 80, -9 = 90, 1- -0 = 100, 1- -1 = 110, 1- -2 = 120, 1- -3 = 130, 1- -4 = 140, 1- -5 = 150, 1- -6 = 160, 1- -7 = 170, 1- -8 = 180, 1- -9 = 190, 2- -0 = 200, 2- -1 = 210, 2- -2 = 220, 2- -3 = 230, 2- -4 = 240, 2- -5 = 250, 2- -6 = 260, 2- -7 = 270, 2- -8 = 280, 2- -9 = 290, 3- -0 = 300.

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

## MU High Density Cable Assemblies

### Product Facts

- Can be used with MU backplane connectors (Z-PACK 2 mm HM type L connector housings) for complete backplane or board to board solution
- 1.25 mm ferrule design
- Polarized to ensure precise insertion
- High density (up to 8 lines per module)
- “Push Pull” (SC style) latching mechanism
- Fully compliant with:
  - 1.25 mm ferrule design IEC60917 and IEC 61076-4-101
  - IEC 60874-1
  - CECC 86 305 801 (MU-APC)
  - JIS C-5970
  - I-ETS 300 671
  - IEC 61300

### Performance Characteristics

#### Insertion Loss —

Singlemode: 0.3 dB Max  
<0.1 dB Typical  
Multimode: 0.1 dB Typical

#### Return Loss —

Singlemode: 55 dB - PC endface  
Typical  
>65 dB - APC endface  
Multimode: 20 dB



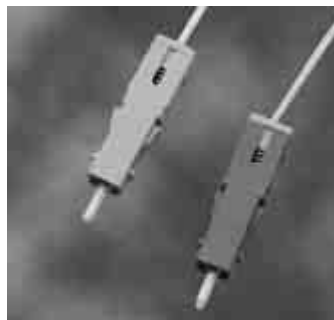
### MU Cable Assemblies

| Description                                | Part Numbers |           |           |
|--------------------------------------------|--------------|-----------|-----------|
|                                            | 1 Meter      | 2 Meters  | 3 Meters  |
| LC to MU Board Plug Singlemode 900 $\mu$ m | 6457327-1    | 6457327-2 | 6457327-3 |
| LC to MU 62.5/125 900 $\mu$ m              | 6457328-1    | —         | —         |
| MU to SC Singlemode 900 $\mu$ m            | 6457329-1    | 6457329-2 | 6457329-3 |
| MU to SC 62.5/125 900 $\mu$ m              | 6457330-1    | 6457330-2 | 6457330-3 |
| MU to MU Singlemode Buffered               | 6457482-1    | 6457482-2 | 6457482-3 |
| MU to MU Singlemode 2 mm                   | 6457523-1    | 6457523-2 | 6457523-3 |
| MU to SC Singlemode 2.0 mm                 | 6588145-1    | 6588145-2 | —         |

Other lengths available upon request.

### MU Boardplug Pigtails with Riser Cable

MU boardplug pigtails are designed for use with female Z-PACK 2 mm HM housings on the daughter-card. Available with 900  $\mu$ m buffered fiber and in lengths of 1 meter as standard, custom lengths are available upon request.



| Fiber Size ( $\mu$ m) | Endface | Cable Type          | Length (meter) | Part Number |
|-----------------------|---------|---------------------|----------------|-------------|
| 9/125                 | PC      | 900 $\mu$ m pigtail | 1              | 5106751-1   |

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



## SC & FC Singlemode Cable Assemblies

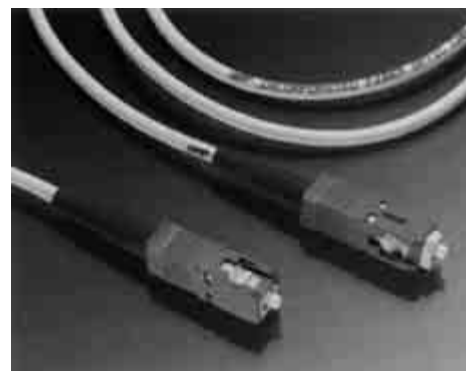
### SC-SC Style Cable Assemblies

#### Product Facts

- Compliant with:
  - JIS C-5973
  - ANSI X3T11 Fibre Channel
  - TIA 568
- Insertion Loss:
  - 0.2 dB typical
  - 0.5 dB maximum



SC/APC Connectors



SC/UPC to SC/UPC Cable Assembly

| Description                              | Min.<br>Return<br>Loss | Cable<br>Diameter | Part Numbers |           |           |             |             |
|------------------------------------------|------------------------|-------------------|--------------|-----------|-----------|-------------|-------------|
|                                          |                        |                   | Length (m)   |           |           |             |             |
|                                          |                        |                   | 1            | 3         | 5         | 10          | 15          |
| Single-Fiber Jumpers                     |                        |                   |              |           |           |             |             |
| Simplex SC/APC to SC/APC                 | 65 dB                  | 3.0 mm            | 5492188-1    | 5492188-3 | 5492188-5 | 1-5492188-0 | 1-5492188-5 |
|                                          | 65 dB                  | 2.0 mm            | 6828410-1    | 6828410-3 | 6828410-5 | 1-6828410-0 | 1-6828410-5 |
|                                          | 65 dB                  | 900 μm            | 5504678-1    | 5504678-3 | 5504678-4 | 5504678-5   | —           |
| Simplex SC/UPC to SC/UPC                 | 55 dB                  | 3.0 mm            | 5492015-1    | 5492015-3 | 5492015-4 | 5492015-5   | 5492015-6   |
|                                          | 55 dB                  | 2.0 mm            | 6828887-2    | 6828887-3 | 6828887-5 | 1-6828887-0 | 1-6828887-5 |
|                                          | 55 dB                  | 900 μm            | 5492276-1    | 5492276-3 | 5492276-5 | 1-5492276-0 | —           |
| Simplex SC/UPC to SC/APC                 | 55/65 dB               | 3.0 mm            | 5492191-1    | 5492191-3 | 5492191-5 | 1-5492191-0 | 1-5492191-5 |
| Single-Fiber Pigtails                    |                        |                   |              |           |           |             |             |
| Simplex SC/APC                           | 65 dB                  | 3.0 mm            | 5492193-1    | 5492193-3 | 5492193-5 | 1-5492193-0 | 1-5492193-5 |
|                                          | 65 dB                  | 900 μm            | 1695588-1    | 1695588-3 | 1695588-5 | 1-1695588-0 | 1-1695588-5 |
| Simplex SC/UPC                           | 55 dB                  | 3.0 mm            | 5492081-1    | 5492081-3 | 5492081-5 | 1-5492081-0 | 1-5492081-5 |
|                                          | 55 dB                  | 900 μm            | 5492065-1    | 5492065-3 | 5492065-5 | 1-5492065-0 | 1-5492065-5 |
| Two-Fiber Jumpers — Zipcord              |                        |                   |              |           |           |             |             |
| Duplex SC/APC to Duplex SC/APC           | 55 dB                  | 3.0 mm            | 1754490-1    | 1754490-3 | 1754490-5 | 1-1754490-0 | 1-1754490-5 |
| Duplex SC/UPC to Duplex SC/UPC           | 55 dB                  | 3.0 mm            | 5492019-1    | 5492019-3 | 5492019-4 | 5492019-5   | 5492019-6   |
| (2) Simplex SC/UPC to (2) Simplex SC/UPC | 55 dB                  | 3.0 mm            | 1907362-1    | 1907362-3 | 1907362-5 | 1-1907362-0 | 1-1907362-5 |

All cable OFNR (Riser).

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

## SC & FC Singlemode Cable Assemblies (Continued)

### FC-FC Style Cable Assemblies

#### Product Facts

- Compliant with:
  - JIS C-5970
  - IEC 1754-13-1
  - TIA 504.4 (FOCIS-4)
- Insertion Loss:
  - 0.2 dB typical
  - 0.5 dB maximum



FC/APC Connectors



FC/UPC to FC/UPC Cable Assembly

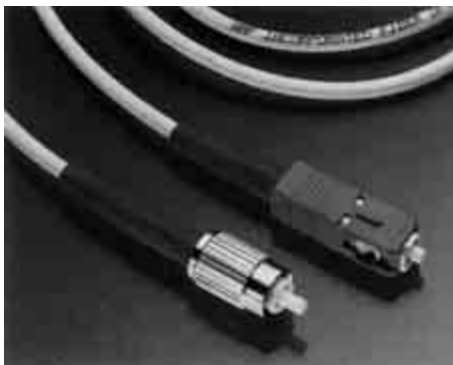
| Description                              | Min.<br>Return<br>Loss | Cable<br>Diameter | Part Numbers |           |           |             |             |
|------------------------------------------|------------------------|-------------------|--------------|-----------|-----------|-------------|-------------|
|                                          |                        |                   | Length (m)   |           |           |             |             |
|                                          |                        |                   | 1            | 3         | 5         | 10          | 15          |
| <b>Single-Fiber Jumpers</b>              |                        |                   |              |           |           |             |             |
| Simplex FC/APC to FC/APC                 | 65 dB                  | 3.0 mm            | 5492187-1    | 5492187-3 | 5492187-5 | 1-5492187-0 | 1-5492187-5 |
|                                          | 65 dB                  | 1.6 mm            | 6754068-1    | 6754068-3 | 6754068-5 | —           | —           |
|                                          | 65 dB                  | 900 µm            | 5503868-1    | 5503868-3 | 5503868-5 | 1-5503868-0 | 1-5503868-5 |
| Simplex FC/UPC to FC/UPC                 | 55 dB                  | 3.0 mm            | 5492014-1    | 5492014-3 | 5492014-4 | 5492014-5   | 5492014-6   |
|                                          | 55 dB                  | 900 µm            | 5492230-1    | 5492230-3 | 5492230-5 | 1-5492230-0 | 1-5492230-5 |
| Simplex FC/UPC to FC/APC                 | 55/65 dB               | 3.0 mm            | 5492190-1    | 5492190-3 | 5492190-5 | 1-5492190-0 | 1-5492190-5 |
| <b>Single-Fiber Pigtails</b>             |                        |                   |              |           |           |             |             |
| Simplex FC/APC                           | 65 dB                  | 3.0 mm            | 5492192-1    | 5492192-3 | 5492192-5 | 1-5492192-0 | 1-5492192-5 |
| Simplex FC/UPC                           | 55 dB                  | 3.0 mm            | 5492194-1    | 5492194-3 | 5492194-5 | 1-5492194-0 | 1-5492194-5 |
|                                          | 55 dB                  | 2.0 mm            | 6278244-1    | 6278244-3 | 6278244-5 | 1-6278244-0 | 1-6278244-5 |
| <b>Two-Fiber Jumpers — Zipcord</b>       |                        |                   |              |           |           |             |             |
| (2) Simplex FC/UPC to (2) Simplex FC/UPC | 55 dB                  | 3.0 mm            | 5492022-1    | 5492022-3 | 5492022-4 | 5492022-5   | 5492022-6   |

All cable OFNR (Riser).

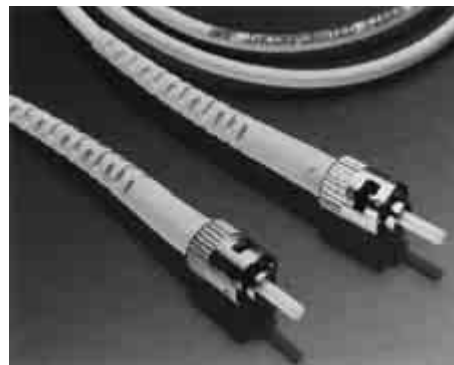
**Note:** All part numbers are RoHS compliant.

## SC & FC Singlemode Cable Assemblies (Continued)

### Hybrid FC/SC and Other Cable Assemblies



FC/UPC to SC/UPC Cable Assembly



ST/UPC Cable Assembly

| Description                       | Min.<br>Return<br>Loss | Part Numbers |           |           |             |             |
|-----------------------------------|------------------------|--------------|-----------|-----------|-------------|-------------|
|                                   |                        | Length (m)   |           |           |             |             |
|                                   |                        | 1            | 3         | 5         | 10          | 15          |
| Stocked Assemblies (FC/SC Hybrid) |                        |              |           |           |             |             |
| Simplex FC/APC to SC/APC          | 65 dB                  | 5492189-1    | 5492189-3 | 5492189-5 | 1-5492189-0 | 1-5492189-5 |
| Simplex FC/APC to SC/UPC          | 65/55 dB               | 6457165-1    | 6457165-3 | 6457165-5 | 1-6457165-0 | 1-6457165-5 |
| Simplex FC/UPC to SC/UPC          | 55 dB                  | 5492017-1    | 5492017-3 | 5492017-4 | 5492017-5   | 5492017-6   |
| Other Simplex Assemblies          |                        |              |           |           |             |             |
| Simplex SC/ST                     | 55 dB                  | 5492016-1    | 5492016-3 | 5492016-4 | 5492016-5   | 5492016-6   |
| Simplex FC/ST                     | 55 dB                  | 5492018-1    | 5492018-3 | 5492018-4 | 5492018-5   | 5492018-6   |
| Simplex ST/ST                     | 55 dB                  | 5502796-1    | 5502796-3 | 5502796-5 | 1-5502796-0 | 1-5502796-1 |
| Other Duplex Assemblies           |                        |              |           |           |             |             |
| SC Duplex/FC                      | 55 dB                  | 5492021-1    | 5492021-3 | 5492021-4 | 5492021-5   | 5492021-6   |
| SC Duplex/ST Style                | 55 dB                  | 5492020-1    | 5492020-3 | 5492020-4 | 5492020-5   | 5492020-6   |
| ST/ST Style                       | 55 dB                  | 5503162-1    | 5503162-3 | 5503162-5 | 1-5503162-0 | 1-5503162-1 |

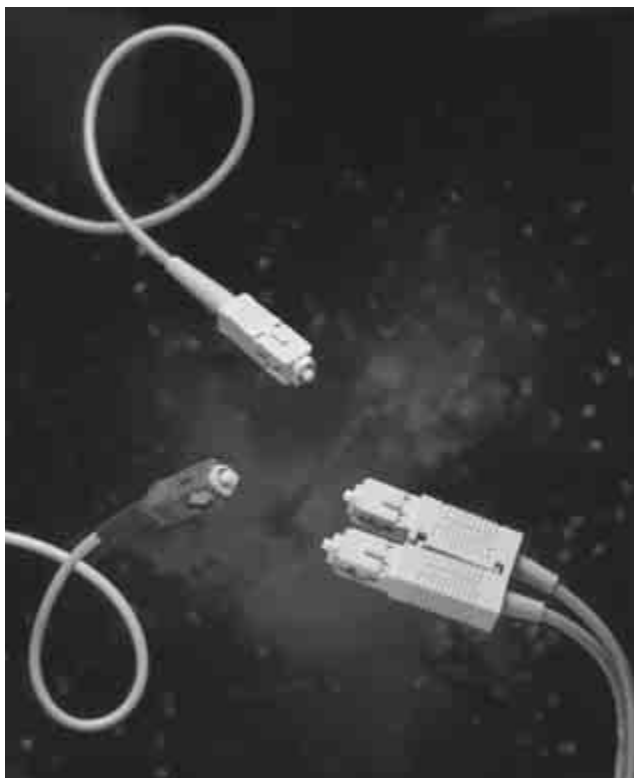
Insertion Loss: 0.5 dB Max., 0.2 dB Typical, when measured against a Reference Lead.  
All cable 3 mm OFNR (Riser).

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

## ST & SC Multimode Cable Assemblies

### ST-Style

| Description                     | Ferrule Type | Part Numbers |           |           |           |             |
|---------------------------------|--------------|--------------|-----------|-----------|-----------|-------------|
|                                 |              | Length (m)   |           |           |           |             |
|                                 |              | 1            | 2         | 3         | 5         | 10          |
| ST-ST, Simplex, 62.5/125, Riser | Ceramic      | 6278789-1    | 6278789-2 | 6278789-3 | 6278789-4 | 6278789-7   |
| ST-ST, Zipcord, 62.5/125, Riser | Ceramic      | 5503995-1    | 5503995-2 | 5503995-3 | 5503995-4 | 5503995-5   |
| ST-ST, Zipcord, 62.5/125, Riser | Polymer      | 5503994-1    | 5503994-2 | 5503994-3 | 5503994-4 | 5503994-5   |
| ST/ST, Zipcord, 50/125, Riser   | Ceramic      | 6278207-1    | 6278207-2 | 6278207-3 | 6278207-5 | 1-6278207-0 |
| ST/ST, Dual, 62.5/125, Plenum   | Ceramic      | 5503959-1    | 5503959-2 | 5503959-3 | 5503959-5 | 1-5503959-0 |



### SC-Style

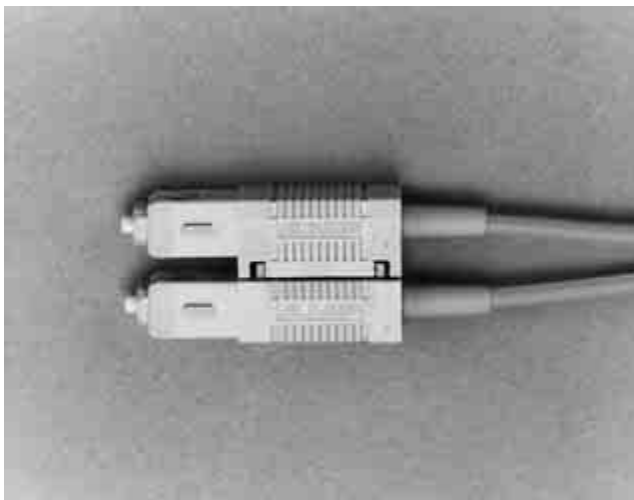
| Description                                     | Ferrule Type | Part Numbers |           |           |           |             |
|-------------------------------------------------|--------------|--------------|-----------|-----------|-----------|-------------|
|                                                 |              | Length (m)   |           |           |           |             |
|                                                 |              | 1            | 2         | 3         | 5         | 10          |
| SC-SC, Simplex, 62.5/125, Riser                 | Ceramic      | 5504970-1    | 5504970-2 | 5504970-3 | 5504970-4 | 5504970-5   |
| SC-SC, Simplex, 50/125, Riser                   | Ceramic      | 5504968-1    | 5504968-2 | 5504968-3 | 5504968-5 | 1-5504968-0 |
| SC-SC, Simplex, Laser Optimized (10 Gig), Riser | Ceramic      | 1907499-1    | 1907499-2 | 1907499-3 | 1907499-5 | 1-1907499-0 |
| SC-SC, Zipcord, 62.5/125, Riser                 | Ceramic      | 5492050-1    | 5492050-2 | 5492050-3 | 5492050-4 | 5492050-5   |
| SC Dup-SC Dup, Zipcord, 62.5/125, Riser         | Ceramic      | 5504971-1    | 5504971-2 | 5504971-3 | 5504971-4 | 5504971-5   |
| SC Dup-SC Dup, Zipcord, 62.5/125, Riser         | Polymer      | 5492249-1    | 5492249-2 | 5492249-3 | 5492249-5 | 1-5492249-0 |
| SC-ST, Simplex, 62.5/125, Riser                 | Ceramic      | 5504972-1    | 5504972-2 | 5504972-3 | 5504972-4 | 5504972-5   |
| SC Dup-ST, Zipcord, 62.5/125, Riser             | Ceramic      | 5504958-1    | 5504958-2 | 5504958-3 | 5504958-4 | 5504958-5   |
| SC Dup-ST, Zipcord, 62.5/125, Riser             | Polymer      | 5492250-1    | 5492250-2 | 5492250-3 | 5492250-5 | 1-5492250-0 |

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

## Fibre Channel Fiber Optic Assemblies

### Product Facts

- Specified connector float assures intermateability with all Fibre Channel compliant devices
- Connector's minimal metal contact helps contain RFI/EMI
- Assemblies available with riser & plenum grade cable
- Custom cable assembly lengths available
- 50/125  $\mu$ m multimode fiber
- 62.5/125  $\mu$ m multimode fiber



| Multimode              | Ferrule Material | Fiber Size | Riser or Plenum | Part Numbers |           |           |           |             |
|------------------------|------------------|------------|-----------------|--------------|-----------|-----------|-----------|-------------|
|                        |                  |            |                 | Length (m)   |           |           |           |             |
|                        |                  |            |                 | 1            | 2         | 3         | 5         | 10          |
| SC Dup/SC Dup Zipcord  | Ceramic          | 50/125     | Plenum          | 6278016-1    | 6278016-2 | 6278016-3 | 6278016-5 | 1-6278016-0 |
| SC Dup/SC Dup, Zipcord | Ceramic          | 62.5/125   | Riser           | 6374040-1    | 6374040-2 | 6374040-3 | 6374040-5 | 1-6374040-0 |
| SC Dup/SC Dup, Zipcord | Ceramic          | 62.5/125   | Plenum          | 6374039-1    | 6374039-2 | 6374039-3 | 6374039-5 | 1-6374039-0 |
| SC Dup-SC Dup, Zipcord | Ceramic          | 50/125     | Riser           | 5504969-1    | 5504969-2 | 5504969-3 | 5504969-4 | 5504969-5   |
| SC Dup-ST, Zipcord     | Ceramic          | 62.5/125   | Riser           | 6374038-1    | 6374038-2 | 6374038-3 | 6374038-5 | 1-6374038-0 |
| SC Dup-ST, Zipcord     | Ceramic          | 50/125     | Riser           | 5492591-1    | 5492591-2 | 5492591-3 | 5492591-5 | 1-5492591-0 |

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

## Low Loss SC & FC Singlemode Cable Assemblies

### Product Facts

- Full physical contact for all connected fibers
- Low back reflection
- One touch connection / disconnection (push-pull type connector)
- Compliant to IEC 61754-4
- Exceeds GR 326 requirements
- Available for all cable types: LSZH, Riser, & Plenum
- Suitable for all wavelengths: 1310, 1550 & 1625 nm

### Applications

- Storage area equipment
- Original Equipment
- Premise installations — Local Area Networks
- Telecommunication Networks
- Multimedia Networks
- SECURE Networks



Tyco Electronics' Low Loss Connectors have an excellent performance of random attenuation <0.1 dB for both PC and APC connectors (GR326 has an objective of <0.2 dB random IL). This allows the system designer to have more interconnections without the need for additional investments in active devices. Line balancing is easier and line stability is easier to achieve.

These Ultra Low Loss Connectors are applicable in Long Haul, Metro and Fiber-to-the-Home applications, as well as DWDM,

CDWM, and Analog Video Transmission.

In Long Haul Networks, more interconnections are possible without necessity for amplification. In Metro Ring applications, the connector allows Telecom vendors to remove the necessity for gain blocks or in-line amplifiers.

Use of the connector in Fiber-to-the-Home environments helps reduce cost, since patching instead of splicing will become more profitable and easier for installers to add subscribers.

Tyco Electronics' Low Loss product range is unique, as it is produced with proprietary processes. It eliminates concerns of attenuation measured against reference or random attenuation.

The connectors produced are of reference quality, since they are made with a standard Zirconia ferrule, which allows them to be used in Outside Plant and Operator Buildings specified in IEC Categories C (controlled), U (uncontrolled), and E (extreme).

### Performance Characteristics

**Typical IL in random connection (dB)\*** — < 0.08

**Max IL in random connection (dB)**  
97% — 0.10

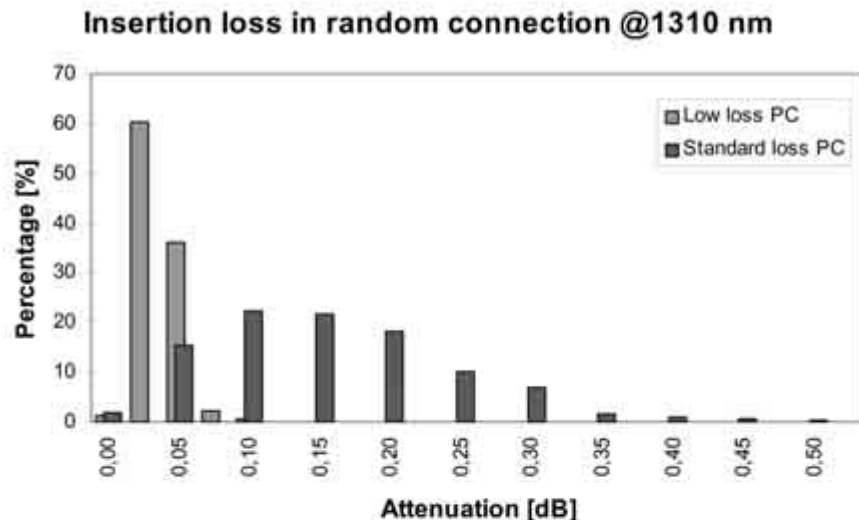
**Max IL in random connection (dB)**  
100% — 0.15

\* **Note:** The above values can only be achieved when low loss connectors are being used at both ends, in combination with a low loss adapter.

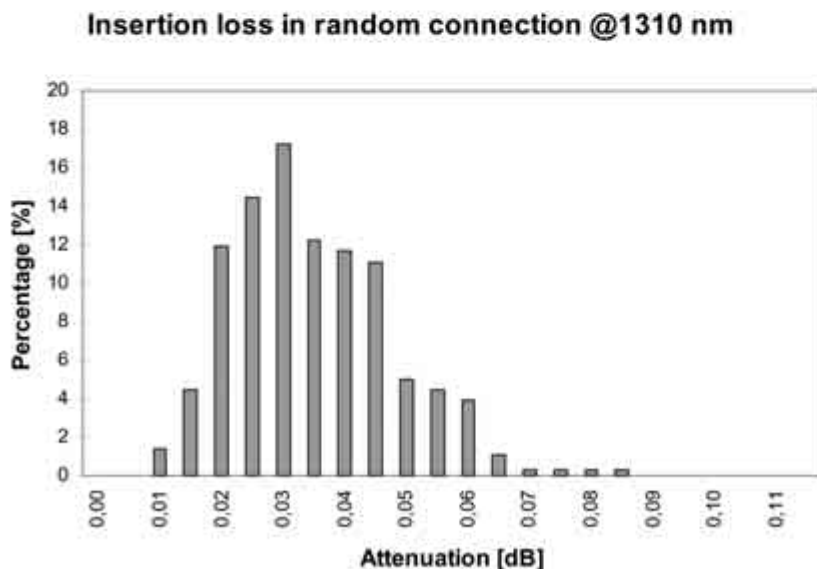


## Low Loss SC & FC Singlemode Cable Assemblies (Continued)

### Performance comparison of standard versus low loss connectors



Graph 1: Insertion loss spreading of standard and low loss connectors (macro scale).



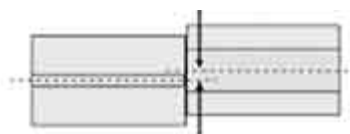
Graph 2: Insertion loss in random connection @ 1310 nm of low loss connectors (micro scale).

## Mode Conditioning Cable Assemblies

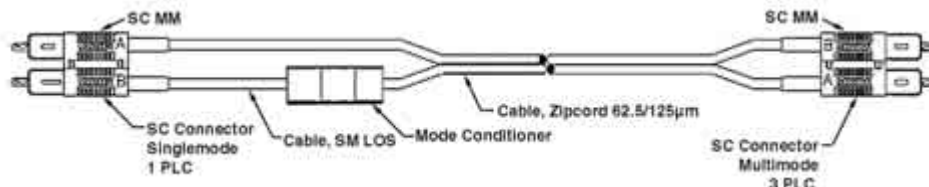
### Mode Conditioning Patch Cords

#### Product Facts

- Allows use of singlemode gigabit ethernet equipment with multimode installed fiber
- Designed for Longwave (-LX) multimode applications for Gigabit Ethernet Compliant with IEEE-802.3z
- Masks Differential Mode Delay (DMD) signal degradation
- Functions the same as a standard patchcord



Singlemode Centerline Offset  
From Multimode Centerline



| Description                                  | Part Number |           |           |
|----------------------------------------------|-------------|-----------|-----------|
|                                              | 2 Meters    | 3 Meters  | 5 Meters  |
| <b>LC - SC Mode Conditioning Patch Cords</b> |             |           |           |
| LC Duplex/SC Duplex, SM 62.5/125 µm          | 6536811-2   | 6536811-3 | 6536811-5 |
| LC Duplex/ST Dual, SM 62.5/125 µm            | 1920476-2   | 1920476-3 | 1920476-5 |

### Mode Conditioning Launch Leads with LSZH Cable

**Note:** See pages 118 & 119 for other LSZH Cable Assemblies

| Description                                                   | Part Numbers |     |
|---------------------------------------------------------------|--------------|-----|
|                                                               | Length (m)   |     |
|                                                               | 3            | 5.5 |
| <b>ST - ST Mode Conditioning Launch Lead with LSZH Cable</b>  |              |     |
| ST/PC-ST/PC 50/125 µm                                         | 6348750-3    |     |
| ST/PC - ST/PC 62.5/125 µm                                     | 6348749-3    |     |
| <b>ST Mode Conditioning Launch Lead Basic with LSZH Cable</b> |              |     |
| ST/PC Basic 50/125 µm                                         | 9-6536401-5  |     |
| ST/PC Basic 62.5/125 µm                                       | 9-6536440-5  |     |

| Description                                                  | Part Numbers |           |           |           |           |           |           |             |
|--------------------------------------------------------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
|                                                              | Length (m)   |           |           |           |           |           |           |             |
|                                                              | 2            | 3         | 4         | 5         | 7         | 8         | 9         | 10          |
| <b>SC - SC Mode Conditioning Launch Lead with LSZH Cable</b> |              |           |           |           |           |           |           |             |
| SC - SC Duplex 50/125 µm                                     | 6206820-2    | 6206820-3 | —         | 6208620-5 | —         | 6206820-8 | —         | 1-6206820-0 |
| SC - SC Duplex 62.5/125 µm                                   | 6206821-2    | 6206821-3 | 6206821-4 | 6206821-5 | 6206821-7 | 6206821-8 | 6206821-9 | 1-6206821-0 |

| Description                                                     | Part Numbers |           |           |           |           |             |
|-----------------------------------------------------------------|--------------|-----------|-----------|-----------|-----------|-------------|
|                                                                 | Length (m)   |           |           |           |           |             |
|                                                                 | 2            | 3         | 5         | 7         | 8         | 10          |
| <b>SC - ST Mode Conditioning Launch Lead with LSZH Cable</b>    |              |           |           |           |           |             |
| SC Duplex - ST 50/125 µm                                        | 6348269-2    | 6348269-3 | 6348269-5 | 6348269-7 |           |             |
| SC Duplex - ST 62.5/125 µm                                      | 6348271-2    | 6348271-3 | 6348271-5 |           | 6348271-8 | 1-6348271-0 |
| <b>SC - MT-RJ Mode Conditioning Launch Lead with LSZH Cable</b> |              |           |           |           |           |             |
| SC/PC - MT-RJ 50/125 µm                                         |              | 6536769-3 |           |           |           |             |
| SC/PC - MT-RJ 62.5/125 µm                                       |              | 6536770-3 |           |           |           |             |
| <b>MT-RJ - ST Mode Conditioning Launch Lead with LSZH Cable</b> |              |           |           |           |           |             |
| MT-RJ - ST Duplex 50/125 µm                                     |              | 6536445-3 | 6536445-5 |           |           |             |
| MT-RJ - ST Duplex 62.5/125 µm                                   |              | 6536444-3 | 6536444-5 |           |           |             |
| <b>MT-RJ - SC Mode Conditioning Launch Lead with LSZH Cable</b> |              |           |           |           |           |             |
| MT-RJ - SC Duplex 50/125 µm                                     |              | 6536447-3 | 6536447-5 |           |           |             |
| MT-RJ - SC Duplex 62.5/125 µm                                   |              | 6536446-3 | 6536446-5 |           |           |             |

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

## Low Smoke, Zero Halogen (LSZH) Cable Assemblies

### LC Cable Assemblies with LSZH Cable

#### Product Facts

- For high performance applications/high density
- 125  $\mu$ m Ceramic Ferrule Technology
- Small size — half the size of standard SC & FC product
- Singlemode & multimode

- Tuned singlemode assemblies
- Hybrid assemblies available with all standard connectors
- Fully compliant with all relevant IEC, CENELEC and ETSI specifications

#### Performance Characteristics

**Insertion Loss** —  
Singlemode: < 0.3 dB Against Reference  
Multimode: < 0.1 dB Typical

**Return Loss** —  
Singlemode: 55 dB - PC endface  
Multimode: 20 dB

**Note: See page 117 for Mode Conditioning LSZH Cable Assemblies**

| Description                                             | Part Numbers |           |           |           |             |
|---------------------------------------------------------|--------------|-----------|-----------|-----------|-------------|
|                                                         | Length (m)   |           |           |           |             |
|                                                         | 1            | 2         | 3         | 5         | 10          |
| <b>LC - LC Lead Assembly with LSZH Cable</b>            |              |           |           |           |             |
| LC/PC - LC/PC Simplex Singlemode 0.9 mm tuned           | 6536330-1    | 6536330-2 | 6536330-3 | 6536330-5 | 1-6536330-0 |
| LC/PC - LC/PC Simplex Singlemode 1.8 mm tuned           | 6536489-1    | 6536489-2 | 6536489-3 | 6536489-5 | 1-6536489-0 |
| LC/PC - LC/PC Simplex Multimode 2.0 mm 50/125 $\mu$ m   | 6536490-1    | 6536490-2 | 6536490-3 | 6536490-5 | 1-6536490-0 |
| LC/PC - LC/PC Simplex Multimode 2.0 mm 62.5/125 $\mu$ m | 6536500-1    | 6536500-2 | 6536500-3 | 6536500-5 | 1-6536500-0 |
| LC/PC - LC/PC Duplex Singlemode 1.8 mm tuned            | 6536501-1    | 6536501-2 | 6536501-3 | 6536501-5 | 1-6536501-0 |
| LC/PC - LC/PC Duplex Multimode 1.8 mm 50/125 $\mu$ m    | 6536502-1    | 6536502-2 | 6536502-3 | 6536502-5 | 1-6536502-0 |
| LC/PC - LC/PC Duplex Multimode 1.8 mm 62.5/125 $\mu$ m  | 6536503-1    | 6536503-2 | 6536503-3 | 6536503-5 | 1-6536503-0 |

**Note:** Custom lengths are available. Please contact your local Tyco Electronics Sales Representative.

### SC Cable Assemblies with LSZH Cable

#### Product Facts

- 125  $\mu$ m Ceramic Ferrule Technology
- Small size — half the size of standard SC & FC product
- Singlemode & multimode
- Tuned singlemode assemblies

- Hybrid assemblies available with all standard connectors
- Fully compliant with all relevant IEC, CENELEC and ETSI specifications

**Performance Characteristics**

**Insertion Loss** —  
Singlemode: < 0.3 dB Against Reference  
Multimode: < 0.1 dB Typical

**Return Loss** —  
Singlemode: 55 dB - PC endface  
Multimode: 20 dB

**Note: See page 117 for Mode Conditioning LSZH Cable Assemblies**

| Description                                              | Part Numbers |           |           |           |             |
|----------------------------------------------------------|--------------|-----------|-----------|-----------|-------------|
|                                                          | Length (m)   |           |           |           |             |
|                                                          | 1            | 2         | 3         | 5         | 10          |
| <b>SC - SC Lead Assembly with LSZH Cable</b>             |              |           |           |           |             |
| SC Duplex/SC Duplex (Ceramic Ferrule) 62.5/125 $\mu$ m   | 5349578-1    | 5349578-2 | 5349578-3 | 5349578-5 | 1-5349578-0 |
| SC/SC Simplex (Ceramic Ferrule) 62.5/125 $\mu$ m         | 5349577-1    | 5349577-2 | 5349577-3 | 5349577-5 |             |
| SC Duplex/SC Duplex (Ceramic Ferrule) 50/125 $\mu$ m     | 5349565-1    | 5349565-2 | 5349565-3 | 5349565-5 | 1-5349565-0 |
| SC/SC Simplex (Ceramic Ferrule) 50/125 $\mu$ m           | 5349564-1    | 5349564-2 | 5349564-3 | 5349564-5 | 1-5349564-0 |
| SC Duplex/SC Duplex (Ceramic Ferrule) 50/125 $\mu$ m OM3 | 6536464-1    | 6536464-2 | 6536464-3 | 6536464-5 | 1-6536464-0 |
| <b>SC Pigtail with LSZH Cable</b>                        |              |           |           |           |             |
| SC/PC Pigtail OM3 0.9 mm 50/125 $\mu$ m DES              |              | 6536555-2 |           |           |             |
| SC/PC Pigtail OM3 0.9 mm 50/125 $\mu$ m PP               |              | 6536561-2 |           |           |             |

**Note:** Custom lengths are available. Please contact your local Tyco Electronics Sales Representative.

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

## Low Smoke, Zero Halogen (LSZH) Cable Assemblies (Continued)

### ST Cable Assemblies with LSZH Cable

| Description                                  | Part Numbers |           |           |           |             |
|----------------------------------------------|--------------|-----------|-----------|-----------|-------------|
|                                              | Length (m)   |           |           |           |             |
|                                              | 1            | 2         | 3         | 5         | 10          |
| <b>ST - ST Lead Assembly with LSZH Cable</b> |              |           |           |           |             |
| ST-ST Simplex (Ceramic Ferrule) 62.5/125 µm  | 5349573-1    | 5349573-2 | 5349573-3 | 5349573-5 | 1-5349573-0 |
| ST-ST Duplex (Ceramic Ferrule) 62.5/125 µm   | 5349574-1    | 5349574-2 | 5349574-3 | 5349573-5 | 1-5349574-0 |
| ST-ST Simplex (Ceramic Ferrule) 50/125 µm    | 5349560-1    | 5349560-2 | 5349560-3 | 5349560-5 | 1-5349560-0 |
| ST-ST Duplex (Ceramic Ferrule) 50/125 µm     | 5349561-1    | 5349561-2 | 5349561-3 | 5349561-5 | 1-5349561-0 |

**Note:** Custom lengths are available. Please contact your local Tyco Electronics Sales Representative.

**Note:** See page 117 for  
Mode Conditioning LSZH  
Cable Assemblies

### MT-RJ Cable Assemblies with LSZH Cable

| Description                                         | Part Numbers |           |           |           |             |
|-----------------------------------------------------|--------------|-----------|-----------|-----------|-------------|
|                                                     | Length (m)   |           |           |           |             |
|                                                     | 1            | 2         | 3         | 5         | 10          |
| <b>MT-RJ to MT-RJ Lead Assembly with LSZH Cable</b> |              |           |           |           |             |
| MT-RJ to MT-RJ Singlemode                           | 6206621-1    | 6206621-2 | 6206621-3 | 6206621-5 | 1-6206621-0 |
| MT-RJ to MT-RJ Multimode 50/125 µm                  | 6206617-1    | 6206617-2 | 6206617-3 | 6206617-5 | 1-6206617-0 |
| MT-RJ to MT-RJ Multimode 62.5/125 µm                | 6206613-1    | 6206613-2 | 6206613-3 | 6206613-5 | 1-6206613-0 |
| MT-RJ to MT-RJ Multimode 50/125 µm OM3              | 6536462-1    | 6536462-2 | 6536462-3 | 6536462-5 | 1-6536462-0 |
| <b>MT-RJ Pigtail with LSZH Cable</b>                |              |           |           |           |             |
| MT-RJ Jack male Pigtail bare OM3                    |              |           | 6536556-1 |           |             |
| MT-RJ Jack male Pigtail 50/125 µm                   |              |           | 6348942-1 |           |             |
| MT-RJ Jack male Pigtail 62.5/125 µm                 |              |           | 6348941-1 |           |             |
| MT-RJ Jack male Pigtail 9/125 µm Singlemode         |              |           | 6391366-1 |           |             |

**Note:** Custom lengths are available. Please contact your local Tyco Electronics Sales Representative.

### Hybrid Cable Assemblies with LSZH Cable

| Description                                              | Part Numbers |           |           |           |             |             |
|----------------------------------------------------------|--------------|-----------|-----------|-----------|-------------|-------------|
|                                                          | Length (m)   |           |           |           |             |             |
|                                                          | 1            | 2         | 3         | 5         | 10          | 15          |
| <b>LC - SC Lead Assembly with LSZH Cable</b>             |              |           |           |           |             |             |
| LC/PC - SC/PC Simplex 0.9 mm tuned                       | 6536504-1    | 6536504-2 | 6536504-3 | 6536504-5 | 1-6536504-0 |             |
| LC/PC - SC/PC Simplex 1.8 mm tuned                       | 6536505-1    | 6536505-2 | 6536505-3 | 6536505-5 | 1-6536505-0 |             |
| LC/PC - SC/PC Simplex Multimode 2.0 mm 50/125 µm         | 6536506-1    | 6536506-2 | 6536506-3 | 6536506-5 | 1-6536506-0 |             |
| LC/PC - SC/PC Simplex Multimode 2.0 mm 62.5/125 µm       | 6536507-1    | 6536507-2 | 6536507-3 | 6536507-5 | 1-6536507-0 |             |
| LC/PC - SC/PC Duplex Singlemode 1.8 mm tuned             | 6536508-1    | 6536508-2 | 6536508-3 | 6536508-5 | 1-6536508-0 |             |
| LC/PC - SC/PC Duplex Multimode 1.8 mm 50/125 µm          | 6536509-1    | 6536509-2 | 6536509-3 | 6536509-5 | 1-6536509-0 |             |
| LC/PC - SC/PC Duplex Multimode 1.8 mm 62.5/125 µm        | 6536510-1    | 6536510-2 | 6536510-3 | 6536510-5 | 1-6536510-0 |             |
| <b>LC - MT-RJ Lead Assembly with LSZH Cable</b>          |              |           |           |           |             |             |
| LC/PC - MT-RJ Duplex Singlemode 1.8 mm tuned             | 6536511-1    | 6536511-2 | 6536511-3 | 6536511-5 | 1-6536511-0 |             |
| LC/PC - MT-RJ Duplex Multimode 1.8 mm 50/125 µm          | 6536512-1    | 6536512-2 | 6536512-3 | 6536512-5 | 1-6536512-0 |             |
| LC/PC - MT-RJ Duplex Multimode 1.8 mm 62.5/125 µm        | 6536513-1    | 6536513-2 | 6536513-3 | 6536513-5 | 1-6536513-0 |             |
| <b>MT-RJ to SC Lead Assembly with LSZH Cable</b>         |              |           |           |           |             |             |
| MT-RJ - SC Duplex Singlemode                             | 6391153-1    | 6391153-2 | 6391153-3 | 6391153-5 |             |             |
| MT-RJ - SC Duplex Ceramic Ferrule Multimode 50/125 µm    | 6206619-1    | 6206619-2 | 6206619-3 | 6206619-5 | 1-6206619-0 |             |
| MT-RJ - SC Duplex Ceramic Ferrule Multimode 62.5/125 µm  | 6206615-1    | 6206615-2 | 6206615-3 | 6206615-5 | 1-6206615-0 |             |
| MT-RJ - SC Simplex Ceramic Ferrule Multimode 50/125 µm   | 6206618-1    | 6206618-2 | 6206618-3 | 6206618-5 | 1-6206618-0 |             |
| MT-RJ - SC Simplex Ceramic Ferrule Multimode 62.5/125 µm | 6206614-1    |           | 6206614-3 | 6206614-5 | 1-6206614-0 |             |
| MT-RJ - SC Multimode 50/125 µm OM3                       | 6536463-1    | 6536463-2 | 6536463-3 | 6536463-5 | 1-6536463-0 |             |
| <b>MT-RJ to ST Lead Assembly with LSZH Cable</b>         |              |           |           |           |             |             |
| MT-RJ - ST Singlemode 9/125 µm                           |              | 6348093-2 |           |           |             | 1-6348093-5 |
| MT-RJ - ST Ceramic Ferrule Multimode 50/125 µm           | 6206620-1    | 6206620-2 | 6206620-3 | 6206620-5 | 1-6206620-0 |             |
| MT-RJ - ST Ceramic Ferrule Multimode 62.5/125 µm         | 6206616-1    | 6206616-2 | 6206616-3 | 6206616-5 | 1-6206616-0 |             |

**Note:** Custom lengths are available. Please contact your local Tyco Electronics Sales Representative.

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

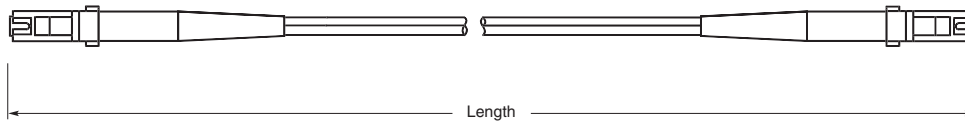
## Optical Fiber Cable Assembly Information

### Optical Fiber Cable Assembly Performance Details

| Test Description                        | FOTP*   | Requirement               |
|-----------------------------------------|---------|---------------------------|
| Visual and Mechanical Inspection:       | MT-RJ – | 13 TIA/EIA-604-12         |
|                                         | SC –    | 13 TIA/EIA-604-3          |
|                                         | ST –    | 13 TIA/EIA-604-2          |
|                                         | LC –    | 13 TIA/EIA-604-10         |
| Attenuation                             | 34      | ≤ 0.75 dB                 |
| Return Loss                             | 107     | ≤ -20 dB                  |
| Low Temperature (0° C for 4 days)       | 188     | ≤ 0.3 dB change           |
| Temperature Life (55° C for 14 days)    | 7       | ≤ 0.3 dB change           |
| Humidity (90 to 95% @ 40° C for 4 days) | 5       | ≤ 0.3 dB change           |
| Impact (8 drops from 1.8 m)             | 2       | ≤ 0.75 dB IL, < -20 dB RL |
| Durability (500 cycles)                 | 21      | ≤ 0.75 dB IL, < -20 dB RL |
| Cable Retention (0° and 90°)            | 6       | ≤ 0.75 dB IL, < -20 dB RL |
| Flex (100 cycles)                       | 1       | ≤ 0.75 dB IL, < -20 dB RL |
| Twist (10 cycles)                       | 36      | ≤ 0.75 dB IL, < -20 dB RL |

\*FOTP = Fiber Optic Test Procedure

### Optical Fiber Cable Assembly Length Reference



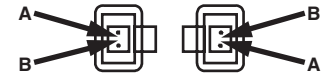
### Meter to Foot and Inch Reference

| Length in Meters | Length in Feet | Length in Inches |
|------------------|----------------|------------------|
| 1                | 3.28           | 39.37            |
| 2                | 6.56           | 78.74            |
| 3                | 9.84           | 118.11           |
| 4                | 13.12          | 157.48           |
| 5                | 16.40          | 196.85           |
| 6                | 19.68          | 236.21           |
| 7                | 22.96          | 275.59           |
| 8                | 26.25          | 314.96           |
| 9                | 29.52          | 354.33           |
| 10               | 32.80          | 393.70           |
| 20               | 65.62          | 787.40           |
| 30               | 98.42          | 1181.10          |
| 40               | 131.23         | 1574.80          |
| 50               | 164.04         | 1968.50          |
| 60               | 196.85         | 2362.20          |
| 70               | 229.66         | 2755.90          |
| 80               | 262.47         | 3149.60          |
| 90               | 295.27         | 3543.30          |
| 100              | 328.08         | 3937.00          |
| 110              | 360.89         | 4330.69          |
| 120              | 393.70         | 4724.39          |
| 130              | 426.51         | 5118.09          |
| 140              | 459.32         | 5511.79          |
| 150              | 492.12         | 5905.49          |
| 160              | 524.93         | 6299.19          |
| 170              | 557.74         | 6692.89          |
| 180              | 590.55         | 7086.59          |
| 190              | 623.36         | 7480.29          |
| 200              | 656.17         | 7873.99          |

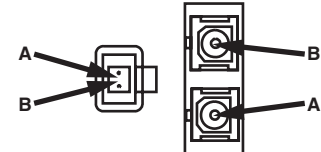
### Fiber Polarity

| Fiber Color | Left Connector | Right Connector |
|-------------|----------------|-----------------|
| White       | A              | B               |
| Blue        | B              | A               |

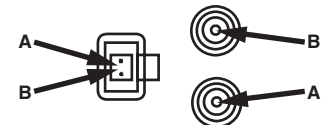
#### MT-RJ



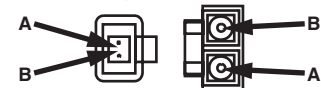
#### MT-RJ to Duplex SC



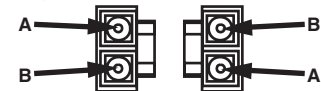
#### MT-RJ to Dual ST



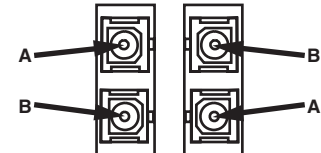
#### MT-RJ to Duplex LC



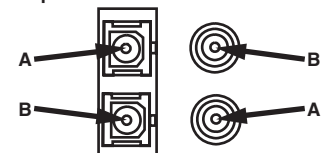
#### Duplex LC



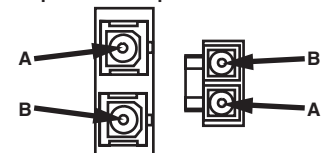
#### Duplex SC



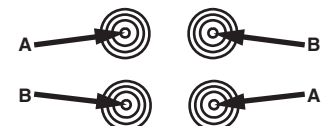
#### Duplex SC to Dual ST



#### Duplex SC to Duplex LC



#### Dual ST



## MT-RJ Cable Assemblies

### Product Facts

- Each MT-RJ connector houses two fibers
- Cable assemblies are riser-rated



| Connector End 1 | Connector End 2 | Fiber Type                                                    | UL/NEC Rating | Part Number |
|-----------------|-----------------|---------------------------------------------------------------|---------------|-------------|
| MT-RJ           | MT-RJ           | 50/125 $\mu$ m Multimode                                      | OFNR          | 6278128-X   |
|                 |                 | Laser Optimized (10 Gig)<br>(850 nm 50/125 $\mu$ m) Multimode | OFNR          | 6588572-X   |
|                 |                 | 62.5/125 $\mu$ m Multimode                                    | OFNR          | 6278032-X   |
|                 |                 | Singlemode                                                    | OFNR          | 6278033-X   |

X denotes length in meters: -1 = 1, -2 = 2, -3 = 3, -5 = 5, 1- -0 = 10

## MT-RJ to SC Cable Assemblies

### Product Facts

- Connects between equipment with different interfaces
- SC connectors feature ceramic ferrules
- Each MT-RJ Connector houses two fibers
- Cable assemblies are riser-rated



| Connector End 1 | Connector End 2 | Fiber Type                                                    | UL/NEC Rating | Part Number |
|-----------------|-----------------|---------------------------------------------------------------|---------------|-------------|
| MT-RJ           | Duplex SC       | 50/125 $\mu$ m Multimode                                      | OFNR          | 6278126-X   |
|                 |                 | Laser Optimized (10 Gig)<br>(850 nm 50/125 $\mu$ m) Multimode | OFNR          | 6693414-X   |
|                 |                 | 62.5/125 $\mu$ m Multimode                                    | OFNR          | 6278028-X   |
|                 |                 | Singlemode                                                    | OFNR          | 6278031-X   |
|                 | Simplex SC      | 50/125 $\mu$ m Multimode                                      | OFNR          | 6278127-X   |
|                 |                 | Laser Optimized (10 Gig)<br>(850 nm 50/125 $\mu$ m) Multimode | OFNR          | 6588573-X   |
|                 |                 | 62.5/125 $\mu$ m Multimode                                    | OFNR          | 6278030-X   |

X denotes length in meters: -1 = 1, -2 = 2, -3 = 3, -5 = 5, 1- -0 = 10

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



## MT-RJ to ST Cable Assemblies

### Product Facts

- Connects between equipment with different interfaces
- ST Connectors feature ceramic ferrules
- Each MT-RJ Connector houses two fibers
- Cable assemblies are riser-rated



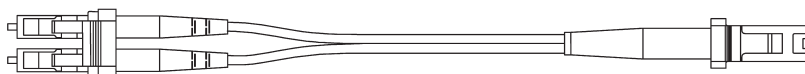
| Connector End 1 | Connector End 2 | Fiber Type                 | UL/NEC Rating | Part Number |
|-----------------|-----------------|----------------------------|---------------|-------------|
| MT-RJ           | Dual ST         | 50/125 $\mu$ m Multimode   | OFNR          | 6278199-X   |
|                 |                 | 62.5/125 $\mu$ m Multimode | OFNR          | 6278027-X   |
|                 |                 | Singlemode                 | OFNR          | 6278298-X   |

X denotes length in meters: -1 = 1, -2 = 2, -3 = 3, -5 = 5, 1- -0 = 10

## MT-RJ to LC Cable Assemblies

### Product Facts

- Connects between equipment with different interfaces
- One Duplex LC Connector and one MT-RJ Plug
- LC Connectors feature ceramic ferrules
- Cable Assemblies are riser-rated
- Each MT-RJ Connector houses two fibers



| Connector End 1 | Connector End 2 | Fiber Type                                                       | UL/NEC Rating | Part Number |
|-----------------|-----------------|------------------------------------------------------------------|---------------|-------------|
| MT-RJ           | LC Duplex       | 50/125 $\mu$ m Multimode                                         | OFNR          | 6374647-X   |
|                 |                 | Laser Optimized (10 Gig)<br>(850 nm LO 50/125 $\mu$ m) Multimode | OFNR          | 6588719-X   |
|                 |                 | 62.5/125 $\mu$ m Multimode                                       | OFNR          | 6374646-X   |
|                 |                 | Singlemode                                                       | OFNR          | 6374645-X   |

X denotes length in meters: -1 = 1, -2 = 2, -3 = 3, -5 = 5, 1- -0 = 10

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

## MT-RJ Pigtail Jack (Single-Ended) Cable Assemblies

### Product Facts

- Compatible with MT-RJ Jack Snap-in Adapter Plates
- Two 250 µm coated fiber in protective 900 µm tubing
- MT-RJ Jack Assemblies are compatible with fusion or mechanical splices
- Each MT-RJ Connector houses two fibers

| Description       | Fiber Type               | Color  | Part Number |
|-------------------|--------------------------|--------|-------------|
| MT-RJ Jack        | 50/125 µm Multimode      | Black  | 6374018-X   |
|                   | 62.5/125 µm Multimode    | Beige  | 6374019-X   |
|                   | Singlemode               | Blue   | 6374020-X   |
|                   | Laser Optimized (10 Gig) | Aqua   | 1938008-X   |
| MT-RJ SECURE Jack | Singlemode               | Red    | 6588568-X   |
|                   |                          | Yellow | 6588569-X   |
|                   |                          | Green  | 6588571-X   |
|                   |                          | Blue   | 6588570-X   |
|                   |                          | Orange | 6828233-X   |
|                   |                          | Brown  | 6828234-X   |
|                   |                          | Slate  | 6828235-X   |
|                   |                          | Violet | 6828236-X   |
|                   |                          | Rose   | 6828237-X   |
|                   |                          | Aqua   | 6828238-X   |

X denotes length in meters: -1 = 1, -2 = 2, -3 = 3

## MT-RJ Pigtail Plug (Single-Ended) Cable Assemblies

### Product Facts

- Compatible with MT-RJ Plug Snap-in Adapter Plates
- Two 250 µm coated fiber in protective 900 µm tubing
- MT-RJ Plug Assemblies are compatible with fusion or mechanical splices
- MT-RJ Plugs are pinned
- Each MT-RJ Connector houses two fibers

| Description | Fiber Type            | Part Number |
|-------------|-----------------------|-------------|
| MT-RJ Plug  | 50/125 µm Multimode   | 6588849-X   |
|             | 62.5/125 µm Multimode | 6693532-X   |
|             | Singlemode            | 6693533-X   |

X denotes length in meters: -1 = 1, -2 = 2, -3 = 3

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

## MT-RJ Cable Assembly Test Kits

### MT-RJ Test Kit Components

#### Kit A

- 2 - MT-RJ (no pins) to SC/ST cable assemblies
- 1 - MT-RJ (pins) to SC/ST cable assembly
- 1 - MT-RJ to MT-RJ cable assembly
- 2 - Mandrels
- 1 - MT-RJ Adapter

#### Kit B

- 2 - MT-RJ to MT-RJ cable assemblies
- 2 - Mandrels

#### Kit C

- 2 - MT-RJ (no pins) to SC/ST cable assembly
- 1 - MT-RJ (pins) to SC/ST cable assembly
- 1 - MT-RJ to MT-RJ cable assembly
- 1 - MT-RJ Adapter

#### Kit D

- 2 - MT-RJ to MT-RJ cable assemblies

MT-RJ Test Leads are divided into two primary categories:

- Launch Leads — made for use with standard test equipment
- OTDR Launch Leads — long lengths (100 meters) to deal with “dead zone” of OTDR equipment

### MT-RJ Test Kits



| Description                  | Part Number                | Components (see list) |
|------------------------------|----------------------------|-----------------------|
| MT-RJ to ST-Style Kit        | Multimode 50/125 $\mu$ m   | 1278861-2             |
|                              | Multimode 62.5/125 $\mu$ m | 1278862-2             |
|                              | Singlemode                 | 1278863-2             |
| MT-RJ to ST-Style SECURE Kit | Multimode 50/125 $\mu$ m   | 1278861-5             |
|                              | Multimode 62.5/125 $\mu$ m | 1278862-5             |
|                              | Singlemode                 | 1278863-5             |
| MT-RJ to SC Kit              | Multimode 50/125 $\mu$ m   | 1278861-1             |
|                              | Multimode 62.5/125 $\mu$ m | 1278862-1             |
|                              | Singlemode                 | 1278863-1             |
| MT-RJ to SC SECURE Kit       | Multimode 50/125 $\mu$ m   | 1278861-4             |
|                              | Multimode 62.5/125 $\mu$ m | 1278862-4             |
|                              | Singlemode                 | 1278863-4             |
| MT-RJ to MT-RJ Kit           | Multimode 50/125 $\mu$ m   | 1278861-3             |
|                              | Multimode 62.5/125 $\mu$ m | 1278862-3             |
|                              | Singlemode                 | 1278863-3             |
| MT-RJ to MT-RJ SECURE Kit    | Multimode 50/125 $\mu$ m   | 1278861-6             |
|                              | Multimode 62.5/125 $\mu$ m | 1278862-6             |
|                              | Singlemode                 | 1278863-6             |

### MT-RJ Test Leads

#### Standard MT-RJ Launch Leads

| Fiber Description     | Part Number        |            |               |
|-----------------------|--------------------|------------|---------------|
|                       | MT-RJ — SC Simplex | MT-RJ — ST | MT-RJ — MT-RJ |
| No Pins, 62.5 Fiber   | 6435092-1          | 6435094-1  | 6435096-1     |
| No Pins, 50/125 Fiber | 6435092-2          | 6435094-2  | 6435096-2     |
| No Pins, Singlemode   | 6435092-3          | 6435094-3  | 6435096-3     |
| Pins, 62.5 Fiber      | 6435092-4          | 6435094-4  | 6435096-4     |
| Pins, 50/125 Fiber    | 6435092-5          | 6435094-5  | 6435096-5     |
| Pins, Singlemode      | 6435092-6          | 6435094-6  | 6435096-6     |

#### OTDR MT-RJ Launch Leads (100 meter length)

| Part Number | Fiber Description                                      |
|-------------|--------------------------------------------------------|
| 6588079-1   | MT-RJ (No Pins) SC Simplex, 62.5/125 Fiber, 100 meters |
| 6588080-1   | MT-RJ (No Pins) SC Simplex, 50/125 Fiber, 100 meters   |

### MT-RJ Loopbacks

| Description    | Part Number                |
|----------------|----------------------------|
| MT-RJ Loopback | Multimode 50/125 $\mu$ m   |
|                | Multimode 62.5/125 $\mu$ m |
|                | Singlemode                 |

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

## MPO to MPO Trunk Cable Assemblies

### Product Facts

- Quick connection of 12 fibers
- Pulling socks protect connectors during installation
- Available in
  - 62.5/125  $\mu$ m
  - 50/125  $\mu$ m
  - 50/125  $\mu$ m laser optimized
  - Singlemode



| Description                       | UL/NEC Ratings                                                | Part Number                              |
|-----------------------------------|---------------------------------------------------------------|------------------------------------------|
| 12 Fiber,<br>Pair-Flipped (AB/BA) | 50/125 $\mu$ m Multimode                                      | Riser (OFNR)/<br>Plenum (OFNP) 6435028-X |
|                                   | Laser Optimized (10 Gig)<br>(850 nm 50/125 $\mu$ m) Multimode | Riser (OFNR)/<br>Plenum (OFNP) 6693087-X |
|                                   | 62.5/125 $\mu$ m Multimode                                    | Riser (OFNR)/<br>Plenum (OFNP) 6435024-X |
|                                   | Singlemode                                                    | Riser (OFNR)/<br>Plenum (OFNP) 6435070-X |
| 24 Fiber,<br>Pair-Flipped (AB/BA) | 50/125 $\mu$ m Multimode                                      | Riser (OFNR)/<br>Plenum (OFNP) 6435029-X |
|                                   | Laser Optimized (10 Gig)<br>(850 nm 50/125 $\mu$ m) Multimode | Riser (OFNR)/<br>Plenum (OFNP) 6754687-X |
|                                   | 62.5/125 $\mu$ m Multimode                                    | Riser (OFNR)/<br>Plenum (OFNP) 6435025-X |
|                                   | Singlemode                                                    | Riser (OFNR)/<br>Plenum (OFNP) 6754882-X |
| 72-Fiber,<br>Pair-Flipped (AB/BA) | 50/125 $\mu$ m Multimode                                      | Plenum (OFNP) 6435031-X                  |
|                                   |                                                               | Riser (OFNR) 6435039-X                   |
|                                   | 62.5/125 $\mu$ m Multimode                                    | Plenum (OFNP) 6435027-X                  |
|                                   |                                                               | Riser (OFNR) 6435035-X                   |

**Note:** X denotes length in feet: -1 = 10, -2 = 20, -3 = 30, -4 = 40, -5 = 50, -6 = 60, -7 = 70, -8 = 80, -9 = 90, 1- -0 = 100, 1- -1 = 110, 1- -2 = 120, 1- -3 = 130, 1- -4 = 140, 1- -5 = 150, 1- -6 = 160, 1- -7 = 170, 1- -8 = 180, 1- -9 = 190, 2- -0 = 200, 2- -1 = 210, 2- -2 = 220, 2- -3 = 230, 2- -4 = 240, 2- -5 = 250, 2- -6 = 260, 2- -7 = 270, 2- -8 = 280, 2- -9 = 290, 3- -0 = 300.

## Other Standard MPO Cable Assemblies

### Other Standard MPO Cable Assemblies

| Part Number | Description                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 6588930-X   | 12-f MPO (f) - MPO (f), 50/125, jacketed ribbon, straight fiber path                                                              |
| 6588688-X   | 12-f MPO (f) - MPO (f), 50/125, jacketed ribbon, reversed fiber path                                                              |
| 6693182-X   | 12-f MPO (f) - MPO (f), 50/125, jacketed ribbon, reversed fiber path<br>(For POP4 TxRx applications. Center 4 fibers not tested.) |
| 6693088-X   | 12-f MPO (f) - MPO (f), SM, jacketed ribbon, straight fiber path                                                                  |
| 1588388-X   | 12-f MPO (f) - MPO (f), 62.5/125, jacketed ribbon, reversed fiber path                                                            |
| 6457988-X   | 12-f MPO (f) - MPO (f), 62.5/125, jacketed ribbon, straight fiber path                                                            |
| 6828375-X   | 12-f MPO (m) - MPO (m), 50/125, jacketed ribbon, straight fiber path                                                              |
| 6828420-X   | 12-f MPO (m) - MPO (m), 50/125, jacketed ribbon, reversed fiber path                                                              |

**Note:** X denotes length in feet: -1 = 10, -2 = 20, -3 = 30, -4 = 40, -5 = 50, -6 = 60, -7 = 70, -8 = 80, -9 = 90, 1- -0 = 100, 1- -1 = 110, 1- -2 = 120, 1- -3 = 130, 1- -4 = 140, 1- -5 = 150, 1- -6 = 160, 1- -7 = 170, 1- -8 = 180, 1- -9 = 190, 2- -0 = 200, 2- -1 = 210, 2- -2 = 220, 2- -3 = 230, 2- -4 = 240, 2- -5 = 250, 2- -6 = 260, 2- -7 = 270, 2- -8 = 280, 2- -9 = 290, 3- -0 = 300.

All part numbers are RoHS compliant.

## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Premise Networks

#### Description

- A modular "plug-and-go" optical cabling system

#### Applications

- A high-performance option for AMP NETCONNECT zone cabling and cabling systems

#### Product Facts

- Uses proven NTT MT linear array technology in the MPO connector
- MPO packs up to 12 optical fibers into a single miniaturized connector about the same size as one SC type
- Cables are pre-terminated and tested
- Distribution hardware is pre-loaded
- Cable rating options:
  - Riser rated, UL-OFNR
  - Plenum rated, UL-OFNP (std.)
  - Low Smoke, Zero Halogen rated, LSZH
- Singlemode or Multimode

#### Other Applications

- Cabling System for Mainframes Catalog 889414

#### Performance Characteristics

##### Insertion Loss —

Singlemode — 0.35 dB typical

Multimode — 0.50 dB typical

##### Return Loss —

Angled Singlemode — -50 dB typical

Flat Multimode — -40 dB typical

##### Durability —

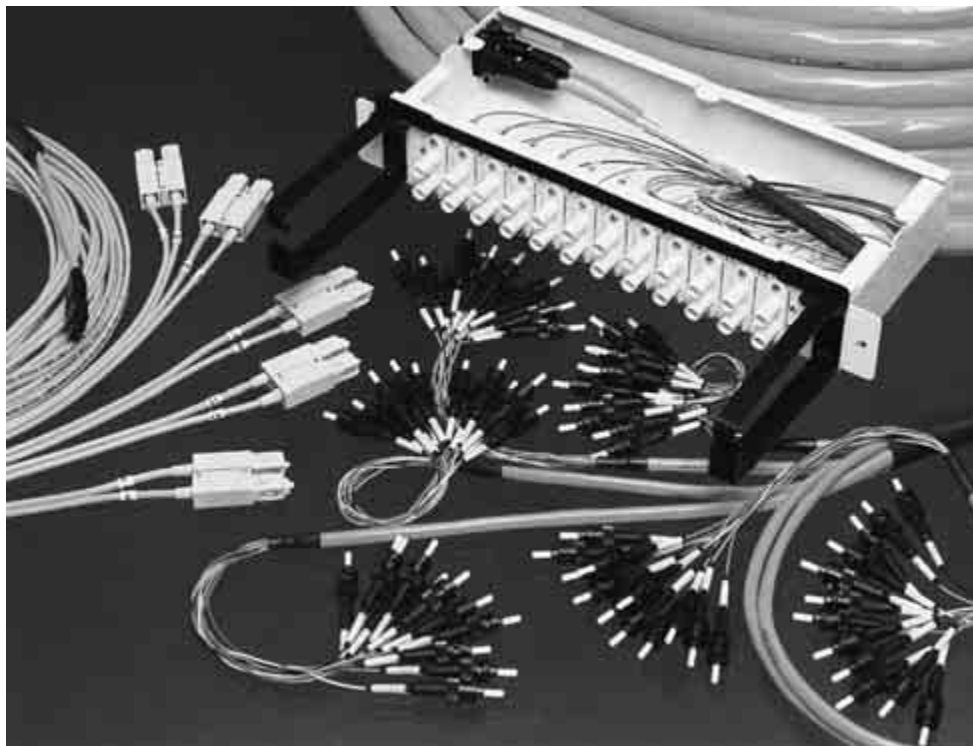
After 500 matings  $\leq 0.1$  dB change

##### Temperature Range —

-40°C to +80°C

- Produced under a Quality Management System certified to ISO 9001

A copy of the certificate is available upon request



Initially designed to replace thick copper parallel cables used under floors of computer rooms in large mainframe centers, Tyco Electronics' MPO Cabling System also makes perfect sense for campus and premise type Local Area Networks. It provides unparalleled ease and flexibility in cabling applications such as backbone and horizontal distribution to the desktop.

The MPO System uses the same simple concepts found in most structured networks following TIA/EIA 568A guidelines. The difference is that with MPO Systems the cables come pre-terminated and tested, with a pulling sock over each end. Just pull through the conduit, remove the netting, and plug it in — that's it.

MPO trunk cables run through the building vertically between floors, and

horizontally through walls, ceilings, and under floors to distribution enclosures and consolidation points strategically located within the building. Mini-trunks and fanout assemblies connect the consolidation point to the workstation outlets. Jumper cables connect the outlet to the workstation, and are also used for cross-connecting in the telecommunications closet. Installation is easier and faster with cables selected specifically for each site.

MPO cabling is a high performance option for AMP NETCONNECT zone cabling, and complements the system as a furniture cabling solution. MPO cables can reside parallel to existing UTP without fear of crosstalk.

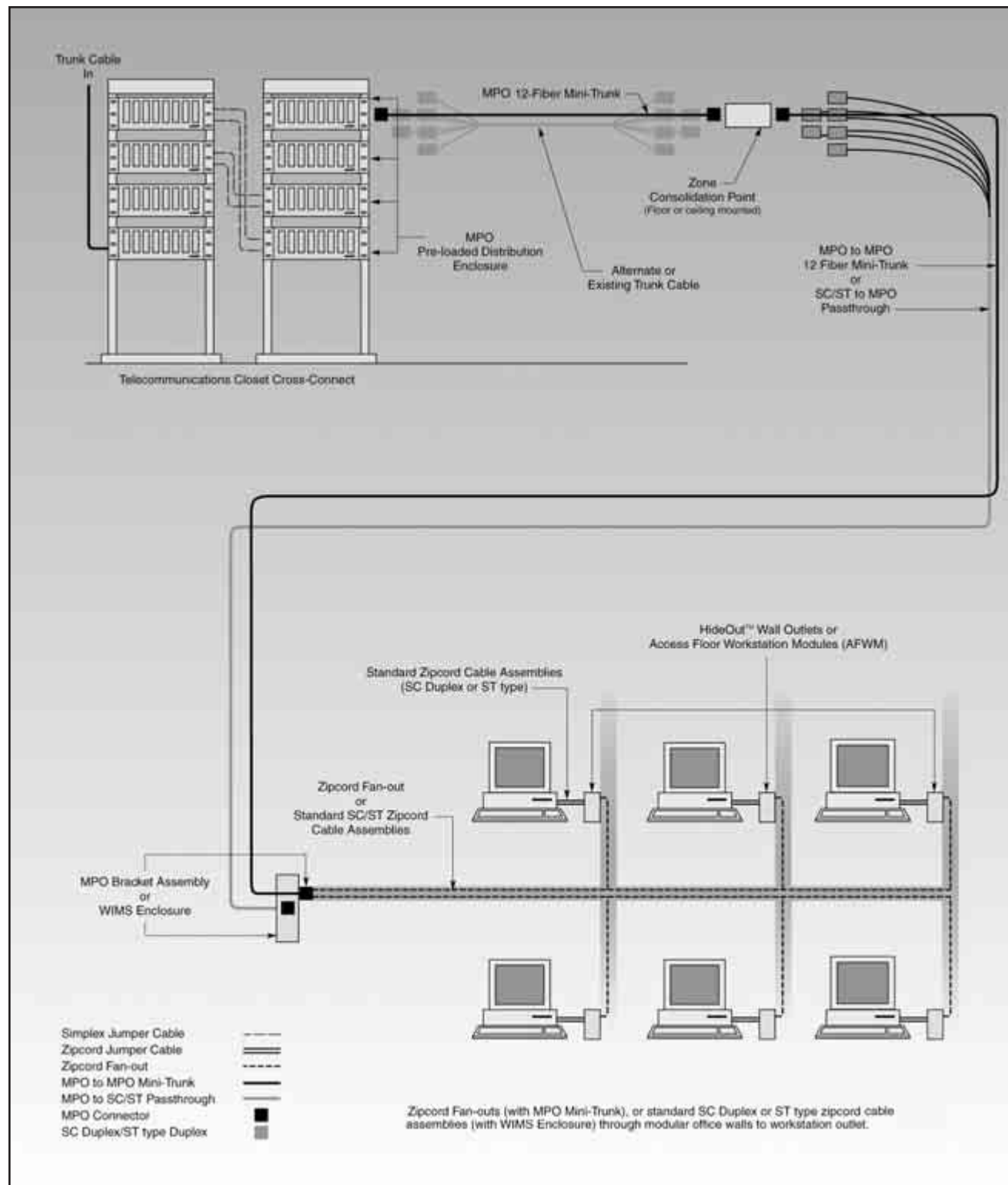
Mini-trunk feeder cables and fan-out cable assemblies are an ideal solution for the open office environment. Their small size

allows easy storage in modular office panels and raceways. When it's time to move add or change the zone, the mini-trunks are simply unplugged from nearby zone enclosures and moved with the furniture. Data outage is contained to the zone under construction. After the zone is reconfigured, just plug the MPO connectors back in to the network, and your workstations are up and running.

There's no longer a need to bring in a network staff to shut down the entire system to re-terminate and test the cabling for moves, adds, and changes. Moves can usually be done by the end-user's facilities crew or someone with minimal network experience. At last, "modular" is living up to its promise. You can take an office apart, move it, and put it back together — quick and simple!

## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Premise Networks (Continued)





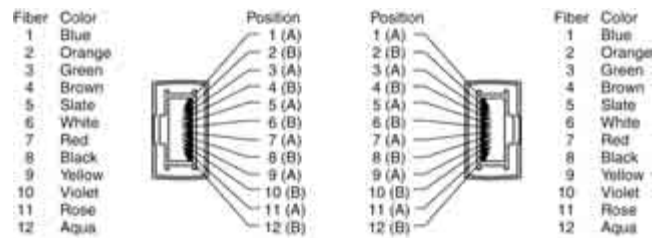
## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Premise Networks (Continued)

#### Pairs Flipped Versus Straight Through Fiber Path Configuration

Unlike the mainframe application counterparts, Tyco Electronics' MPO trunks for Premise applications typically do not require "pair flipping". Pair Flipping, or "AB/BA" transmit/receive configuration is a sequential channel cross-over scheme used for

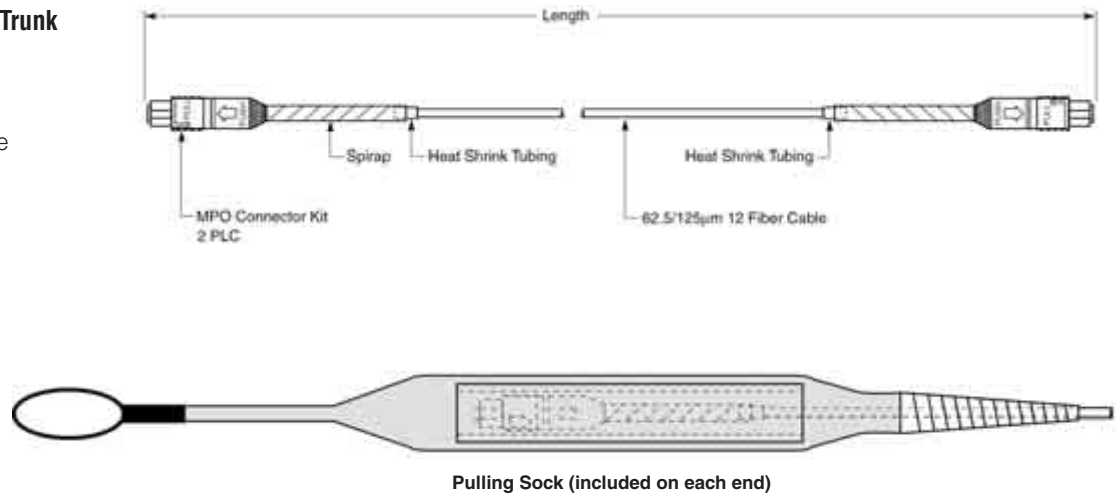
IBM Enterprise Systems Connectivity (ESCON) architecture. MPO premise trunk fiber pairs are configured as "AB/AB". For example — blue fiber (1) travels straight through the cable and exits on the opposite end in the same position (1), as illustrated (right). This fiber path configuration is known as "straight through".



**Straight Through  
Fiber Path Configuration**

#### MPO to MPO Mini-Trunk Cable Assembly

4 pair (8 fiber),  
straight through  
62.5/125 multimode



#### MPO to MPO Mini-Trunks

| Trunk Length          | Part Number (OFNP) |
|-----------------------|--------------------|
| 6 meter [19.7 feet]   | 1-5492105-9        |
| 8 meter [26.3 feet]   | 2-5492105-0        |
| 10 meter [32.8 feet]  | 5492105-2          |
| 15 meter [49.2 feet]  | 5492105-7          |
| 20 meter [65.6 feet]  | 5492105-3          |
| 23 meter [75.5 feet]  | 2-5492105-1        |
| 27 meter [88.6 feet]  | 2-5492105-2        |
| 30 meter [98.4 feet]  | 5492105-4          |
| 33 meter [108.3 feet] | 2-5492105-3        |
| 38 meter [124.7 feet] | 1-5492105-5        |
| 43 meter [141.1 feet] | 2-5492105-4        |
| 46 meter [150.9 feet] | 1-5492105-6        |
| 50 meter [164.1 feet] | 5492105-8          |
| 53 meter [173.9 feet] | 1-5492105-7        |
| 61 meter [200.1 feet] | 1-5492105-3        |

Additional lengths available.  
Custom lengths can be built to customer's specifications.

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

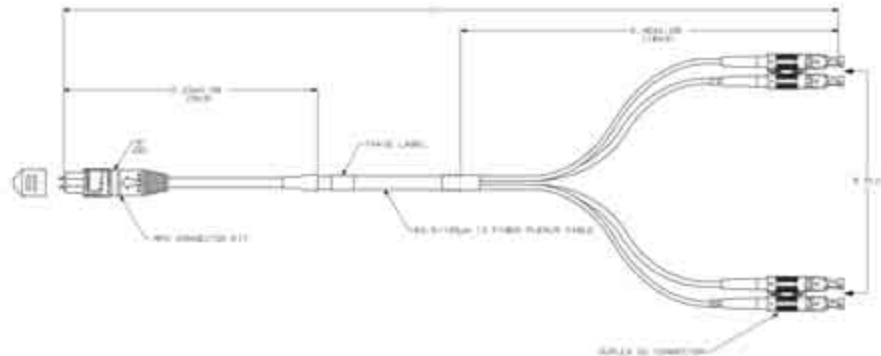
ESCON is a trademark of IBM Corporation.

## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Premise Networks (Continued)

#### MPO to SC Duplex PASS-THROUGH Fan-out

6 pair (12 fiber),  
straight through  
62.5/125 multimode



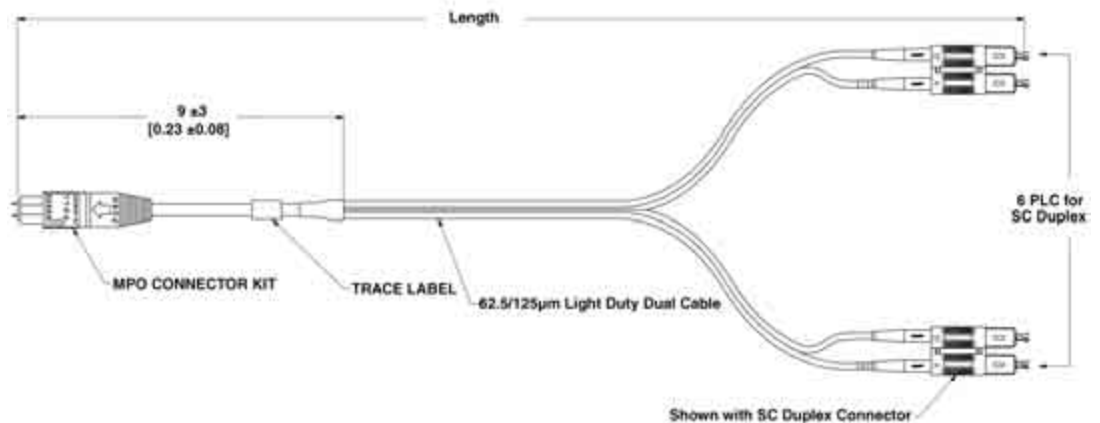
#### MPO to SC Duplex

| Overall Length [L]   | Part Number (OFNP) |
|----------------------|--------------------|
| 6 meter [19.7 feet]  | 5492362-6          |
| 8 meter [26.3 feet]  | 5492362-8          |
| 10 meter [32.8 feet] | 1-5492362-0        |
| 15 meter [49.2 feet] | 1-5492362-5        |
| 20 meter [65.6 feet] | 2-5492362-0        |

Additional lengths available.  
Custom lengths can be built to customer's specifications.

#### MPO to SC Duplex Zipcord Fan-out

6 pair (12 fiber),  
straight through  
62.5/125 multimode



#### MPO to SC Duplex

| Overall Length [L]   | Part Number |
|----------------------|-------------|
| 6 meter [19.7 feet]  | 5492363-6   |
| 8 meter [26.3 feet]  | 5492363-8   |
| 15 meter [49.2 feet] | 1-5492363-5 |

Additional lengths available.  
Custom lengths can be built to customer's specifications.

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

## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Mainframes

#### Description

- A modular "plug-and-go" optical cabling system for mainframe information centers

#### Application

- Replaces copper bus-and-tag cables in parallel architecture, or streamlines IBM ESCON serial fiber optic technology

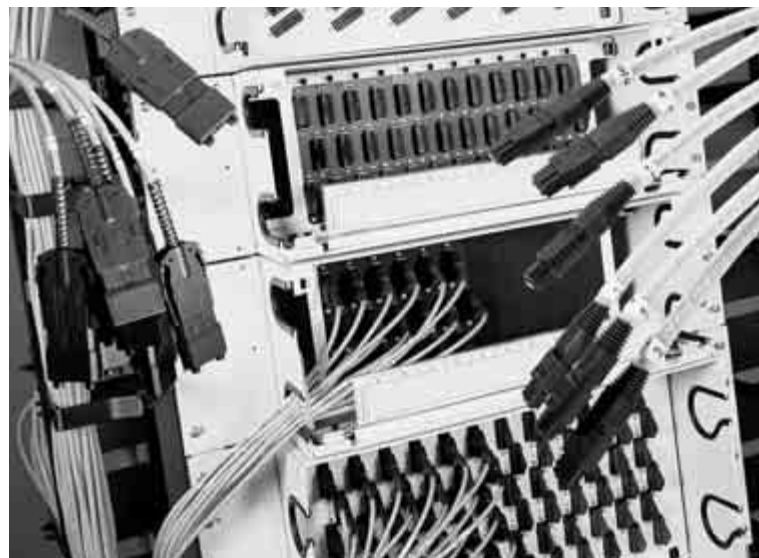
#### Product Facts

- Proven NTT MT linear array technology in the MPO connector
- MPO packs up to 12 optical fibers into a single miniaturized connector about the same size as one SC type
- ESCON Connectors are IBM Approved and 100% compatible
  - Direct attach harnesses
  - Jumper cables
- Cables are pre-terminated and tested
- Distribution hardware is pre-loaded
- Cable rating options:
  - Riser rated, UL-OFNR (std.)
  - Plenum rated, UL-OFNP
  - Low smoke, Zero Halogen rated, LSZH
- Singlemode or Multimode

#### Other Applications

- Cabling System for Premise Networks
- Produced under a Quality Management System certified to ISO 9001

A copy of the certificate is available upon request



Tyco Electronics' MPO modular cabling system is structured to provide unparalleled ease and flexibility in the cabling of IBM Enterprise Systems Connection architecture (ESCON).

MPO provides every thing you need to cable your data center:

- assorted lengths of MPO connectorized 36 and 72-fiber trunks
- 8 or 12-fiber mini-trunks
- MPO to ESCON direct attach harnesses
- pre-loaded distribution enclosures
- MPO coupler bushing mounting brackets
- cable clamps
- ESCON jumper cables

Select what you need to connect your system and plug it in. Installation is faster and easier with cables selected specifically for the hardware layout in your data center.

MPO trunk cables deployed around the periphery or down the center of the computer room through under-floor conveyance systems provide plug-and-go connectivity to pre-loaded MPO distribution enclosures mounted in main and zone cabinets throughout the data center.

Multiple layers of MPO trunks and distribution hardware allow the data center to be divided into zones. Zoning further increases simplicity and flexibility of connections between equipment.

MPO mini-trunks, ESCON jumper cables and harnesses plugged into the distribution panels provide final connections to IBM Enterprise Systems processors, ESCON directors, and I/O devices.

Tyco Electronics' MPO System eliminates thick, inflexible point-to-point copper cables, or tangled bundles of ESCON jumpers

running under computer room floors.

Once installed, the MPO System simplifies the hassles associated with migration. Because fiber transmissions are electrically silent, systems can be upgraded without planned outages. Re-configuring and rearranging equipment is six times faster, since only one connector is plugged in. It is also as simple as unplugging the trunk from the ESCON harness, leaving the harness to be removed with the equipment. Each MPO cable is removable and reusable.

The MPO System takes the superior performance of ESCON fiber optic technology one step further — by simplifying installation and migration, while opening up crowded space under computer room floors, improving air flow and breathing new life into data centers.

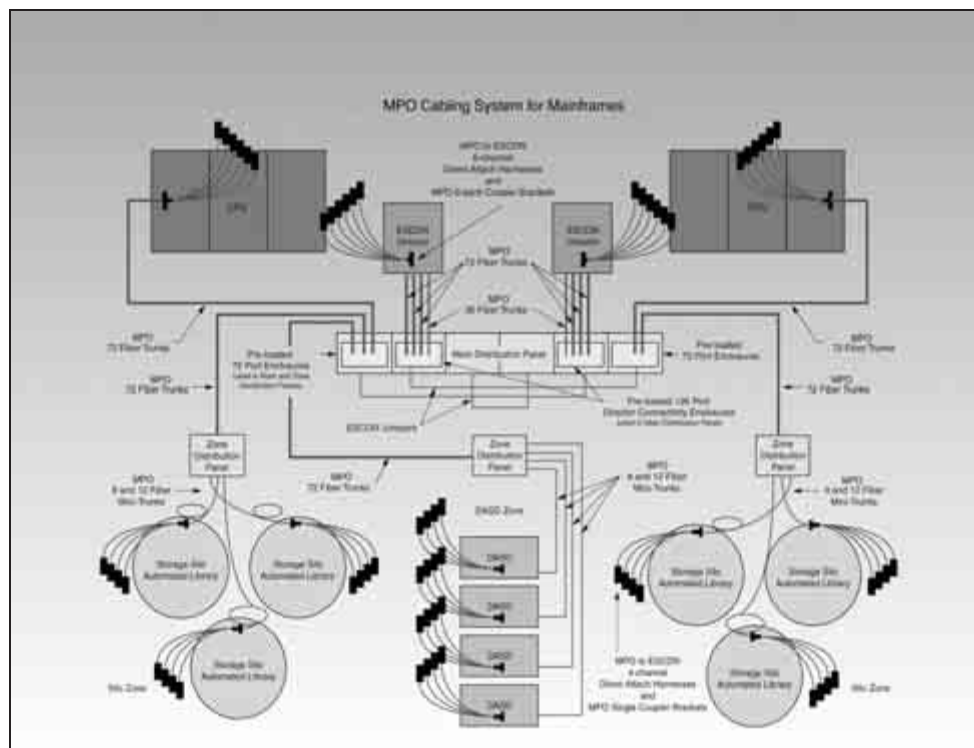
ESCON is a trademark of IBM Corporation.

## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Mainframes (Continued)

#### Product Facts

- Fiber wiring pattern is pair-flipped (AB/BA)
- Also available in straight-through (AB/AB) configuration
- Simple and flexible premise fiber cabling
- All cassettes have MPO trunk connections at rear
- Fits all AMP NETCONNECT Enclosures listed in this catalog that accept snap-in adapter plates
- Easy installation, moves, adds and changes



#### MPO Cassettes

| Part Number | Description          | Color | Fiber Count | Fiber Type               | Config. |
|-------------|----------------------|-------|-------------|--------------------------|---------|
| 6435067-2   | MPO-ST mod. assy.    | Black | 12          | 50                       | Crossed |
| 6278418-2   | MPO-ST mod. assy.    | Black | 12          | 62.5                     | Crossed |
| 6754286-1   | MPO-MT-RJ mod. assy. | Black | 12          | 50                       | Crossed |
| 6754288-1   | MPO-MT-RJ mod. assy. | Black | 24          | 50                       | Crossed |
| 6754285-2   | MPO-MT-RJ mod. assy. | Black | 12          | 62.5                     | Crossed |
| 6754287-1   | MPO-MT-RJ mod. assy. | Black | 24          | 62.5                     | Crossed |
| 1938996-1   | MPO-MT-RJ mod. assy. | Black | 12          | SM                       | Crossed |
| 6828819-1   | MPO-MT-RJ mod. assy. | Black | 24          | SM                       | Crossed |
| 1918777-1   | MPO-MT-RJ mod. assy. | Black | 12          | Laser Optimized (10 Gig) | Crossed |
| 1918778-1   | MPO-MT-RJ mod. assy. | Black | 24          | Laser Optimized (10 Gig) | Crossed |
| 6435181-2   | MPO-SC mod. assy.    | Black | 12          | 50                       | Crossed |
| 6435180-2   | MPO-SC mod. assy.    | Black | 12          | 62.5                     | Crossed |

| Part Number | Description       | Color | Fiber Count | Fiber Type               | Config. |
|-------------|-------------------|-------|-------------|--------------------------|---------|
| 6435069-2   | MPO-SC mod. assy. | Black | 12          | SM                       | Crossed |
| 6754333-2   | MPO-SC mod. assy. | Black | 12          | Laser Optimized (10 Gig) | Crossed |
| 1918779-1   | MPO-LC mod. assy. | Black | 12          | 50                       | Crossed |
| 1918780-1   | MPO-LC mod. assy. | Black | 24          | 50                       | Flipped |
| 1918781-1   | MPO-LC mod. assy. | Black | 12          | 62.5                     | Crossed |
| 1918782-1   | MPO-LC mod. assy. | Black | 24          | 62.5                     | Flipped |
| 1938056-1   | MPO-LC mod. assy. | Black | 12          | SM                       | Crossed |
| 1918786-1   | MPO-LC mod. assy. | Black | 24          | SM                       | Flipped |
| 1918783-1   | MPO-LC mod. assy. | Black | 12          | Laser Optimized (10 Gig) | Crossed |
| 1918784-1   | MPO-LC mod. assy. | Black | 24          | Laser Optimized (10 Gig) | Flipped |

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

ESCON is a trademark of IBM Corporation.

## MPO Cable Assemblies (Continued)

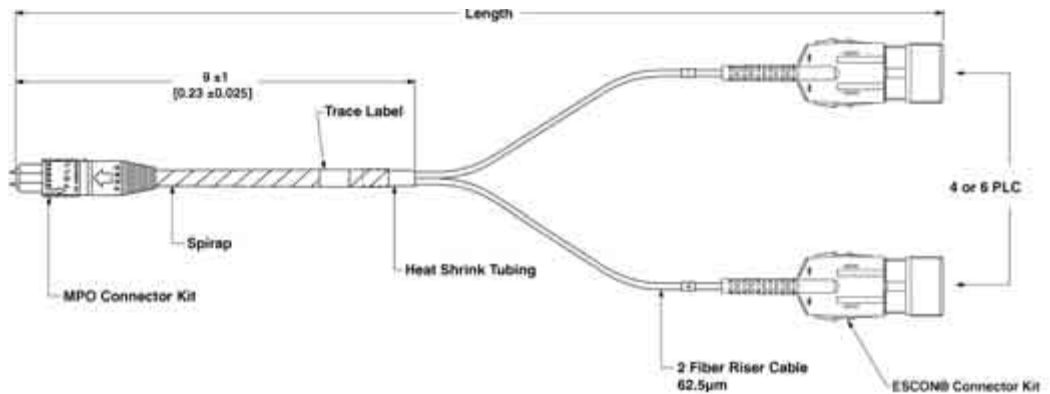
### MPO Cable Assemblies for Mainframes (Continued)

#### MPO to ESCON Direct Attach Harness

4 channel (8 fiber), AB/AB  
straight through

6 channel (12 fiber), AB/AB  
straight through

62.5/125 multimode



| Harness Length      | 6 Channel (12 fiber) |
|---------------------|----------------------|
|                     | Part Number          |
| 3 feet [0.9 meters] | 6754335-1            |

Custom lengths can be built to customer's specifications.  
Cable is Riser rated.

#### ESCON Cable Assemblies 62.5/125 µm Multimode

| Cable Type                | Length (meters) |           |           |           |           |           |             |             |             |             |             |             |
|---------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|
|                           | 1               | 2         | 3         | 4         | 5         | 7         | 13          | 22          | 31          | 46          | 61          | 122         |
| Riser                     | 5492231-1       | 5492231-2 | 5492231-3 | 5492231-4 | 5492231-5 | 5492231-7 | 1-5492231-3 | 2-5492231-2 | 3-5492231-1 | 4-5492231-6 | 6-5492231-1 | 9-5492231-9 |
| Plenum                    | 5492251-1       | 5492251-2 | 5492251-3 | 5492251-4 | 5492251-5 | 5492251-7 | 1-5492251-3 | 2-5492251-2 | 3-5492251-1 | 4-5492251-6 | 6-5492251-1 | 9-5492251-9 |
| Low Smoke<br>Zero Halogen | 5492275-1       | 5492275-2 | 5492275-3 | 5492275-4 | 5492275-5 | 5492275-7 | 1-5492275-3 | 2-5492275-2 | 3-5492275-1 | 4-5492275-6 | 6-5492275-1 | 9-5492275-9 |

Connectors are black, cable is orange.  
Cable construction is two fiber round.  
Custom lengths are available.

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

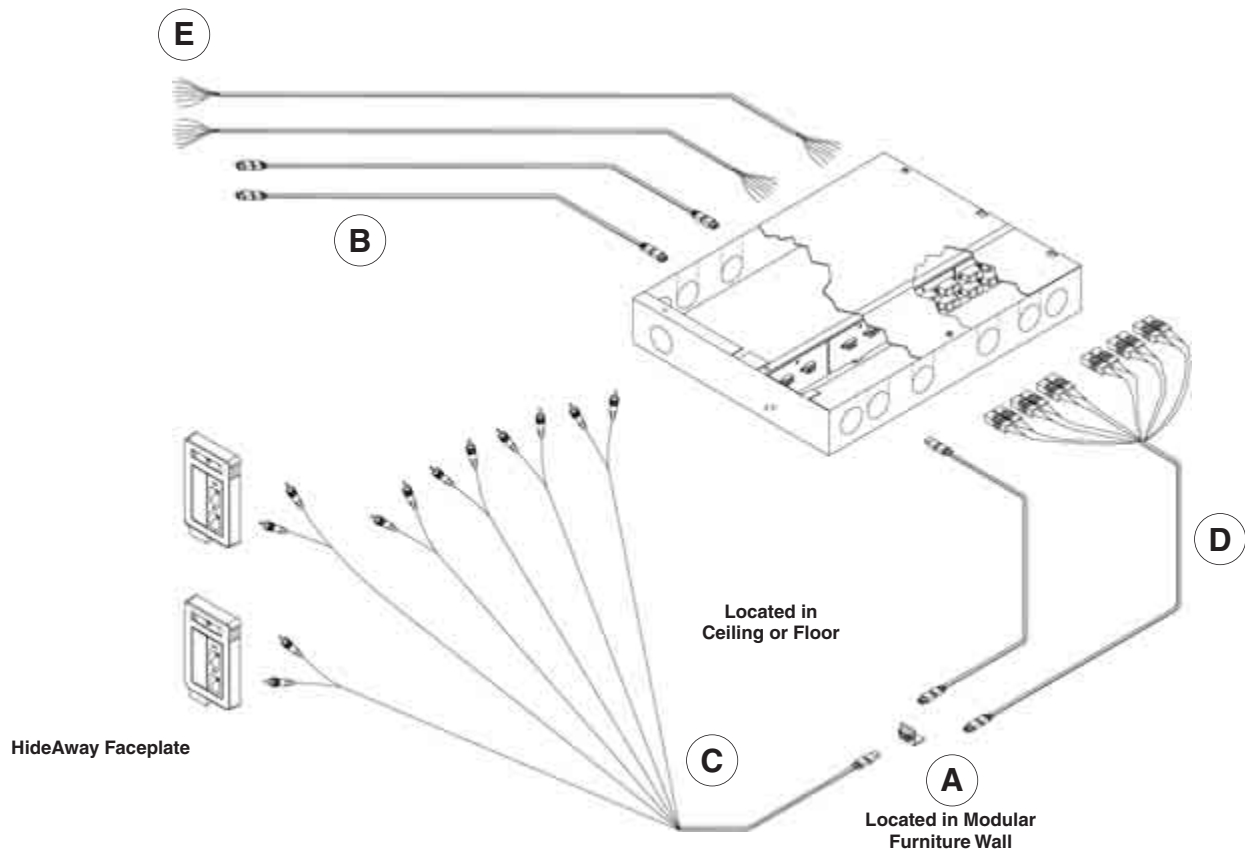
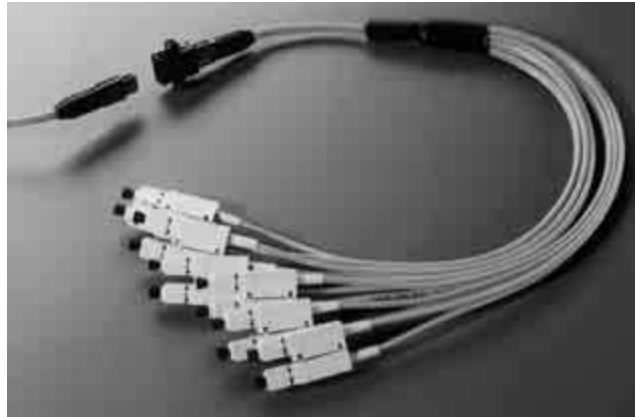
ESCON is a trademark of IBM  
Corporation.



## MPO Cable Assemblies (Continued)

### MPO Cable Assemblies for Mainframes (Continued)

Tyco Electronics' MPO System delivers the full bandwidth of optical fiber while maintaining the flexibility for the open office with reusable assemblies.



#### Ordering Information:

|   | Part Number | Description                                                            |
|---|-------------|------------------------------------------------------------------------|
| A | 5504954-1   | MPO Receptacle Mounting Bracket                                        |
| B | 5492105-X   | MPO Cable Assembly, MPO/MPO straight through, 12 fiber, 62.5/125 mm    |
| C | 5492363-Y   | MPO Cable Assembly, MPO/SC Duplex long fan-out, 12 fiber, 62.5/125 mm  |
| D | 5492362-Z   | MPO Cable Assembly, MPO/SC Duplex short fan-out, 12 fiber, 62.5/125 mm |

X denotes length in meters: -7 = 15, 1- -4 = 30, 1- -5 = 38, 1- -6 = 45, 2- -0 = 8, 2- -1 = 23

Y denotes length in meters: -6 = 6, -8 = 8, 1- -5 = 15

Z denotes length in meters: -6 = 6, -8 = 8, 1- -0 = 10, 1- -5 = 15, 2- -0 = 20

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



## High Density PARA-OPTIX 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 12, 24, 32, 48, and 72 fiber
- Other fiber counts and lengths available
- Save time during installation — requires less connectors
- 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 Tyco Electronics for detailed performance characteristics and specifications.

Specifications are preliminary and subject to change.



Tyco Electronics' high density PARA-OPTIX cable assemblies use the latest in MT-ferrule technology to provide the maximum fiber density for parallel optical applications.

By terminating these ferrules in MPO style connectors, Tyco Electronics is able to take advantage of the industry standards and acceptance of the MPO connector family.

Tyco Electronics' PARA-OPTIX Cable Assemblies can support up to 72 fibers through a single connector, saving space on the board and time during installation.



| Part Number | Description                                          |
|-------------|------------------------------------------------------|
| 6588930-X   | 12-fiber MPO-MPO, 50/125 Multimode                   |
| 6588967-X   | 24-fiber MPO-MPO, 50/125 Multimode                   |
| 6693070-X   | 32-fiber MPO-MPO, 50/125 Multimode                   |
| 6693069-X   | 48-fiber MPO-MPO, 50/125 Multimode                   |
| 1919166-X   | 72-fiber MPO-MPO, 50/125 Multimode                   |
| 6693068-X   | 48-fiber MPO — (4), 12-fiber MPO, 50/125 bare ribbon |
| 6693067-X   | 72-fiber MPO — (6), 12-fiber MPO, 50/125 bare ribbon |

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

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

## Plastic Fiber Cable Assemblies

### F07 Duplex Plastic Fiber Cable Assemblies

#### Product Facts

- Standard and custom lengths
- Conforms to JISC-5976



| Fiber Type                                | Length | Part Number |
|-------------------------------------------|--------|-------------|
| 980/1000 $\mu$ m<br>Plastic Optical Fiber | 1      | 5492155-1   |
|                                           | 2      | 5492155-2   |
|                                           | 3      | 5492155-3   |
|                                           | 5      | 5492155-4   |
|                                           | 10     | 5492155-5   |
|                                           | 15     | 5492155-6   |
|                                           | 20     | 5492155-7   |

### Audio-DNP Plastic Fiber Cable Assemblies

#### Product Facts

- Complies with EIAJ RC-5720 for digital audio equipment and Japan Industry STD F05
- Compatible with TDSLlink
- Mates with receptacle configuration CNF50SR3 Type per EIAJ RC-5720
- Economical and highly reliable based on Tyco Electronics' high speed automatic assembly technologies
- Cable assemblies available with or without logo
- 980/100  $\mu$ m POF cable with UL VW-1 rating



| Length<br>(mm) | Cable Assembly Part Number |            |
|----------------|----------------------------|------------|
|                | Without Logo               | With Logo  |
| 300            | 178671-3                   | 173317-3   |
| 400            | 178671-4                   | 173317-4   |
| 500            | 178671-5                   | 173317-5   |
| 600            | 178671-6                   | 173317-6   |
| 700            | 178671-7                   | 173317-7   |
| 800            | 178671-8                   | 173317-8   |
| 900            | 178671-9                   | 173317-9   |
| 1000           | 1-178671-0                 | 1-173317-0 |
| 1100           | 1-178671-1                 | 1-173317-1 |
| 1200           | 1-178671-2                 | 1-173317-2 |
| 1300           | 1-178671-3                 | 1-173317-3 |
| 1400           | 1-178671-4                 | 1-173317-4 |
| 1500           | 1-178671-5                 | 1-173317-5 |
| 1600           | 1-178671-6                 | 1-173317-6 |
| 1700           | 1-178671-7                 | 1-173317-7 |
| 1800           | 1-178671-8                 | 1-173317-8 |
| 1900           | 1-178671-9                 | 1-173317-9 |
| 2000           | 2-178671-0                 | 2-173317-0 |
| 2500           | 2-178671-1                 | —          |
| 3000           | 2-178671-2                 | —          |
| 3500           | 2-178671-3                 | —          |
| 4000           | 2-178671-4                 | —          |
| 4500           | 2-178671-5                 | —          |
| 5000           | 2-178671-6                 | —          |
| 5500           | 2-178671-7                 | —          |
| 6000           | 2-178671-8                 | —          |
| 10000          | 3-178671-6                 | —          |

#### Applications

- I/O and internal cabling of AV, OA, and FA equipment plus automotive internal networking

#### Performance Characteristics

**Operating Temperature** —  
-30 C to +80 C

**Max. Insertion Loss** — 3.5 dB

**Connector Mating Force** —  
4 Kg max.

**Connector Unmating Force** —  
0.4 to 4 Kg

**Cable Retaining Strength** —  
5 Kg min.

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

## LIGHTPLANE Connector System

### Product Facts

- Optical interconnection of daughter cards to motherboard
- Bellcore compliant SC interface from motherboard
- 2 to 8 positions
- Centerline spacing 12.5 mm (0.492 in.)
- Singlemode and multimode versions
- Daughtercard floats and alignment pins on motherboard assure mating

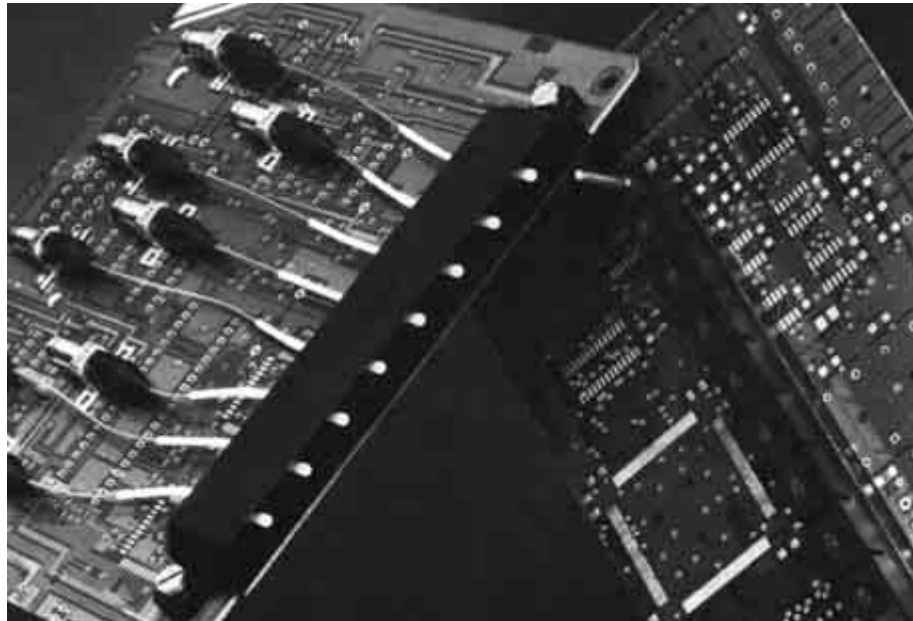
### Performance Characteristics

**Insertion Loss** — 0.5 dB typ.

**Return Loss** — 40 dB min.

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

**Durability** — <0.5 dB after 200 cycles



The Tyco Electronics' LIGHTPLANE Connector is a multi-position fiber optic backplane connector that permits blind mating of singlemode or multimode optical fibers from a daughtercard to a system backplane or motherboard. Now you can simultaneously make both the optical and electronic interconnections when installing the daughtercard. The LIGHTPLANE connector contains up to 8 fiber positions utilizing the standard SC interface.

Use of off the shelf SC components minimizes per line costs. It also eliminates the need for separate optical jumpers from the daughtercards to the front or back of the cabinet, minimizing labor costs and possible fiber damage.

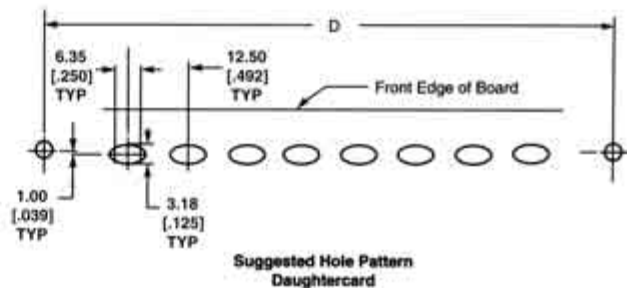
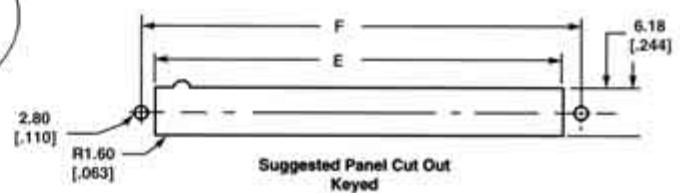
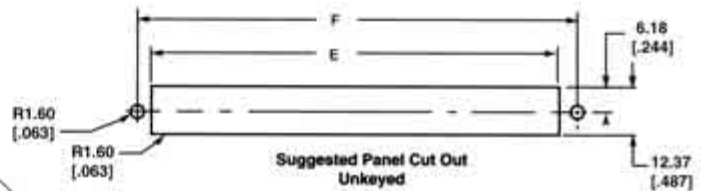
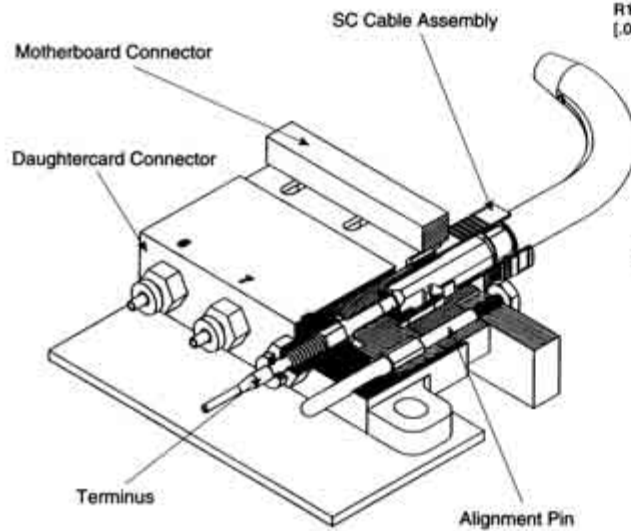
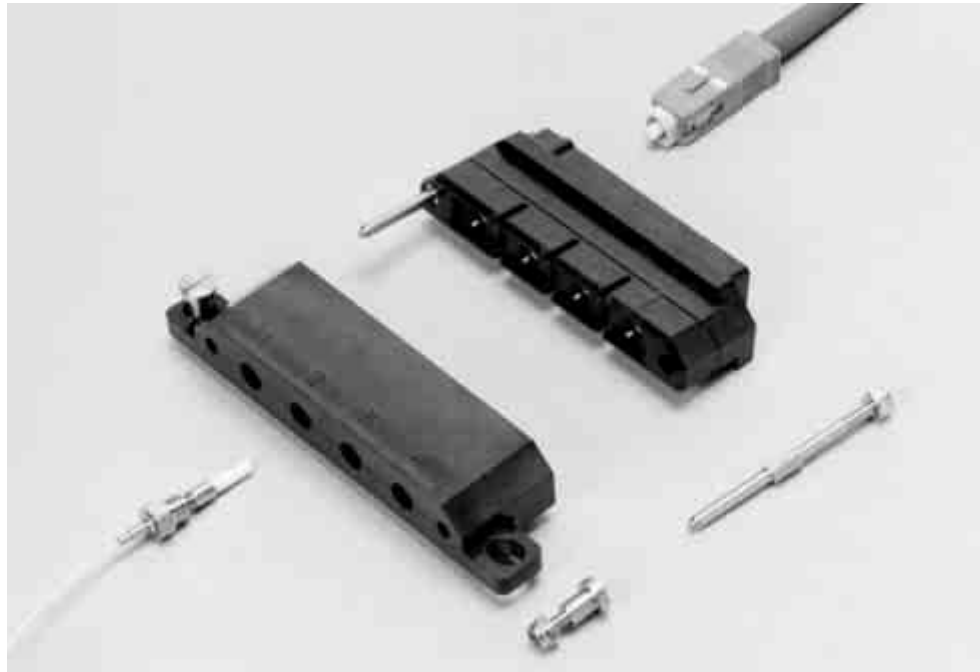
Designed for telecommunications and networking equipment, the LIGHTPLANE connector provides performance comparable to conventional SC interconnections: 0.5 dB typical insertion loss and 40 dB return loss. Shoulder screws on the daughtercard

module provide the necessary float for precise alignment. Daughtercard termini are spring loaded to ensure optical contact between the backplane and daughtercard. The daughtercard connector acts like multiple SC connectors, providing fiber density and minimizing packaging all in one protective shell. The shell protects the optical contacts on all sides from accidental damage if the board is dropped or knocked against a hard surface.

| Description                                                                                        | Size/No. of Positions     | Part Number |
|----------------------------------------------------------------------------------------------------|---------------------------|-------------|
| <b>Daughtercard Connector</b>                                                                      | 8                         | 503185-1    |
| <b>Motherboard Connector</b><br>Ceramic Alignment Sleeves<br>with Polarization Key                 | 8                         | 5503682-1   |
| Description                                                                                        | Type/Fiber Hole Dia. (µm) | Part Number |
| <b>Daughtercard Terminus</b><br>for 900 µm buffered fiber                                          | Singlemode/125            | 5503186-1   |
|                                                                                                    | Singlemode/126            | 5503186-2   |
|                                                                                                    | Singlemode/127            | 5503186-3   |
|                                                                                                    | Multimode/125             | 5503412-1   |
| <b>Pre-Assembled Cable Assembly</b><br>Daughtercard Terminus on<br>both ends-2 meters — Singlemode |                           | 5503683-1   |

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

## LIGHTPLANE Connector System (Continued)



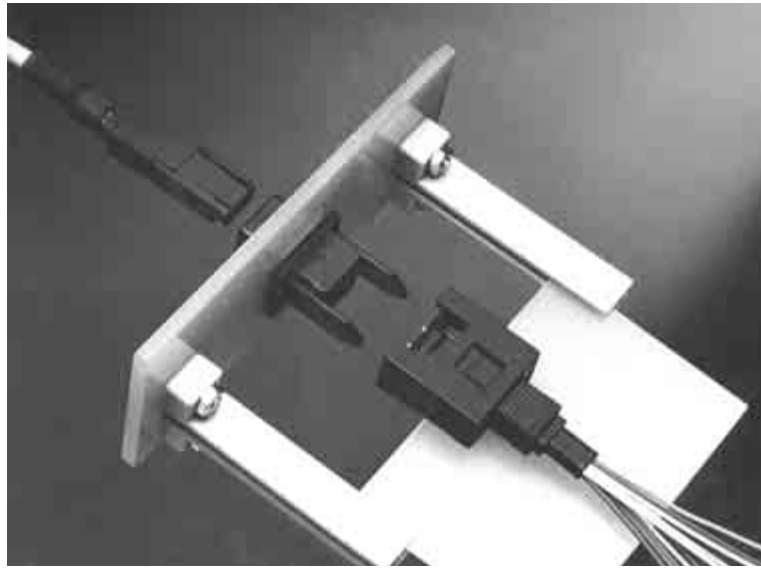
### LIGHTPLANE Connector System

| No. of Positions | Dimension      |                |                |
|------------------|----------------|----------------|----------------|
|                  | D              | E              | F              |
| 1                | 38.00 [1.496]  | 12.88 [.507]   | 20.00 [.787]   |
| 2                | 50.50 [1.988]  | 25.38 [.999]   | 32.50 [1.280]  |
| 4                | 75.50 [2.972]  | 50.38 [1.984]  | 57.50 [2.264]  |
| 8                | 125.50 [4.941] | 100.38 [3.952] | 107.50 [4.232] |

## LIGHTRAY MPX System Interconnects

### 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  $\mu$ m or 50/125  $\mu$ m) and singlemode (9  $\mu$ m) 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:**  
 $\pm 2.0$  mm horizontal  
 $\pm 2.5$  mm vertical  
 $\pm 2$  degree angular



Tyco Electronics' 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  $\mu$ m centers.

Tyco Electronics' 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

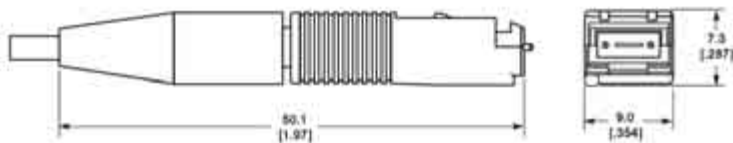
| Parameter                        | Value                   |            |                     |
|----------------------------------|-------------------------|------------|---------------------|
|                                  | Multimode               | Singlemode | Singlemode Low Loss |
| Insertion 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.

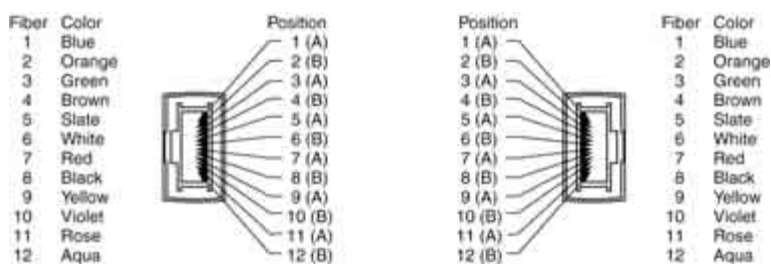


## LIGHTRAY MPX System Interconnects (Continued)

### LIGHTRAY MPX Connector



### Straight Through Fiber Path Configuration



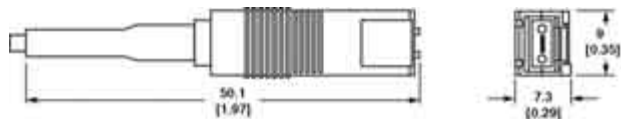
**Straight Through  
Fiber Path Configuration**

Unlike their mainframe application counterparts, LIGHTRAY MPX trunks for Premise applications typically do not require "pair flipping". Pair Flipping, or "AB/BA" transmit/receive configuration is a sequential

channel cross-over scheme used for IBM Enterprise Systems Connectivity (ESCON) architecture. LIGHTRAY MPX premise-trunk fiber pairs are configured as "AB/AB". For example — blue fiber

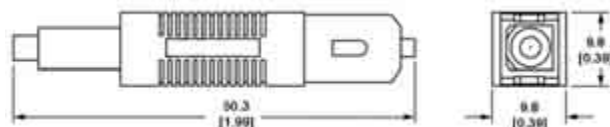
(1) travels straight the cable and exits on the opposite end in the same position (1), as illustrated below. This fiber path configuration is known as "straight through".

### LIGHTRAY MPX Connector



LIGHTRAY MPX Connector accommodates up to 12 fibers in a form factor smaller than typical single-fiber connectors

### SC Connector



ESCON is a trademark of IBM Corporation.



## LIGHTRAY MPX System Interconnects (Continued)

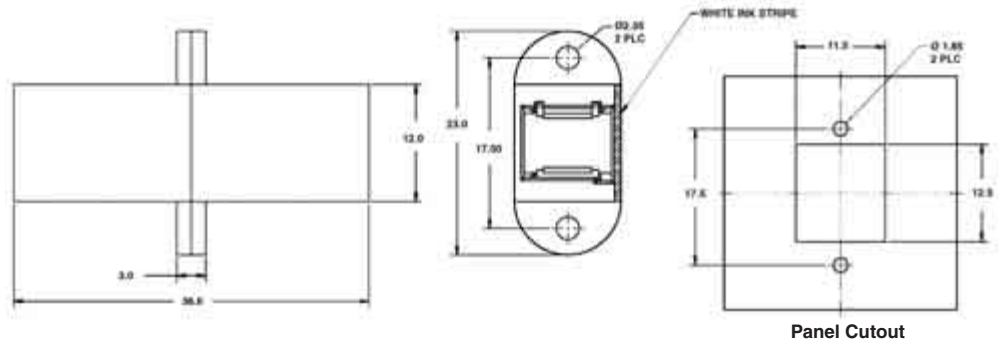
### Bulkhead Coupling Adapter

Part Number 492305-1



#### Product Facts

- Use two #2 screws for panel mounting
- LIGHTRAY MPX coupling adapter uses the same dust cover as the SC coupling adapter
- Can be mounted side-by-side for maximum port density



### Backplane Housings and Adapters

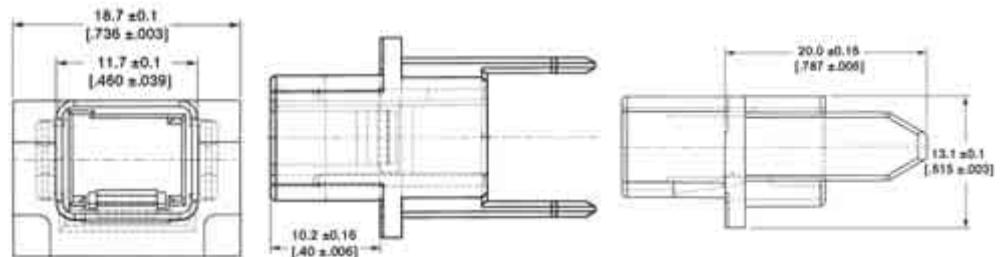
#### Backplane Housing — Simplex

Part Number 492739-1

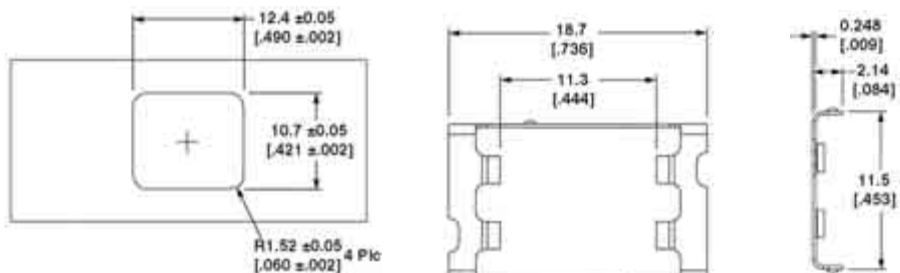


#### Product Facts

- All backplane mounting holes must be within 0.1 mm diameter true position of nominal from backplane datums to assure proper mating
- Used to mate any LIGHTRAY MPX Connector from the backplane side
- Mates to 492234-1



Clip Part Number 492740-2



Backplane Cutout

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

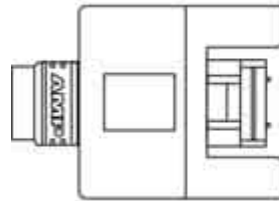
## LIGHTRAY MPX System Interconnects (Continued)

### Backplane Housings and Adapters (Continued)

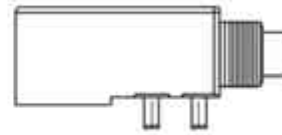
#### System Card Housing — Simplex



#### Part Number 492234-1



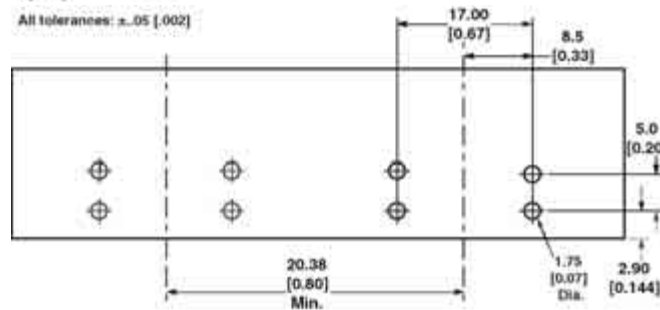
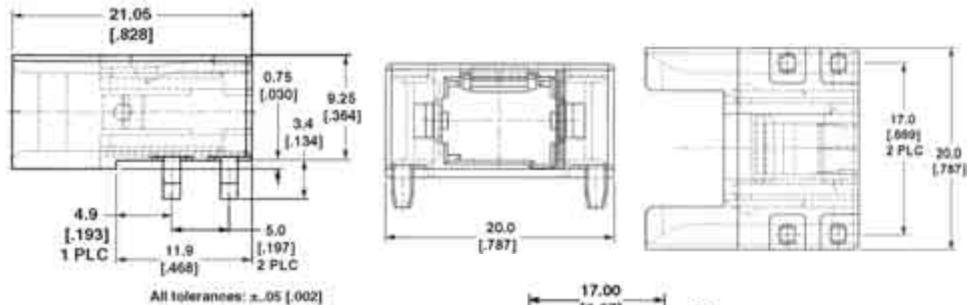
Top View



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
- Space daughtercard mounting hole patterns no closer than 20.38 mm
- All daughtercard mounting holes must be within 0.1 mm diameter true position of nominal from daughtercard daturn to assure proper mating
- Mates to 492739-1

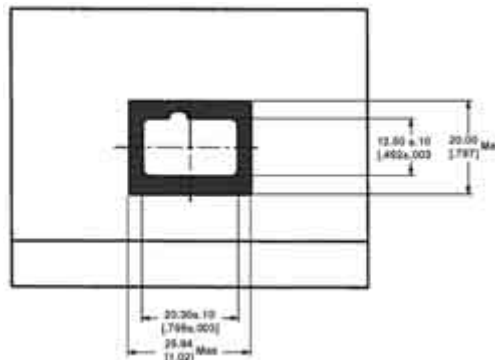
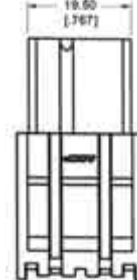
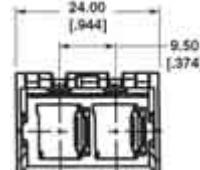
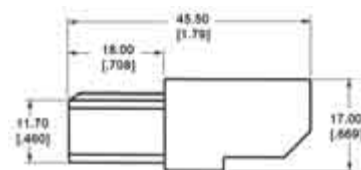


Daughtercard Housing Spacing

#### Backplane Housing — Duplex



#### Part Number 1374490-1 and 6374493-1 (with safety shutter)



Panel Cutout

#### Product Facts

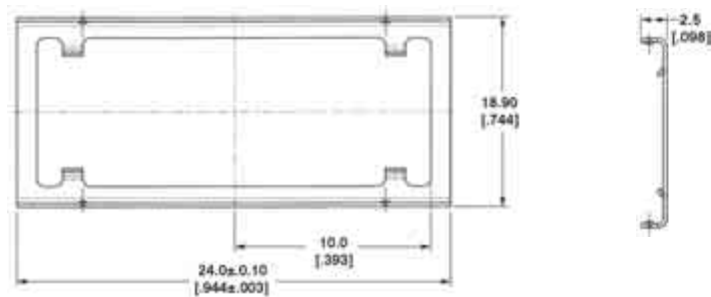
- Holds two standard or low loss LIGHTRAY MPX connectors
- Optional self actuated laser safety shutter
- Up to 48 fibers simultaneously mated and managed
- Mates to part number 1374491-1
- Used with clip part number 1278530-2 (next page)

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

## LIGHTRAY MPX System Interconnects (Continued)

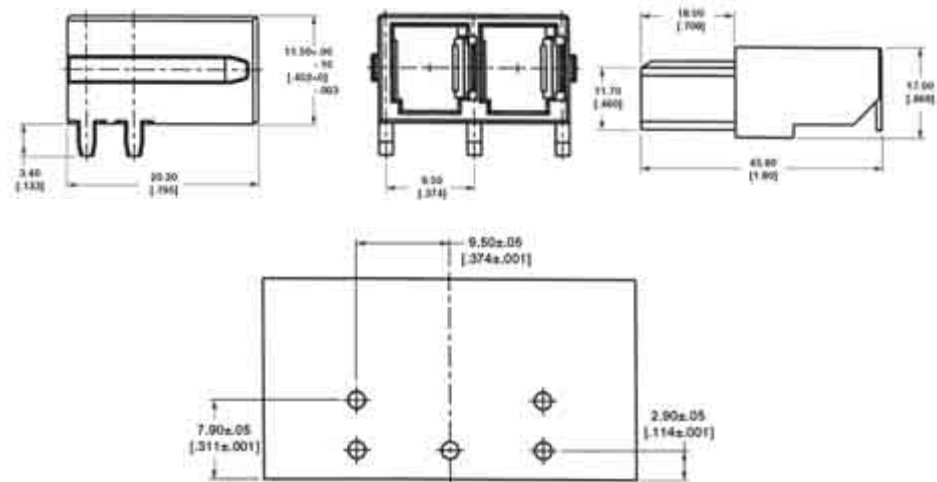
### Backplane Housings and Adapters (Continued)

#### Clip Part Number 1278530-2, 1 x 2 Duplex



### System Card Housing — Duplex

#### Part Number 1374491-1



Recommended Hole Pattern

#### Product Facts

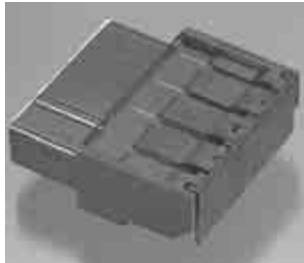
- Holds two standard or low loss LIGHTRAY MPX connectors
- Up to 48 fibers simultaneously mated and managed
- Simple press-fit mounting, no hardware needed
- Unique latching provides positive retention when card is unmated
- Mates to part number 1374490-1

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

## LIGHTRAY MPX System Interconnects (Continued)

### Backplane Housings and Adapters (Continued)

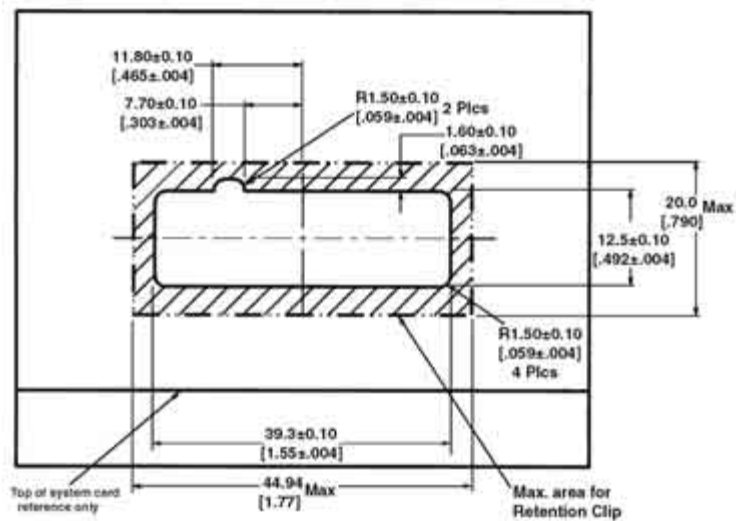
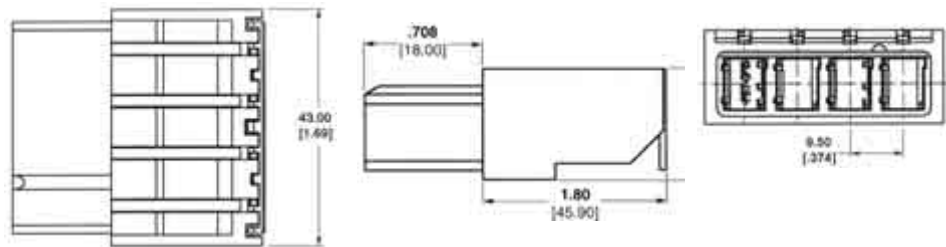
#### Backplane Housing — Quad



#### Product Facts

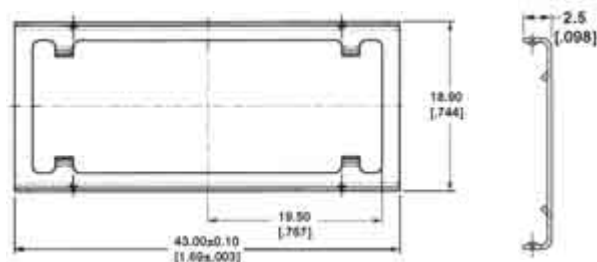
- Holds up to 4 standard or low loss LIGHTRAY MPX connectors
- Self actuated laser-safe shutter
- Up to 96 fibers simultaneously mated and managed
- Integral “tool safe” cable latching
- Mates to 1278391-1
- Used with clip 1278530-1

#### Part Number 6278529-1



Suggested Panel Cutout Looking from System Card Side

#### Clip Part Number 1278530-1, 1 x 4 Quad



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

## LIGHTRAY MPX System Interconnects (Continued)

### Backplane Housings and Adapters (Continued)

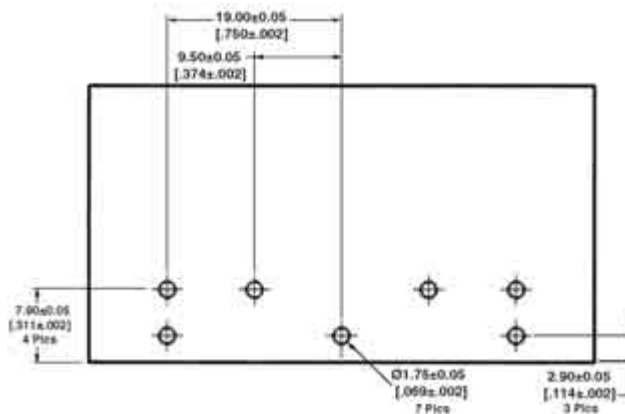
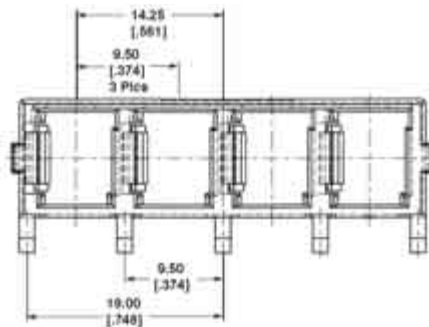
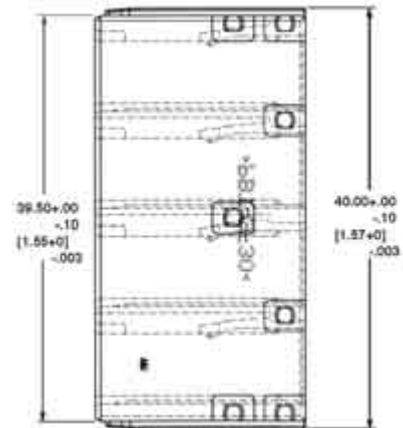
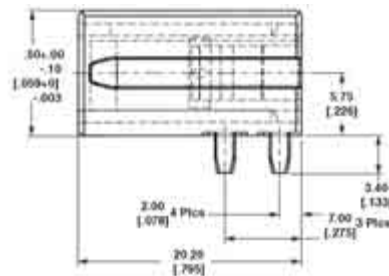
#### System Card Housing — Quad



#### Product Facts

- Holds 4 standard or low loss LIGHTRAY MPX connectors
- Up to 96 fibers simultaneously mated and managed
- Simple press-fit mounting — no hardware needed
- Unique latching provides positive retention when card is unmated
- Mates to 6278529-1

#### Part Number 1278391-1



Recommended Hole Pattern

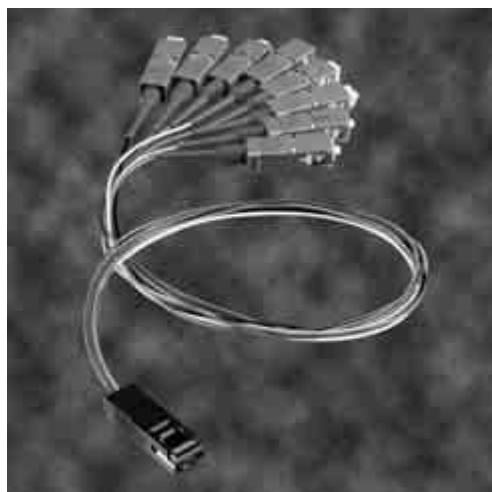
**Note:** All part numbers are RoHS compliant.

## LIGHTRAY MPX System Interconnects (Continued)

### Fanout Assemblies

#### Product Facts

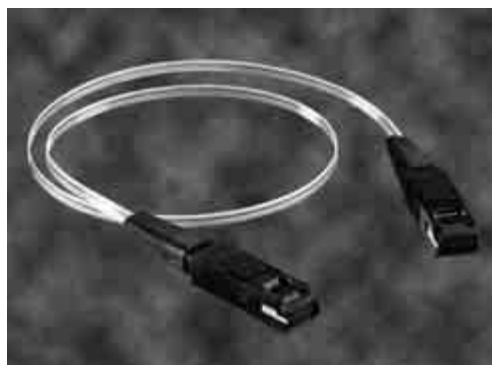
- Multimode 62.5/125  $\mu\text{m}$  and 50/125  $\mu\text{m}$
- Singlemode 9  $\mu\text{m}$ , 8° angle interface
- Color coded buffered fiber or LSZH (Low Smoke Zero Halogen) sheathed cable with breakout kit
- Male LIGHTRAY MPX connectors (with guide pins)
- 4, 8, 12, 16 and 24 fibers
- Custom lengths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



### Mini Trunk Assemblies

#### Product Facts

- Multimode 62.5/125  $\mu\text{m}$  and 50/125  $\mu\text{m}$
- Singlemode 9  $\mu\text{m}$ , 8° angle interface
- 250  $\mu\text{m}$  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  $\mu\text{m}$  and 50/125  $\mu\text{m}$
- Singlemode 9  $\mu\text{m}$ , 8° angle interface
- Available with female LIGHTRAY MPX connectors (without guide pins) and/or male LIGHTRAY MPX connectors (with guide pins)
- 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 System Interconnects (Continued)

### System Card Assemblies

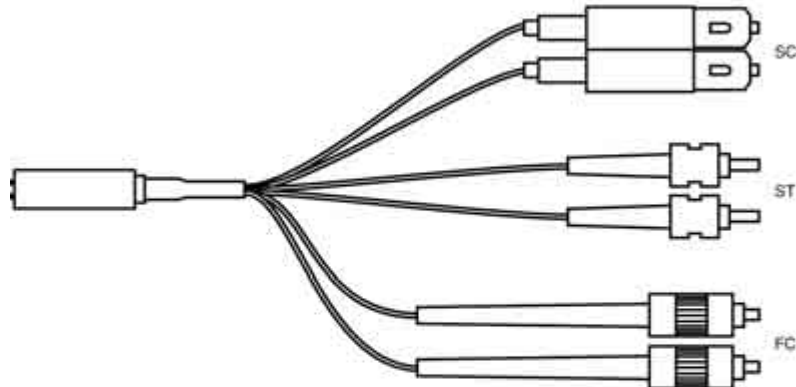


LIGHTRAY MPX to LIGHTRAY MPX Connector

### Fanout Assembly Options

#### Product Facts

- Multimode and singlemode
- Available with 900  $\mu$ m buffered fiber, jacketed cable and ruggedized cable
- SC, ST, FC, MT-RJ, LC or other industry-standard connector terminations available
- Up to 24 fibers
- Custom lengths available



LIGHTRAY MPX Connectors to Industry-Standard Connectors



LIGHTRAY MPX Connector Pigtail

Factory terminated assemblies are supplied custom built for each application. Assemblies are fully tested and can be offered with standard (multimode) or 8° angled (singlemode) end finishes to meet return loss needs.

The connectors accommodate various cable types, including ribbon and easy strip cable. The variety of configurations in cable assemblies makes it easy to transition from industry standard transceiver interfaces at one end and patch panels at the other. Factory terminated cables also speed system assembly, since the cables quickly and simply snap into place.

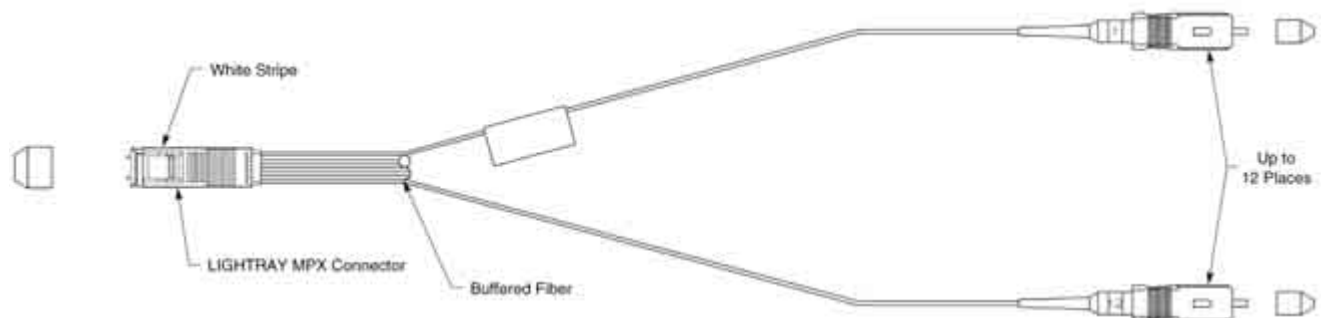
## LIGHTRAY MPX System Interconnects (Continued)

### System Card Assemblies (Continued)

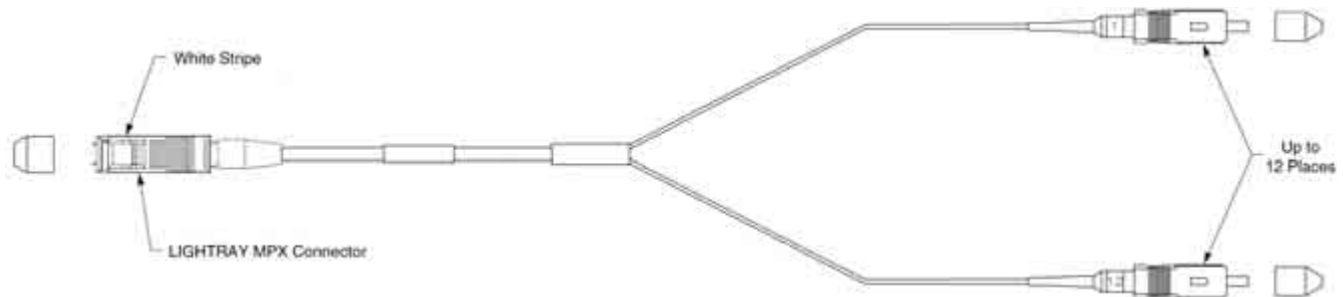
#### Optical Performance Characteristics

- Mean insertion loss of 0.35 dB, with a maximum of 1.0 dB for both multimode and singlemode
- Minimum return loss 45 dB (8° APC interface for singlemode)

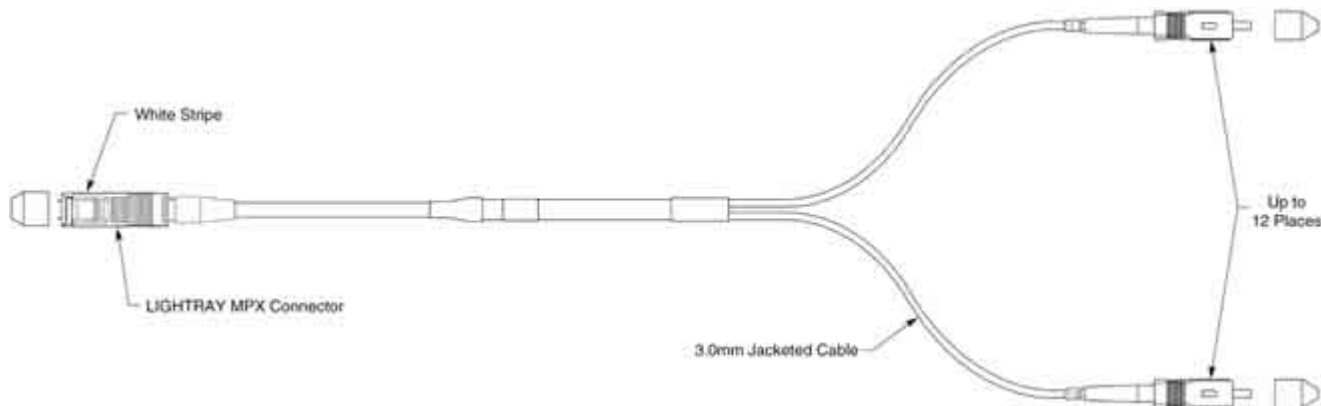
#### LIGHTRAY MPX Fanout Assembly — 900 $\mu$ m Buffered Fiber



#### LIGHTRAY MPX Fanout Assembly — Jacketed Cable



#### LIGHTRAY MPX Fanout Assembly — Ruggedized Cable



## LIGHTRAY MPX System Interconnects (Continued)

### Patch Cords

### Cable Assembly Options

#### Product Facts

- Multimode and singlemode
- Up to 24 fibers
- Ribbon cable, ruggedized or unruggedized cable construction
- Custom lengths available

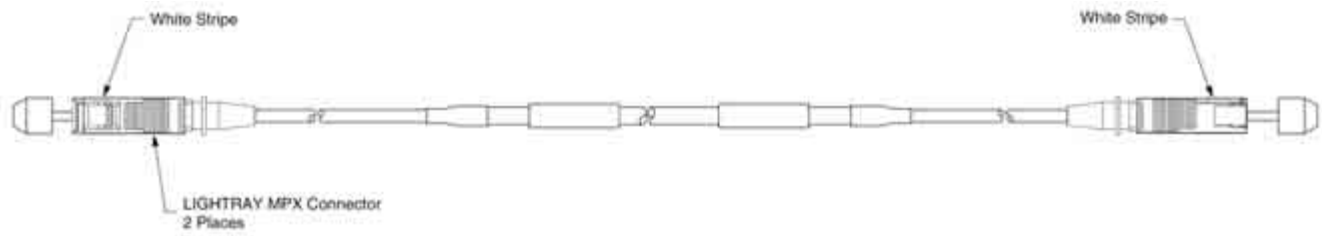
The LIGHTRAY MPX connector is pre-terminated onto fiber optic cable and pre-tested at the factory before being shipped.

It can be used with either multimode or singlemode fiber and accepts a wide range of cable constructions, including ribbon fiber or "easy strip" fiber.

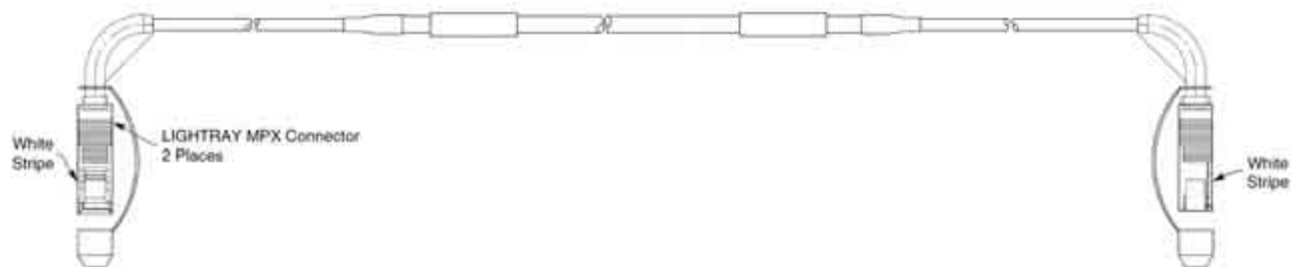
### LIGHTRAY MPX to LIGHTRAY MPX Cable Assembly — Ribbon Fiber



### LIGHTRAY MPX to LIGHTRAY MPX Cable Assembly — Jacketed Cable — Straight



### LIGHTRAY MPX to LIGHTRAY MPX Cable Assembly — Jacketed Cable — Right Angle



## LIGHTRAY MPX System Interconnects (Continued)

### LIGHTRAY MPX Cable Assemblies

| Description                                                         | Part Number |
|---------------------------------------------------------------------|-------------|
| <b>Singlemode</b>                                                   |             |
| <b>Standard Loss LIGHTRAY MPX Cable Assemblies</b>                  |             |
| 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 (f) pigtail assy., 900 µm buffered fibers      | 6374537-X   |
| 8-fiber LIGHTRAY MPX (m) pigtail assy., 900 µm buffered fibers      | 6374538-X   |
| 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   |
| 8-fiber LIGHTRAY MPX (f) to LIGHTRAY MPX (f) assy., jacketed ribbon | 6374887-X   |
| 12-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon    | 6374743-X   |
| 12-fiber LIGHTRAY MPX (m) assy. to (12) SC, ruggedized              | 5492515-X   |
| <b>Low Loss LIGHTRAY MPX Cable Assemblies</b>                       |             |
| 4-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon     | 6457398-X   |
| 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   |
| 8-fiber LIGHTRAY MPX (m) to LIGHTRAY MPX (m) assy., bare ribbon     | 6374738-X   |

**Note:** All assemblies are custom built to customer's length specifications. Dash number indicates length. Please contact Tyco Electronics for proper dash number.

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

## LIGHTRAY MPX System Interconnects (Continued)

### Dust Covers

| Description     |                | Part Number              |
|-----------------|----------------|--------------------------|
| <b>Simplex</b>  |                |                          |
| 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                |
| <b>Duplex</b>   |                |                          |
| System Card     | Board Side     | 5502871-1                |
|                 | Backplane Side | 1374674-1                |
| Backplane       | Inside Cage    | 6374671-1                |
|                 | Back of Rack   | 5502871-1                |
| <b>Quad</b>     |                |                          |
| System Card     | Board Side     | 5502871-1                |
|                 | Backplane Side | 1374547-1                |
| Backplane       | Inside Cage    | 6374548-1                |
|                 | Back of Rack   | 5502871-1                |
| <b>Bulkhead</b> |                | 5502871-1                |
| <b>Cable</b>    |                | 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 Tyco Electronics' 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.

## LIGHTRAY MPX System Interconnects (Continued)

### Tooling and Accessories



#### Simplex Backplane Housing Tooling

| Part Number | Description                                                               |
|-------------|---------------------------------------------------------------------------|
| 492356-3    | System Card Mounting (Kit)                                                |
| 492356-2    | Backplane Mounting (Kit)                                                  |
| 492356-1    | System Card & Backplane Mounting (Kits)                                   |
| 492493-1    | Backplane Connector Side — Connector Support                              |
| 1278315-1   | Retention Clip Tool (Molded Plastic)                                      |
| 492578-1    | Dust Cover — System Card Connector                                        |
| 5492576-1   | Dust Cover — Backplane Connector Mating Connector Side (System Card Side) |
| 503967-5    | Dust Cover Removal Tool — Backplane (System Card Side)                    |
| 5502871-1   | Dust Cover — Backplane Connector Cable Side <sup>1</sup>                  |
| 492740-2    | Retention Clip                                                            |

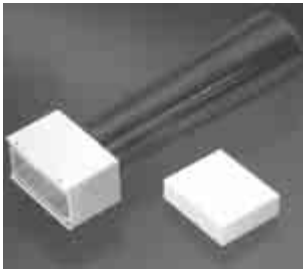
<sup>1</sup> Dust cover shown is flush mount. Same part with finger tabs is 1374678-1.

#### Duplex Backplane Housing Tooling

| Part Number                      | Description                                                               |
|----------------------------------|---------------------------------------------------------------------------|
| (Customer Supplied) <sup>2</sup> | System Card Seating Tool (Flat Rock on Housing)                           |
| (Customer Supplied) <sup>2</sup> | System Card Support Tool (Clearance for Attachment Posts)                 |
| 1278944-2                        | Backplane Connector Side — Connector Support                              |
| 1278945-4                        | Retention Clip Tool (with Handle)                                         |
| 1374674-1                        | Dust Cover — System Card Connector                                        |
| 6374671-1                        | Dust Cover — Backplane Connector Mating Connector Side (System Card Side) |
| 503967-5                         | Dust Cover Removal Tool — Backplane (System Card Side)                    |
| 5502871-1                        | Dust Cover — Backplane Connector Cable Side <sup>1</sup>                  |
| 1278530-2                        | Retention Clip                                                            |

<sup>1</sup> Dust cover shown is flush mount. Same part with finger tabs is 1374678-1.

<sup>2</sup> System card tooling is "customer supplied" — suggested detail is defined in application specifications (contact Tyco Electronics for availability).



#### Quad Backplane Housing Tooling

| Part Number                      | Description                                                               |
|----------------------------------|---------------------------------------------------------------------------|
| (Customer Supplied) <sup>2</sup> | System Card Seating Tool (Flat Rock on Housing)                           |
| (Customer Supplied) <sup>2</sup> | System Card Support Tool (Clearance for Attachment Posts)                 |
| 1278944-1                        | Backplane Connector Side — Connector Support                              |
| 1278945-2                        | Retention Clip Tool (with Handle)                                         |
| 1374547-1                        | Dust Cover — System Card Connector                                        |
| 6374548-1                        | Dust Cover — Backplane Connector Mating Connector Side (System Card Side) |
| 503967-5                         | Dust Cover Removal Tool — Backplane (System Card Side)                    |
| 5502871-1                        | Dust Cover — Backplane Connector Cable Side <sup>1</sup>                  |
| 1278530-1                        | Retention Clip                                                            |

<sup>1</sup> Dust cover shown is flush mount. Same part with finger tabs is 1374678-1.

<sup>2</sup> System card tooling is "customer supplied" — suggested detail is defined in application specifications (contact Tyco Electronics for availability).

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



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**Engineering Notes**

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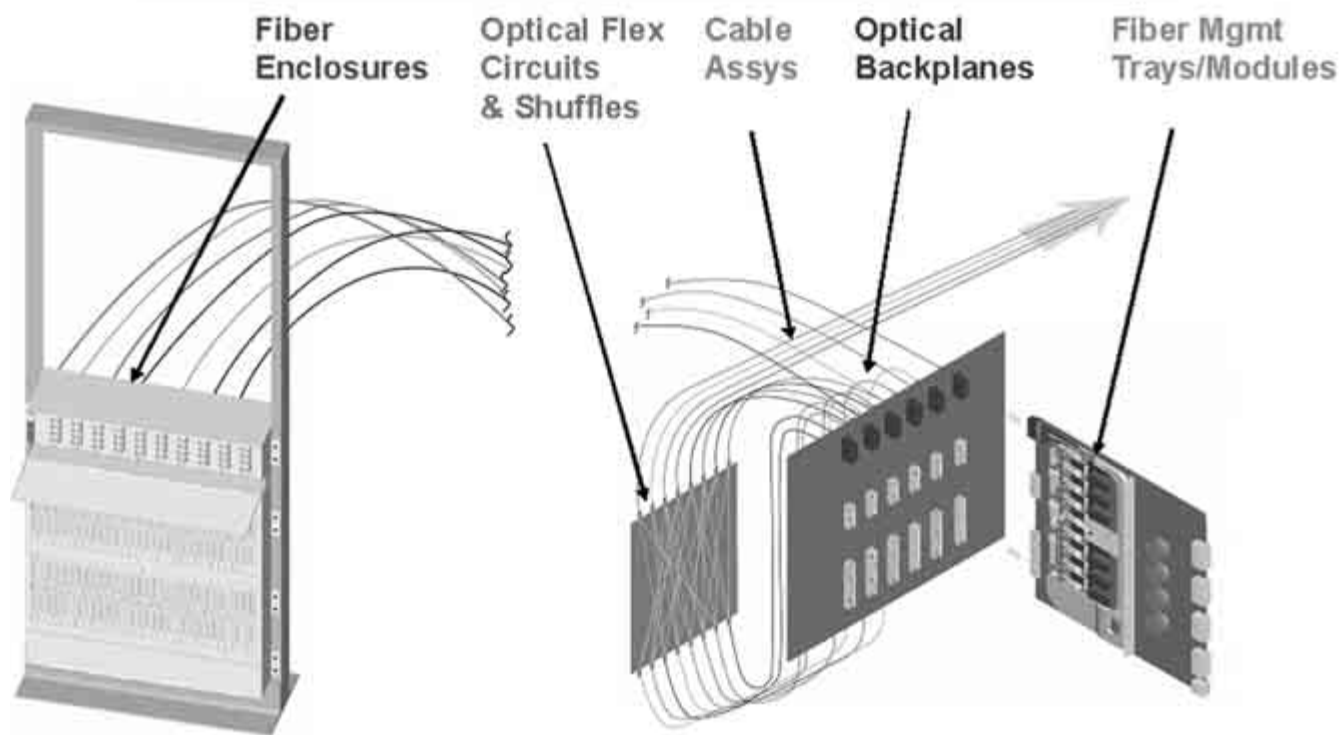


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### Fiber Management, Packaged Solutions, Sub Systems & Laser Process

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## Fiber Management Systems



Tyco Electronics' Fiber Optics Business Unit 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 Tyco Electronics' Sales Representative for design assistance.**

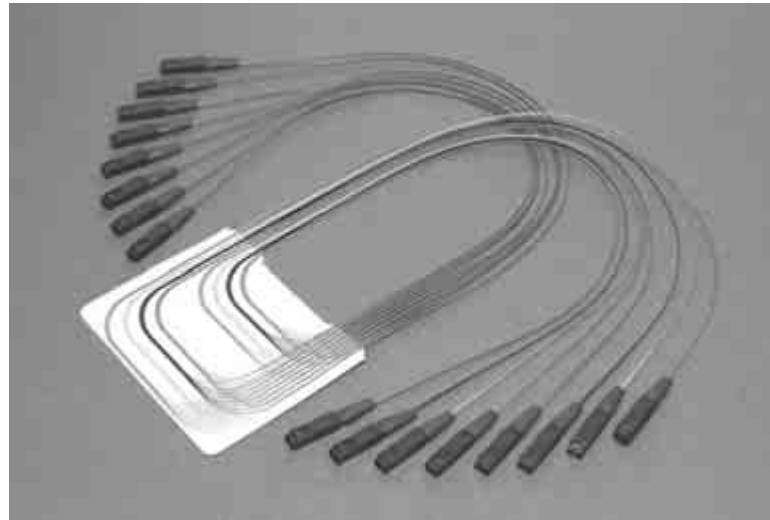
## LIGHTRAY OFX Optical Fiber Circuit Assemblies

### 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 V0 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



Tyco Electronics' 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  $\mu$ m 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

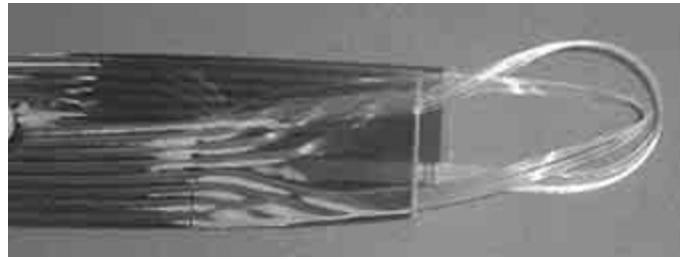
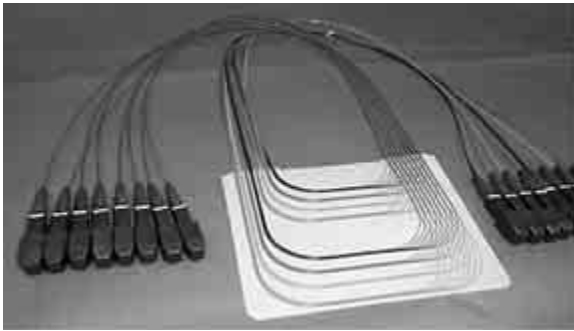
**Storage Temperature** — -40°C to +85°C

**Humidity** — 95%

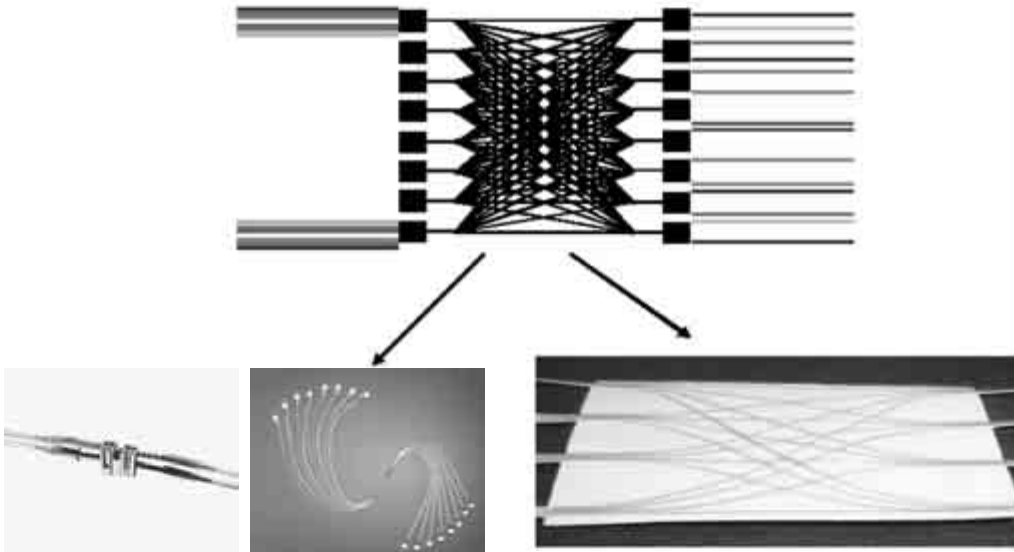
\* final loss depending on connector types

## LIGHTRAY OFX Optical Fiber Circuit Assemblies (Continued)

### Optical Flex Circuits & Shuffles



### Optical Shuffle (Perfect)



Tyco Electronics' Optical Flex Circuits offer unique solutions that can greatly simplify fiber routing, just as the printed circuit board simplified electrical wiring. We offer a broad range of Optical Flex Circuit solutions, so that even the most complex routing challenges can be efficiently resolved:

- Standard ribbon or single fiber terminations
- Custom point-to-point routing done by Numerically Controlled (NC) machine
- Attachment to rigid carrier or copper backplane
- Low loss: < 0.05 typical
- Tube style "shuffles" for optimum density
- On board fiber management
- Stacked shuffles can be used as cross connects

## On Card Fiber Management

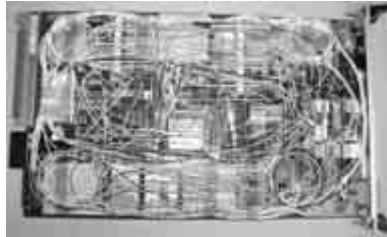
### Product Facts

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

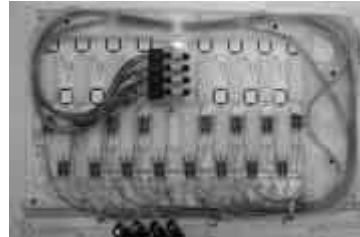
### Benefits

- 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

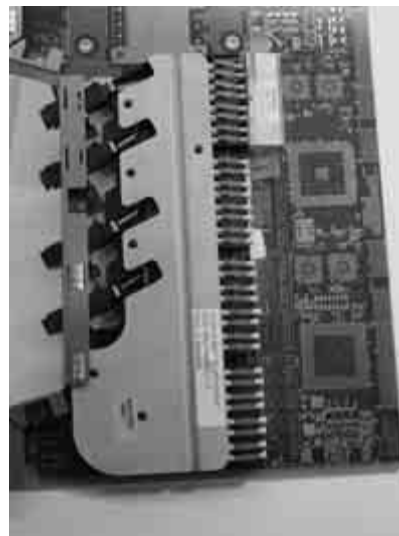
Before



After



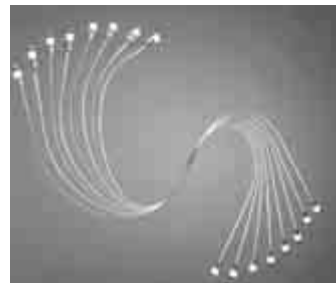
Thin modules designed to fit on your system card.



Plug and play — drop the module on your board and plug the connectors.



Non-planar circuits





## Optical Backplanes & Fiber Management Solutions



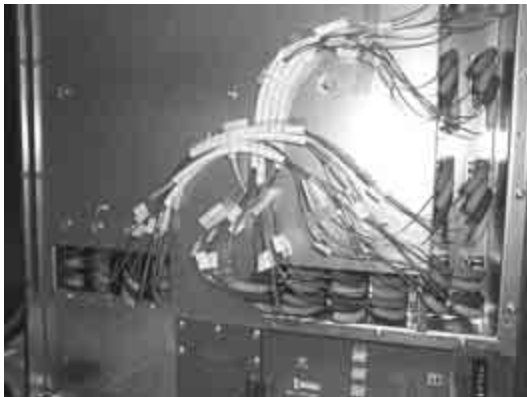
**LIGHTRAY MPX Optical Backplane**



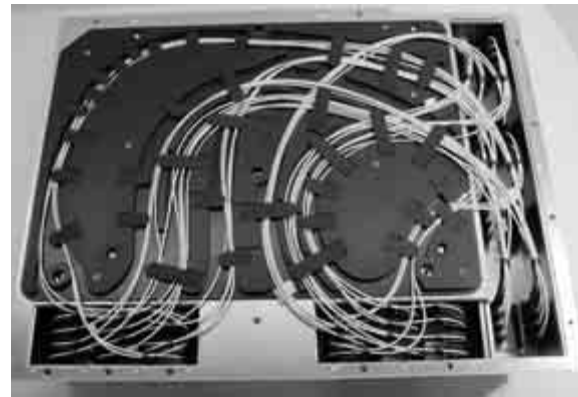
**Backside of Optical Backplane with  
Fiber Management**

### Fiber Management Solutions

**Before**



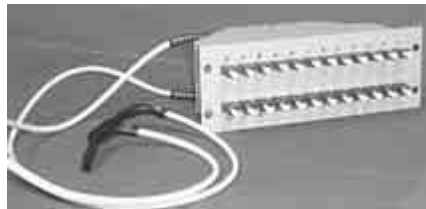
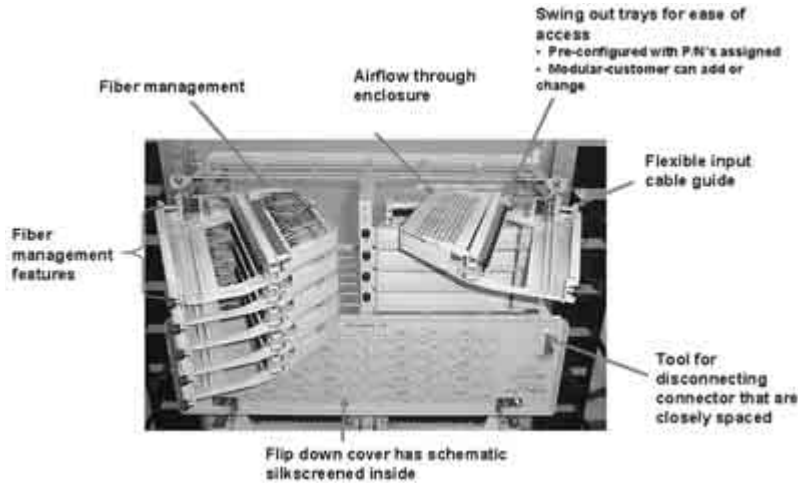
**After**



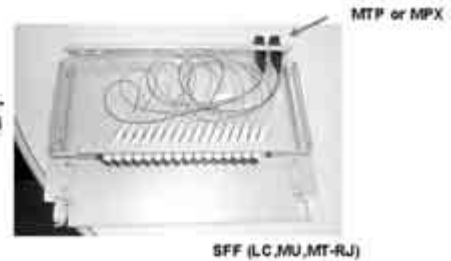
Customers' demands for scalability and adding optics functionality in the field can be satisfied with custom Optical Backplanes provided as complete modules by Tyco Electronics. Optical backplanes can be integrated with a variety of fiber management solutions to resolve most complex applications. Optical backplanes, using Tyco Electronics' LIGHTRAY MPX Interconnection System offers several significant benefits:

- Backplane connector float in all planes
- Proven and reliable MT technology
- Singlemode and multimode
- Up to 24 fibers per MT ferrule available
- High density: up to 96 fibers in 50 mm (using 24 fiber ferrule)
- Easily Upgradeable: start with all 12 fibers loaded in backplane cable and you can upgrade your system card from 4 to 8 to 12 fibers without changing the backplane cabling.
- Can be integrated with copper backplane, Optical Flex circuits, or specialized fiber management solutions

## Enclosures and Customer Interface Panels



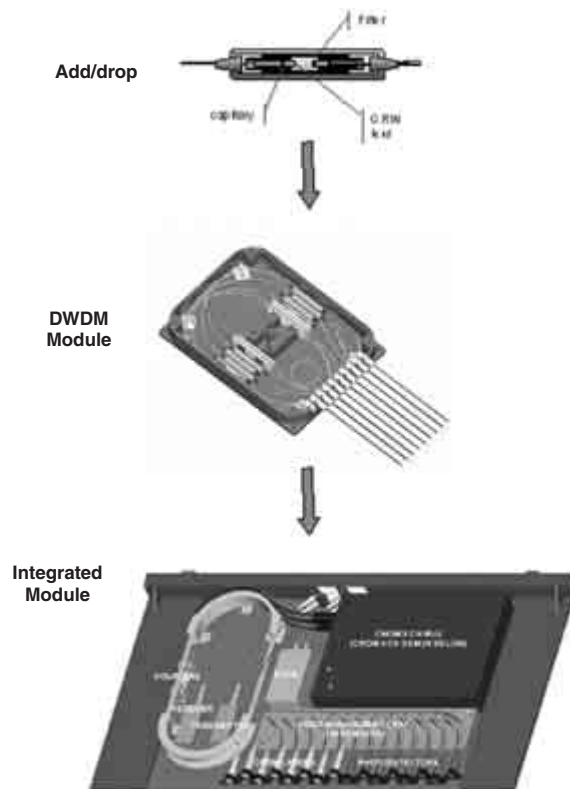
Tray is pre-loaded and tested.



As customer interface panels and enclosures increase in fiber count and density, issues of fiber management, reparability, 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

## xWDM & Integrated Modules



### Standard Modules



### Custom Module



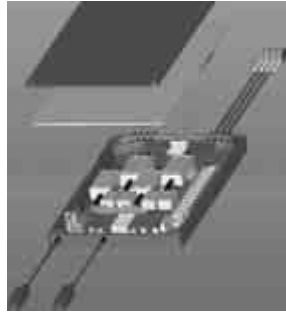
Tyco Electronics' offers standard and custom completed xWDM modules. Capabilities include:

- Work with increasingly tighter specifications and higher density requirements
- 100 & 200 GHz, C, Passband, AWG's, etc.
- Modules 100% tested with SWS
  - Small increments and narrow spectral width for optical performance over the entire operating range
  - Tested for PDL as well as IL
- Offer expertise in packaging and testing of add-drops. Will also source newest technology outside
- Custom and high density packaging can be provided, standard cassettes also available
- Will integrate into higher value add modules.

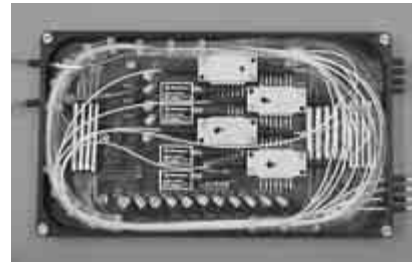
**See Attenuator, WDM's and Switches, Section 5, pages 185 & 186 for details on WDM products.**

## Advanced Optical Modules

### Concept to Production



Concept

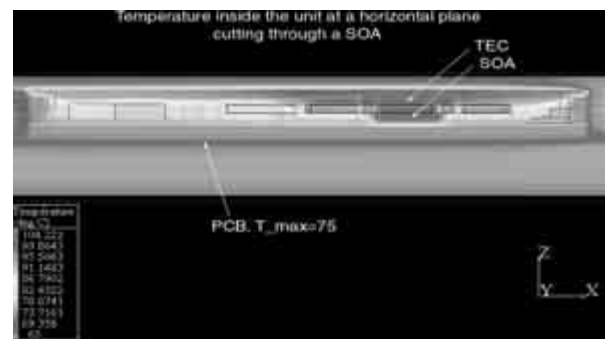


Production

Tyco Electronics offers fully designed optical modules for individual customer requirements. Modules can offer complete integration of passive, active, and electrical components. Solutions can incorporate:

- Amplifier technologies: EDFA, SOA, EDWA
- Protection circuitry
- Line balancing/equalization
- Amplification for transparent networks

- Fiber management, component placement/profiles and impact on thermals
- Design for manufacturability
- Reliability



### Design for Manufacturability



From complex optics to packaging designs for specialized customer needs including:

- Electrical and optical design
- Scale to manufacturing; optimize costs and benefits of discrete vs integrated solutions

- Custom packaging of standard devices and increase density
- Integrated E/O components
- Module layouts optimized to meet GR-63
- Standard modeling tools (Pro-E)

- Component layout to maintain bend radius compliance
- Design for repair-ability

## Advanced Optical Modules (Continued)

### Turn-Key Solutions



Full turn-key packaging services offering customer print builds of electro-optic modules:

- Daughter card mezzanine modules
- Advanced fiber management solutions
- Channel and line cards
- Inventory management — customer, vendor

### Advance Optical Module Qualification Capabilities



Tyco Electronics will qualify modules to various Industry Standards:

- GR326 singlemode connectors
- GR1435 MT connectors
- GR1380 splice integrity
- GR1209 branching components
- GR1221 reliability assurance
- GR63 environmental integrity for network systems
- Custom testing for module performance parameters

### ATCA Splitter Cassette





## Rack Mountable C-Band EDFA



### Product Facts

- High gain
- Low power consumption
- Low noise figure
- Integrated control electronics
- Input and output isolation
- Rack mountable
- Alarms and monitoring capability
- RS-232 interface
- PC controllable software
- Fully customizable design
- CB certificate
- UL Recognized 
- CSA Certified, File No. 237388 

### Applications

- Long haul and metro applications
- Pre-amplifier, inline amplifier, or booster amplifier
- R&D laboratory environments with PC control software
- Single-channel amplification
- Narrow band amplification

The Tyco Electronics Rack Mountable C-Band EDFA is a low-cost, compact, and flexible optical amplifier solution optimized for a variety of applications within your network systems or subsystems. The high gain profile and low noise figure enables its use as a pre, inline, or booster amplifier for metro and long haul applications. It is capable of signal gains up to 35 dB with a noise figure of less than 4.5 dB and total output power of up to +10 dBm for inline applications (+17 dBm for booster applications).

This heightened performance EDFA is available as a cooled inline amplifier with powerful integrated control electronics or a gain block with input and/or output monitoring capabilities to meet your needs. The control electronics design includes a built-in laser and TEC driver circuit with alarms and monitors. The RS-232 electrical interface

**Rack Mountable C-band EDFA  
(-48VDC, RS-232 interface)**



module and software bundle is designed for control, ease of use, integration, and/or evaluation in your laboratory.

Tyco Electronics is customer driven and is capable of delivering low-cost, customized functionality for your application. Tyco Electronics can quickly optimize the EDFA design to meet your specific optical, electrical, mechanical and environmental requirements.

### Product Specifications

#### Optical Parameters

- Wavelength Range** — 1530 nm min.; 1570 nm max.
- Input Power Range\*** — -30 dBm min.; -10 dBm max.
- Gain Range\*\*** — 25 dB typ.; 35 dB max.
- Output Power (@ -10 dBm input power)\*\*\*** — 10 dBm max.
- Output Power Stability\*\*\*\*** — 0.2 dB typ.
- Polarization Dependent Gain** — 0.3 dB max.
- Polarization Mode Dispersion** — 0.4 ps max.
- Noise Figure** — 4.5 dB typ.

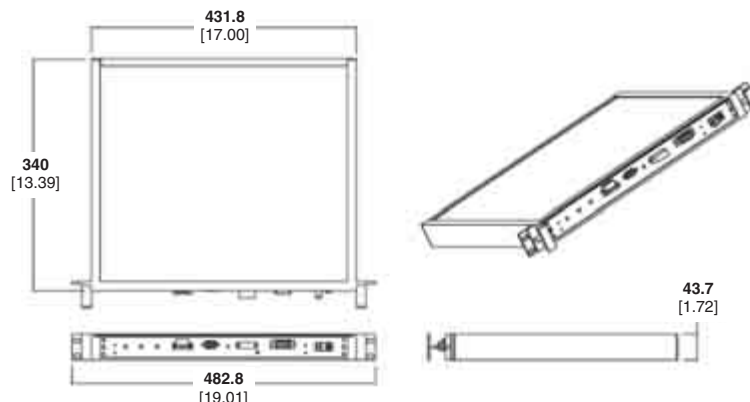
#### Electrical Parameters

- Pump Laser Diode Threshold Current** — 35 mA max.
- Pump Laser Diode Forward Current** — 250 mA max.
- Pump Laser Diode Reverse Voltage** — 2 V max.
- Monitor Photodiode Forward Current** — 0.1 mA min.; 3 mA max.
- Monitor Photodiode Reverse Voltage** — 20 V max.
- EDFA Power Consumption @ 25 °C** — 3.5 W max.
- EDFA Power Consumption @ 70 °C** — 10 W max.
- Supply Voltage** — -38 VDC min.; -48 VDC typ.; -60 VDC max.

#### Environmental Parameters

- Operating Temperature Range** — -5 °C min.; 70 °C max.
- Storage Temperature Range** — -40 °C min.; 85 °C max.
- Operating Humidity** — 5% RH min.; 95% RH max.

- \* Booster amplifier range is -10 to +3 dBm
- \*\* Typical gain range of 15 to 25 dB
- \*\*\* Absolute maximum output power is +15 dBm
- \*\*\*\* Across the operating temperature range of -5 °C – 70 °C



**Figure 1: Mechanical Details of the Rack Mountable C-band EDFA**



## Rack Mountable C-Band EDFA (Continued)

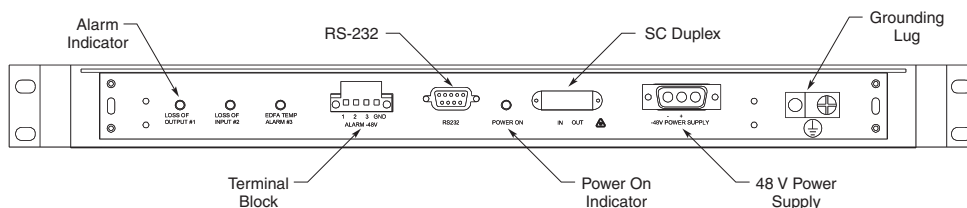


Figure 2: Front view of the Rack Mountable C-band EDFA

| Alarm Indicators        | Description                                                 |
|-------------------------|-------------------------------------------------------------|
| 1                       | Loss of input power<br>(- 20 dBm or below: red color)       |
| 2                       | Loss of output power<br>(+ 5 dBm or lower: red color)       |
| 3                       | Temperature alarm<br>(70 °C or higher: red color)           |
| Terminal Block Position | Description                                                 |
| 1                       | Loss of input power<br>(- 20 dBm or below: - 48 VDC signal) |
| 2                       | Loss of output power<br>(+ 5 dBm or lower: - 48 VDC signal) |
| 3                       | Temperature alarm<br>(70 °C or higher: - 48 VDC signal)     |
| 4                       | GND                                                         |

| RS-232                      | Description          |
|-----------------------------|----------------------|
| DB9 Connector               | Serial communication |
| Power On Indicator          | Description          |
| Power ON                    | LED: green color     |
| SC Duplex Adapter           | Description          |
| IN                          | Optical Input Power  |
| OUT                         | Optical Output Power |
| 48 V Power Supply Connector | Description          |
| 48 VDC                      | 48 VDC Power Supply  |
| Grounding Screw             | Grounding Screw      |

### EDFA Block Diagram — Options

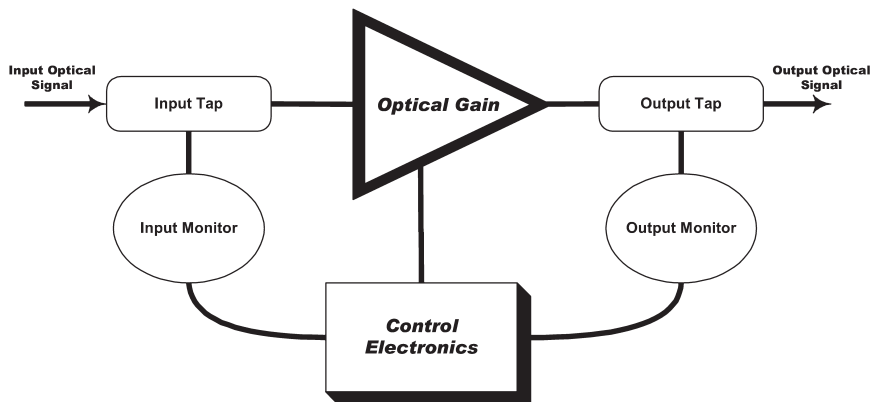


Figure 3: Block Diagram for Inline Amplifier Configuration

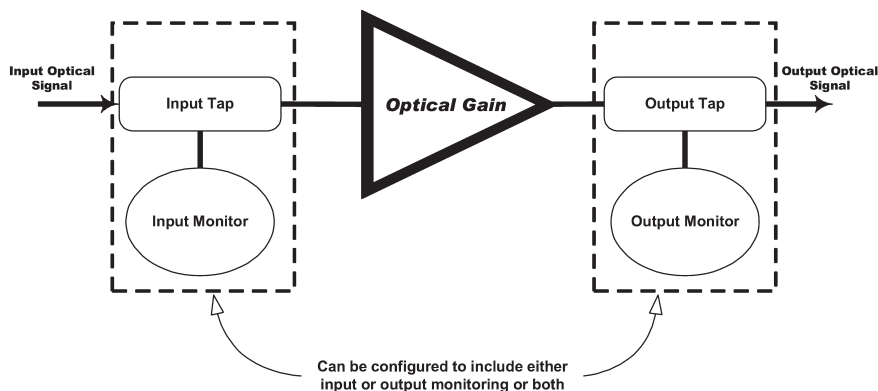


Figure 4: Block Diagram for Gain Block Configuration

## Rack Mountable C-Band EDFA (Continued)

### Control and Monitoring Software

#### Product Facts

- Software Laser ON / OFF alarm indicator
- Software alarm indicator for input power lower than -20 dBm
- Software alarm indicator for output power lower than +5 dBm
- EDFA Laser Current Start-up Value
- EDFA Password Protection

### Rack Mountable C-band EDFA with Control Electronics and Software for Monitoring and Control

**Part Number 1919520-1**  
Module, EDFA with RS-232 Interface and -48 V Power Supply, 200 mW

**Part Number 1919520-2**  
Module, EDFA with RS-232 Interface and -48 V Power Supply, 250 mW

**For specific ordering information or for additional product detail, please contact your Tyco Electronics Sales Representative.**

The Tyco Electronics Rack Mountable C-Band EDFA with an RS-232 control interface and software control package allows the flexibility to experiment with various module parameters through a PC. Parameters such as EDFA laser drive current input and output power levels, and EDFA gain are all dynamically configurable which allows the user to choose appropriate drive currents to achieve the desired output power.

The Tyco Electronics C-Band EDFA module with integrated control electronics and software is an all-in-one solution that offers all the above functionality within one GUI window via the RS-232 interface module to a PC.

**Figure 5: GUI of the EDFA Control and Monitoring Software Bundle**



Drive current information, input and output optical power, EDFA gain, and module temperature are all displayed continuously and updated dynamically. The data is calibrated to offer precise readings of the input and output power. Data can also be stored to a text file (\*.txt) if desired in the following format:

```
*****
"Date and Time: 6/2/2005 4:25:59 PM"
Laser Drive current = 120 mA
Optical Input Power = -17 dBm
Optical Output Power = 3 dBm
EDFA Gain = 20 dB
Case Temperature = 25 °C
"Laser Drive current (Start-up value) = 50 mA"
*****
```

A convenient windows based help file (EDFA.HLP) is also included with the distributed software and contains all the information about the EDFA Software functionality and features.

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

## Single-Channel C-Band EDFA

### Product Facts

- High gain
- Low power consumption
- Low noise figure
- Integrated control electronics
- Input & output isolation
- Compact size (90 x 70 x 12 mm)
- Alarms & monitoring capability (TTL logic)
- PC controllable software
- Fully customizable design
- Designed for compliance to GR-1312-CORE

### Applications

- Long Haul & Metro
- Pre-amplifier, Inline amplifier, or Booster amplifier
- Narrow Band Amplification
- R&D Laboratory
- Environments with PC Control Software

Tyco Electronics' Single-Channel C-Band EDFA is a low-cost, compact, and flexible optical amplifier solution optimized for a variety of applications within your network systems or subsystems. The high gain profile and low noise figure enables its use as a Pre, Inline, or Booster amplifier for metro and long haul applications. It is capable of signal gains up to 35 dBm with a noise figure of less than 4.5 dB and total output power of up to +10 dBm for inline applications 9 +17 dBm for booster applications.



This heightened performance EDFA is available as a cooled inline amplifier with powerful integrated control electronics or a gain block with input and/or output monitoring capabilities to meet your needs. The control electronics design includes a built-in laser and TEC drive circuit with alarms and monitors. The optional RS-232 electrical interface module and included software bundle are designed for control, ease of use, and/or evaluation in your laboratory.

Tyco Electronics is customer driven and is capable of delivering low-cost, customized functionality for your application. Tyco Electronics can quickly optimize the EDFA design to meet your specific optical, electrical, mechanical and environmental requirements. ( Rack mount options available )

### Product Specifications

| Optical Parameters                     | Min  | Typical | Max  | Unit |
|----------------------------------------|------|---------|------|------|
| Wavelength Range                       | 1530 |         | 1570 | nm   |
| Input Power Range*                     | -30  |         | -10  | dBm  |
| Gain Range**                           |      | 25      | 35   | dB   |
| Output power ( @ -10 dBm input power)§ |      |         | 10   | dBm  |
| Output Power Stability §§              |      | 0.2     |      | dB   |
| Polarization Dependent Gain            |      |         | 0.3  | dB   |
| Polarization Mode Dispersion           |      |         | 0.4  | ps   |
| Noise Figure                           |      | 4.5     |      | dB   |

| Electrical Parameters              | Min | Typical | Max | Unit |
|------------------------------------|-----|---------|-----|------|
| Pump Laser Diode Threshold Current |     |         | 35  | mA   |
| Pump Laser Diode Forward Current   |     |         | 250 | mA   |
| Pump Laser Diode Reverse Voltage   |     |         | 2   | V    |
| Monitor Photodiode Forward Current | 0.1 |         | 3   | mA   |
| Monitor Photodiode Reverse Voltage |     |         | 20  | V    |
| Power Consumption                  |     |         | 3.5 | W    |

| Environmental Parameters    | Min | Typical | Max | Unit |
|-----------------------------|-----|---------|-----|------|
| Operating Temperature Range | -5  |         | 70  | °C   |
| Storage Temperature Range   | -40 |         | 85  | °C   |
| Operating Humidity          | 5   |         | 95  | %RH  |

\* Booster amplifier range is -10 to +3 dBm

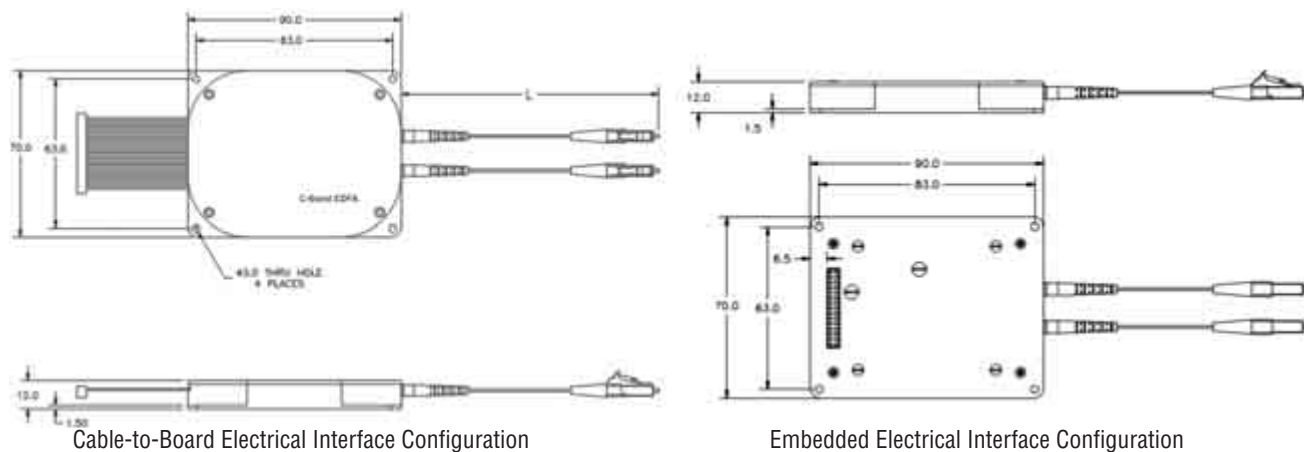
\*\* Typical gain range of 15 to 25 dBm

§ Absolute maximum output power is +17 dBm

§§ Across the operating temperature range of -5°C - 70°C

## Single-Channel C-Band EDFA (Continued)

### Mechanical Details



### EDFA Evaluation Kit - Controlling and Monitoring Software with PC Cable Interface: 1607030-1 ♦

| Pin | Description                   | Pin | Description               | Pin | Description          |
|-----|-------------------------------|-----|---------------------------|-----|----------------------|
| 1   | 5V                            | 11  | Pump Laser Bias Alarm     | 21  | Reserved             |
| 2   | 5V                            | 12  | Reserved                  | 22  | Reserved             |
| 3   | 5V                            | 13  | Reserved                  | 23  | Set Gain             |
| 4   | 5V                            | 14  | Reserved                  | 24  | Reserved             |
| 5   | Loss of Output Power Alarm    | 15  | GND                       | 25  | TEC Disable          |
| 6   | Loss of Input Power Alarm     | 16  | Serial Input              | 26  | Gain Set Acknowledge |
| 7   | Output Power Monitor          | 17  | GND                       | 27  | Reserved             |
| 8   | Input Power Monitor           | 18  | GND                       | 28  | Reserved             |
| 9   | Amplifier Disable             | 19  | Amplifier and TEC disable | 29  | Serial Output        |
| 10  | EDFA Module Temperature Alarm | 20  | GND                       | 30  | Reserved             |

### EDFA C-Band Module

| Part Number | Description                                                                                                              |
|-------------|--------------------------------------------------------------------------------------------------------------------------|
| 1607033-1 ♦ | Embedded Elec. Interface, Gain Block, In and Out Monitor, Dual Isolation, LC, 0.5m fiber length, 2.0 mm fiber diameter   |
| 1607037-1 ♦ | Embedded Elec. Interface, Controllable, In and Out Monitor, Dual Isolation, LC, 0.5m fiber length, 2.0 mm fiber diameter |
| 1607035-1 ♦ | Cable-to-Board, Gain Block, In and Out Monitor, Dual Isolation, LC, 0.5m fiber length, 2.0 mm fiber diameter             |
| 1607039-1 ♦ | Cable-to-Board, Controllable, In and Out Monitor, Dual Isolation, LC, 0.5m fiber length, 2.0 mm fiber diameter           |
| 1607033-2 ♦ | Embedded Elec. Interface, Gain Block, In and Out Monitor, Dual Isolation, SC, 0.5m fiber length, 2.0 mm fiber diameter   |
| 1607035-2 ♦ | Embedded Elec. Interface, Controllable, In and Out Monitor, Dual Isolation, SC, 0.5m fiber length, 2.0 mm fiber diameter |
| 1607039-2 ♦ | Cable-to-Cable, Controllable, In and Out Monitor, Dual Isolation, SC, 0.5m fiber length, 2.0 mm fiber diameter           |

The Tyco Electronics C-Band EDFA can be bundled with an RS-232 control interface and software control package allowing the customer the flexibility to experiment with various module parameters through a PC. Parameters such as EDFA / laser drive currents, input and output power levels, and EDFA gain are all dynamically configurable and this allows the user to choose appropriate drive currents to achieve the desired output power.

The Tyco Electronics C-Band EDFA module with integrated control electronics and software is an all-in-one solution that offers all the above functionality within one GUI window via the RS-232 interface module to a PC. Drive current information, input and output optical power, EDFA gain, and module temperature are all displayed continuously and updated dynamically.

Data can be stored in a text file (\*.txt) in the following format::

```
*Date and Time: 11/29/2002 4:25:59 PM*
Laser Drive current = 120 mA
Optical Input Power = -15 dBm
Optical Output Power = 10 dBm
EDFA Gain = 25 dB
Case Temperature = 25°C
```

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

## C-Band Gain Flattened EDFA

### Product Facts

- Gain Flatness over wide band
- Low power consumption
- Low noise figure
- Integrated control electronics
- Input & output isolation
- Compact size (90 x 70 x 12 mm)
- Alarms & monitoring capability (TTL logic)
- PC controllable software
- Fully customizable design
- Designed for compliance to GR-1312-CORE

### Applications

- Long Haul & DWDM Metro
- Inline amplifier
- R&D Laboratory Environments with PC Control Software
- Single-Channel Amplification
- Narrow Band Amplification

Tyco Electronics' C-Band Gain Flattened EDFA is a low-cost, compact, and flexible optical amplifier solution optimized for a variety of applications within your network systems or subsystems. The low cost, optimized gain flatness and high gain profile enables its use as an inline amplifier for DWDM metro and long haul applications. It is capable of signal gains up to 25 dB with a typical gain flatness of +/- 0.5 dB and total output power of up to +13 dBm.



This heightened performance EDFA is available as a cooled inline amplifier with powerful integrated control electronics or a gain block with input and/or output monitoring capabilities to meet your needs. The control electronics design includes a built-in laser and TEC drive circuit with alarms and monitors. The optional RS-232 electrical interface module and included software bundle are designed for control, ease of use, integration, and/or evaluation in your laboratory.

Tyco Electronics is customer driven and is capable of delivering low-cost, customized functionality for your application. Tyco Electronics can quickly optimize the EDFA design to meet your specific optical, electrical, mechanical and environmental requirements. ( Rack mount options available. )

### Product Specifications

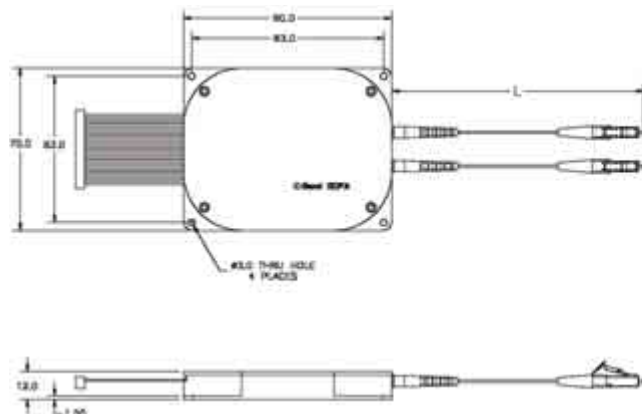
| Optical Parameters                                    | Min  | Typical | Max  | Unit |
|-------------------------------------------------------|------|---------|------|------|
| Wavelength Range                                      | 1530 |         | 1563 | nm   |
| Input Power Range                                     | -17  |         | -3   | dBm  |
| Gain Range                                            |      | 20      | 25   | dB   |
| Output power @ -3 dBm input power                     |      |         | 13   | dBm  |
| Gain Flatness                                         |      | +/-0.5  |      | dB   |
| Gain Flatness (Maximum) Peak to Peak at Pin = -12 dBm |      |         | 0.98 | dB   |
| Polarization Dependent Gain                           |      |         | 0.3  | dB   |
| Polarization Mode Dispersion                          |      |         | 0.4  | ps   |
| Optical Stability                                     |      | 0.2     |      | dB   |
| Noise Figure                                          |      | 4.5     |      | dB   |

| Electrical Parameters              | Min | Typical | Max | Unit |
|------------------------------------|-----|---------|-----|------|
| Pump Laser Diode Threshold Current |     |         | 35  | mA   |
| Pump Laser Diode Forward Current   |     | 190     | 220 | mA   |
| Pump Laser Diode Reverse Voltage   |     |         | 2   | V    |
| Monitor Photodiode Forward Current | 0.1 |         | 3   | mA   |
| Monitor Photodiode Reverse Voltage |     |         | 20  | V    |
| Power Consumption                  |     |         | 3.5 | W    |

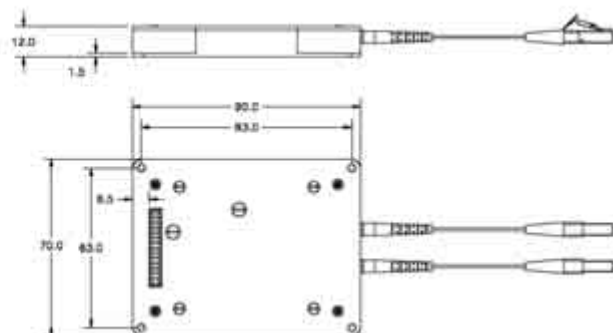
| Environmental Parameters    | Min | Typical | Max | Unit |
|-----------------------------|-----|---------|-----|------|
| Operating Temperature Range | -5  |         | 70  | °C   |
| Storage Temperature Range   | -40 |         | 85  | °C   |
| Operating Humidity          | 5   |         | 95  | %RH  |

## C-Band Gain Flattened EDFA (Continued)

### Mechanical Details



Cable-to-Board Electrical Interface Configuration



Embedded Electrical Interface Configuration

| Pin | Description                   | Pin | Description               | Pin | Description          |
|-----|-------------------------------|-----|---------------------------|-----|----------------------|
| 1   | 5V                            | 11  | Pump Laser Bias Alarm     | 21  | Reserved             |
| 2   | 5V                            | 12  | Reserved                  | 22  | Reserved             |
| 3   | 5V                            | 13  | Reserved                  | 23  | Set Gain             |
| 4   | 5V                            | 14  | Reserved                  | 24  | Reserved             |
| 5   | Loss of Output Power Alarm    | 15  | GND                       | 25  | TEC Disable          |
| 6   | Loss of Input Power Alarm     | 16  | Serial Input              | 26  | Gain Set Acknowledge |
| 7   | Output Power Monitor          | 17  | GND                       | 27  | Reserved             |
| 8   | Input Power Monitor           | 18  | GND                       | 28  | Reserved             |
| 9   | Amplifier Disable             | 19  | Amplifier and TEC disable | 29  | Serial Output        |
| 10  | EDFA Module Temperature Alarm | 20  | GND                       | 30  | Reserved             |

### EDFA Evaluation Kit - Controlling and Monitoring Software with PC Cable Interface: 1607030-1 ♦

### C-Band Gain Flattened EDFA Module

| Part Number | Description                                                                                                  |
|-------------|--------------------------------------------------------------------------------------------------------------|
| 1607300-1 ♦ | Gain-Flattened EDFA, Cable-to-Board Elec. Interface, Controllable, LC, 2.0 mm fiber diam., 0.5m fiber length |
| 1607300-2 ♦ | Gain-Flattened EDFA, Cable-to-Board Elec. Interface, Controllable, SC, 2.0 mm fiber diam., 0.5m fiber length |
| 1607334-1 ♦ | Gain-Flattened EDFA, Embedded Elec. Interface, Controllable, LC, 2.0 mm fiber diam., 0.5m fiber length       |
| 1607334-2 ♦ | Gain-Flattened EDFA, Embedded Elec. Interface, Controllable, SC, 2.0 mm fiber diam., 0.5m fiber length       |
| 1607335-1 ♦ | Gain-Flattened EDFA, Cable-to-Board Elec. Interface, Gain Block, LC, 2.0 mm fiber diam., 0.5m fiber length   |
| 1607335-2 ♦ | Gain-Flattened EDFA, Cable-to-Board Elec. Interface, Gain Block, SC, 2.0 mm fiber diam., 0.5m fiber length   |
| 1607336-1 ♦ | Gain-Flattened EDFA, Embedded Elec. Interface, Gain Block, LC, 2.0 mm fiber diam., 0.5m fiber length         |
| 1607336-2 ♦ | Gain-Flattened EDFA, Embedded Elec. Interface, Gain Block, SC, 2.0 mm fiber diam., 0.5m fiber length         |

The Tyco Electronics C-Band EDFA can be bundled with an RS-232 control interface and software control package allowing the customer the flexibility to experiment with various module parameters through a PC. Parameters such as EDFA / laser drive currents, input and output power levels, and EDFA gain are all dynamically configurable and this allows the user to choose appropriate drive currents to achieve the desired output power.

The Tyco Electronics C-Band EDFA module with integrated control electronics and software is an all-in-one solution that offers all the above functionality within one GUI window via the RS-232 interface module to a PC. Drive current information, input and output optical power, EDFA gain, and module temperature are all displayed continuously and updated dynamically.

Data can be stored in a text file (\*.txt) in the following format::

```
"Date and Time: 11/29/2002 4:25:59 PM"
Laser Drive current = 120 mA
Optical Input Power = -15 dBm
Optical Output Power = 10 dBm
EDFA Gain = 25 dB
Case Temperature = 25°C
```

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



## 1310 Amplifier Module

### Product Facts

- High optical gain at 1310 nm
- Low power consumption
- High saturation output power
- Wide optical bandwidth
- Input & output isolation
- Data rate transparent
- Compact size
- Designed for compliance to GR-1312-CORE

### Applications

- Metro and Access
- Applications
- Booster or Pre-Amplifier
- CATV
- CWDM

Tyco Electronics' 1310 Optical Amplifier is a low-cost, compact, and flexible optical amplifier solution optimized for a variety of applications within your network systems or subsystems. The high gain profile and low noise figure enables its use as a pre-amplifier or booster amplifier for metro and access applications. It is capable of signal gains up to 25 dB with a noise figure of less than 7 dB.

This heightened performance 1310 optical amplifier is available as a cooled pre-amplifier, with integrated control electronics allowing automatic and dynamic gain control or as a gain block with input and/or output monitoring capabilities. The integrated control electronics includes a build-in TEC and laser driver to allow the amplifier module to begin amplification the instant power is applied to the module to a pre-determined gain setting. The integrated control electronics will also maintain a pre-determined output power or gain setting regardless of input power stability.

Tyco Electronics is customer driven and is capable of delivering low-cost, customized functionality for your application. Tyco Electronics can quickly optimize the 1310 amplifier design to meet your specific optical, electrical, mechanical and environmental requirements. ( Rack mount options available.)



### Product Specifications

| Optical Parameters                | Min  | Typical | Max  | Unit |
|-----------------------------------|------|---------|------|------|
| Wavelength Range                  | 1280 |         | 1340 | nm   |
| 3 dB Optical Bandwidth (booster)* | 55   |         |      | dBm  |
| Fiber to Fiber Gain (booster)§    | 10   |         |      | dB   |
| Gain Ripple                       |      | 0.5     | 0.8  | dB   |
| Saturation Output Power**         | 8    | 9       |      | dBm  |
| Polarization Dependent Gain       |      | 0.5     | 1.0  | dB   |
| Noise Figure                      |      | 6       | 7    | dB   |

| Electrical Parameters | Min | Typical | Max | Unit |
|-----------------------|-----|---------|-----|------|
| SOA Forward Current   |     |         | 250 | mA   |
| SOA Reverse Voltage   |     |         | 2.5 | V    |
| TEC Drive Current     |     |         | 1.5 | A    |
| TEC Drive Voltage     |     |         | 3.6 | V    |
| Power Consumption     |     |         | 2.5 | W    |

| Environmental Parameters    | Min | Typical | Max | Unit |
|-----------------------------|-----|---------|-----|------|
| Operating Temperature Range | -5  |         | 70  | °C   |
| Storage Temperature Range   | -40 |         | 85  | °C   |
| Operating Humidity          | 5   |         | 95  | %RH  |

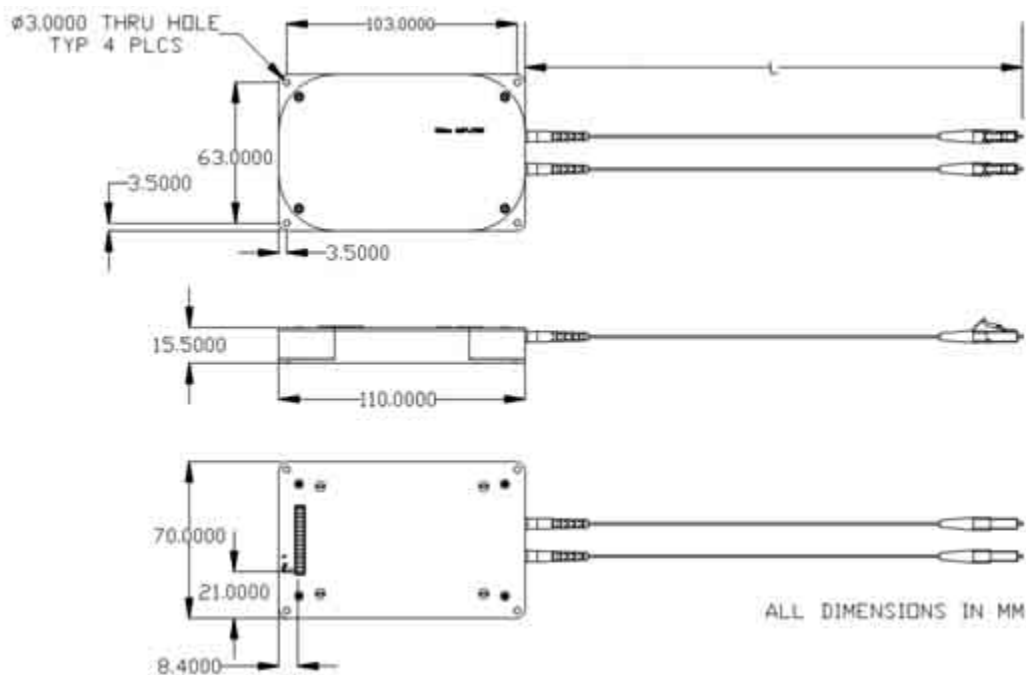
\* For pre-amplifier the minimum optical bandwidth is 45 nm

§ For pre-amplifier the minimum fiber-to-fiber gain is +18 dB

\*\* Output saturation power is defined as the power for which the gain is 3 dB compressed from its maximum value

## 1310 Amplifier Module (Continued)

### Mechanical Details



Embedded Electrical Interface Configuration

| Pin | Description              | Pin | Description | Pin | Description |
|-----|--------------------------|-----|-------------|-----|-------------|
| 1   | Input Pin Diode Anode    | 11  | Reserved    | 21  | Reserved    |
| 2   | Input Pin Diode Cathode  | 12  | Reserved    | 22  | SOA -       |
| 3   | Reserved                 | 13  | TEC +       | 23  | + 5 V       |
| 4   | Input Pin Diode Ground   | 14  | TEC +       | 24  | + 5 V       |
| 5   | Reserved                 | 15  | Reserved    | 25  | Reserved    |
| 6   | Output Pin Diode Anode   | 16  | Reserved    | 26  | Reserved    |
| 7   | Reserved                 | 17  | TEC -       | 27  | Reserved    |
| 8   | Output Pin Diode Cathode | 18  | TEC -       | 28  | Thermistor  |
| 9   | Reserved                 | 19  | Reserved    | 29  | Reserved    |
| 10  | Output Pin Diode Ground  | 20  | SOA +       | 30  | Thermistor  |

### 1310 Amplifier Module

| Part Number | Description                                                       |
|-------------|-------------------------------------------------------------------|
| 1607290-1 ♦ | 1310 Booster Amplifier, LC, 2.0 mm fiber diam., 0.5m fiber length |
| 1607290-2 ♦ | 1310 Booster Amplifier, SC, 2.0 mm fiber diam., 0.5m fiber length |
| 1607291-1 ♦ | 1310 Pre-Amplifier, LC, 2.0 mm fiber diam., 0.5m fiber length     |
| 1607291-2 ♦ | 1310 Pre-Amplifier, SC, 2.0 mm fiber diam., 0.5m fiber length     |
| 1607292-1 ♦ | 1310 Smart Amplifier, LC, 2.0 mm fiber diam., 0.5m fiber length   |
| 1607292-2 ♦ | 1310 Smart Amplifier, SC, 2.0 mm fiber diam., 0.5m fiber length   |

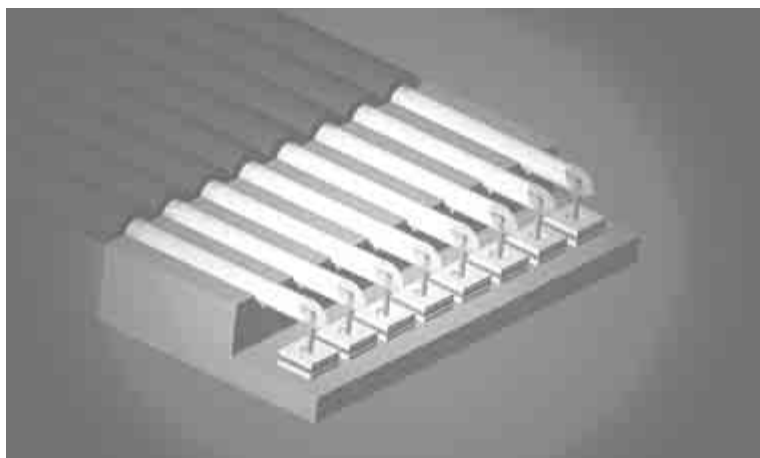
**Note:** Part Numbers are RoHS compliant except: ♦ Indicates non-RoHS compliant.

## Laser Process for FIBERSHAPE Products

### FIBERSHAPE Products by Laser Processing

#### Product Facts

- Complete range of cleave angles
- Ultra high precision measured @ core region ( $< \pm 0.5$  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



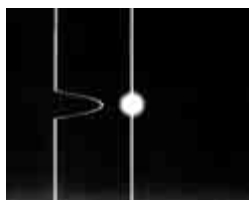
90 Degree VCSEL Array Interface

Tyco Electronics 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.

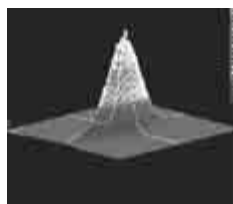
Please contact your local sales representative or Tyco Electronics for more in-depth product information.



Near Field Scan @ 1310 nm



Straight and Angled Cleave



Wedge Fiber Characteristics



Laser Processed Subassembly

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## AMP NETCONNECT Premises Wiring Products

### Premises Wiring Products



**SECURE Optical Fiber Connectivity: LC SECURE, MPO SECURE, and MT-RJ SECURE Products**  
Section 1 and 2 - Pages 8-13, 105, 106, 108, and 121



**No Epoxy, No Polish Terminations (SC, LC, MT-RJ and ST)**  
Section 1 and 2 - Pages 9, 13, 53-59, 73, 74, and 77



**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 Tyco Electronics 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 AMP NETCONNECT 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](http://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 Tyco Electronics sales representative.

## Telecom Outside Plant Products

### Telecom Outside Plant Products



The Telecom Outside Plant Business Unit of Tyco Electronics 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 Tyco Electronics sales representative.



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**Engineering Notes**

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## Attenuators

### Singlemode Build Out Attenuators

#### Product Facts

- A range of fixed attenuation values. Standard values of 1 through 20 and 25 dB
- UPC and APC offer Excellent Return Loss
- LC, SC, FC, ST, and D4 styles
- Attenuation is wavelength independent and polarization insensitive
- Low PDL
- Low modal noise
- High reliability
- Very low reflectance
- 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.tycoelectronics.com/documents>

- Customer Drawings



Tyco Electronics high performance Build Out Attenuators utilize a unique all-fiber construction to absorb the optical signal.

By employing a Tyco Electronics' technology, the design minimizes

reflectance, attenuation tolerance, and PDL while maximizing reliability, environmental stability, and power handling. There are no filters, air gaps, or core mismatches.

#### 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

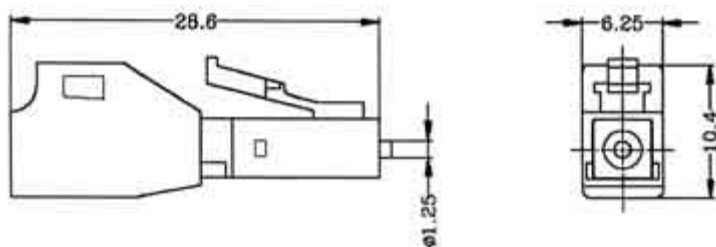
#### Customizable Features

- 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.

## Attenuators (Continued)

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

#### LC/UPC



**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 |

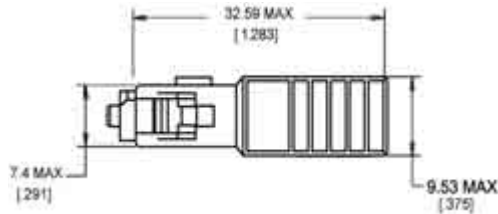
**Note:** Attenuation Tolerance, Ambient  
 $\geq 5$  dB:  $\pm .10 \times$  nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -55$  dB

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

## Attenuators (Continued)

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

#### SC/UPC



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

#### Dual Window Attenuators Operating Wavelength 1310/1550 nm $\pm 25$ 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  
 $\geq 5$  dB:  $\pm .10 \times$  nominal attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
0 dB: 0.50 dB max  
Reflectance  $\leq -55$  dB

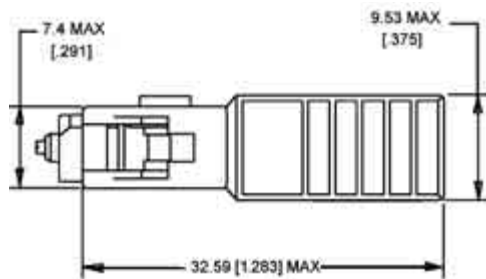
#### Broadband Bandpass Attenuators Operating Wavelength 1260-1360 nm & 1430-1625 nm

| 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  
 $\geq 5$  dB:  $\pm .10 \times$  nominal attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
0 dB: 0.50 dB max.  
Reflectance  $\leq -55$  dB

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

#### SC/APC 8°



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

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

#### Dual Window Attenuators Operating Wavelength 1310/1550 nm $\pm 25$ 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  
 $\geq 5$  dB:  $\pm .10 \times$  nominal attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -60$  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 |

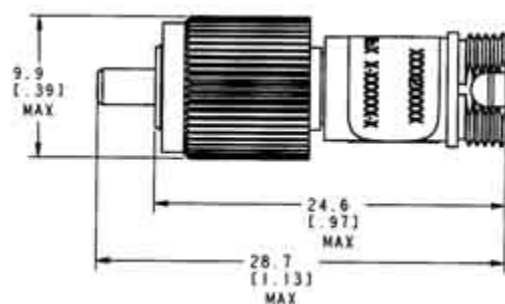
**Note:** Attenuation Tolerance, Ambient  
 $\geq 5$  dB:  $\pm .10 \times$  nominal attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -65$  dB

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

## Attenuators (Continued)

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

#### FC/UPC



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

### Dual Window Attenuators Operating Wavelength 1310/1550 nm $\pm 25$ 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  
 $\geq 5$  dB:  $\pm .10$  x nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -55$  dB

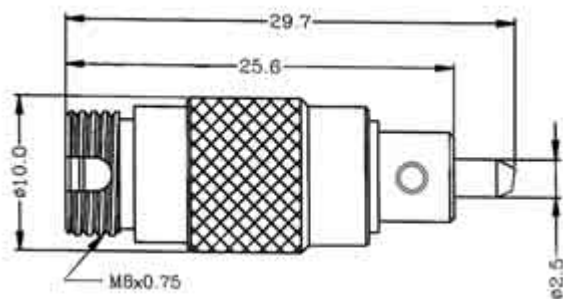
### Broadband Bandpass Attenuators Operating Wavelength 1260-1360 nm & 1430-1625 nm

| 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  
 $\geq 5$  dB:  $\pm .10$  x nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
0 dB: 0.50 dB max.  
Reflectance  $\leq -55$  dB

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

#### FC/APC (8°)



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

### Dual Window Attenuators Operating Wavelength 1310/1550 nm $\pm 25$ nm

| Attenuation (dB) | Part Number |
|------------------|-------------|
| 1                | 1754722-1   |
| 2                | 1754722-2   |
| 3                | 1754722-3   |
| 4                | 1754722-4   |
| 5                | 1754722-5   |
| 6                | 1754722-6   |
| 10               | 1-1754722-0 |
| 12               | 1-1754722-2 |
| 15               | 1-1754722-5 |
| 18               | 1-1754722-8 |
| 20               | 2-1754722-0 |
| 25               | 2-1754722-5 |

**Note:** Attenuation Tolerance, Ambient  
 $\geq 5$  dB:  $\pm .10$  x nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -65$  dB

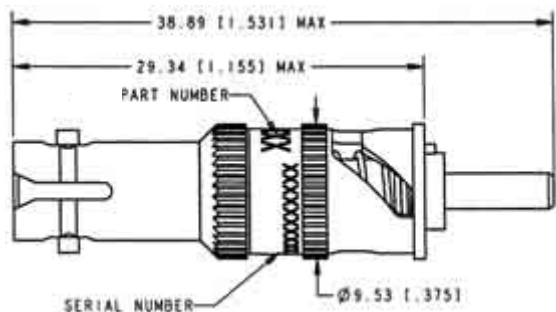
**Note:** All part numbers are RoHS compliant.



## Attenuators (Continued)

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

#### ST/UPC



### 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  
 $\geq 5$  dB:  $\pm .15 \times$  nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.75$  dB  
Reflectance  $\leq -55$  dB

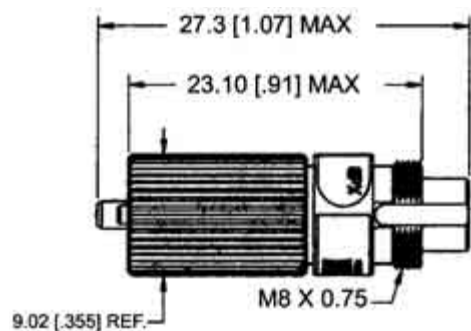
### Broadband Bandpass Attenuators Operating Wavelength 1260-1360 nm & 1430-1625 nm

| 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  
 $\geq 5$  dB:  $\pm .10 \times$  nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
0 dB: 0.50 dB max.  
Reflectance  $\leq -55$  dB

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

#### D4/PC



**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  
 $\geq 5$  dB:  $\pm .15 \times$  nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.75$  dB  
Reflectance  $\leq -45$  dB

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

## Attenuators (Continued)

### In Line Attenuators

#### Product Facts

- A range of fixed attenuation values. Standard values of 1 through 20, and 25 dB
- UPC offers Excellent Return Loss
- Attenuation is wavelength independent and polarization insensitive
- Low PDL
- Low modal noise
- High reliability
- $\leq -60$  dB Reflectance (unconnectorized)
- Low cost
- Vibration resistant
- Single and Dual Window
- Designed to comply with Telcordia GR-910

#### Applications

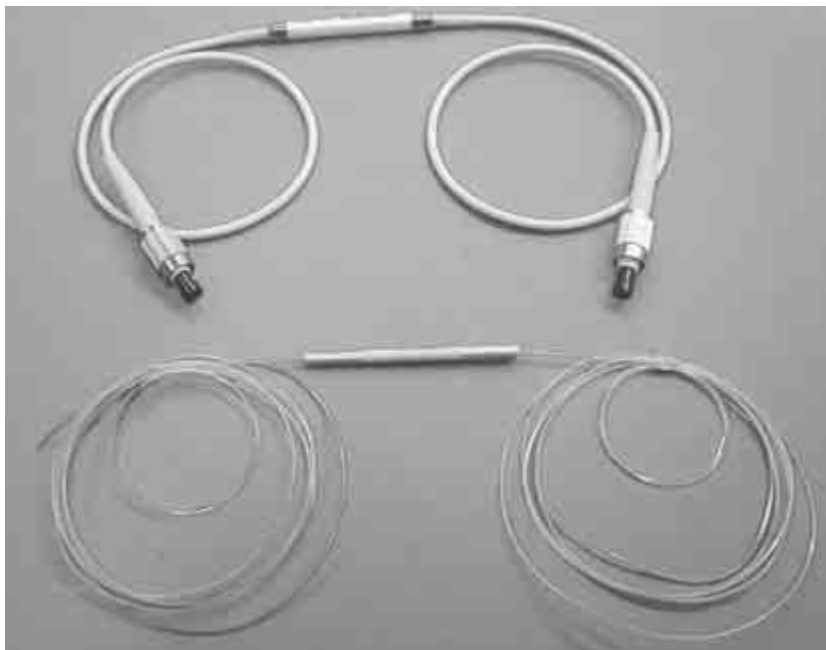
- Power leveling in DWDM transmission systems
- Test and Measurement
- Power attenuation at the receiver

#### Available Collateral

- Product Specification  
108-2103 Heavy Duty  
3 mm cable  
108-2130 Medium Duty  
900  $\mu$ m cable
- Customer Drawings

#### Customizable Features

- Lead lengths
- Connectorized types, including SC, FC, ST, & LC
- LC available in Medium Duty (900  $\mu$ m cable) only
- Available in Heavy Duty (3 mm cable) and Medium Duty (900  $\mu$ m cable)



#### Specifications

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

**Reflectance** —  
 $\leq -55$  and  $-60$  dB for UPC and unterminated respectively

**Operating Temperature** —  
 $-40^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$

**Vibration Resistance** —  
 $< 0.1 \times$  attenuation

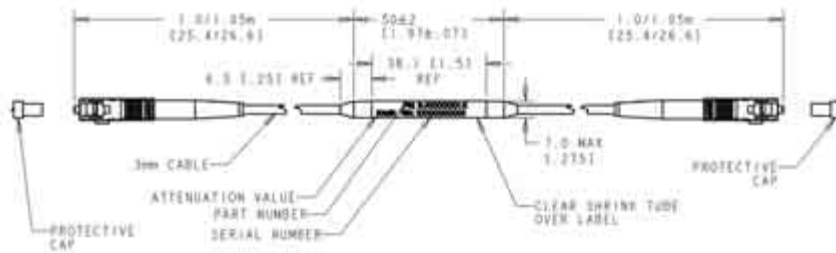
Tyco Electronics' high performance In Line Attenuators utilize a unique all fiber construction to absorb the optical signal.

By employing a Tyco Electronics' technology,

the design minimizes reflectance, attenuation tolerance, and PDL while maximizing reliability, environmental stability, and power handling. There are no filters, air gaps, or core mismatches.

## Attenuators (Continued)

### Singlemode In Line Attenuators, Heavy Duty (3 mm cable), Fixed Value SC - SC

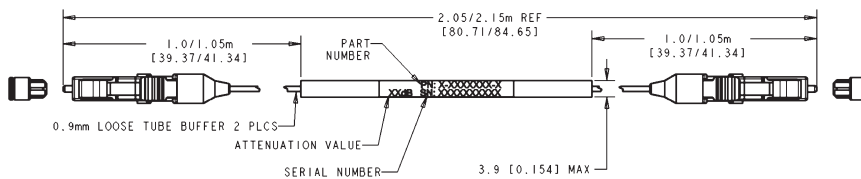


### Dual Window In Line Attenuators Operating Wavelength 1310/1550 nm ±25 nm

| Attenuation (dB) | Part Number |
|------------------|-------------|
| 1                | 6588517-1   |
| 2                | 6588517-2   |
| 3                | 6588517-3   |
| 4                | 6588517-4   |
| 5                | 6588517-5   |
| 6                | 6588517-6   |
| 7                | 6588517-7   |
| 8                | 6588517-8   |
| 9                | 6588517-9   |
| 10               | 1-6588517-0 |
| 11               | 1-6588517-1 |
| 12               | 1-6588517-2 |
| 13               | 1-6588517-3 |
| 14               | 1-6588517-4 |
| 15               | 1-6588517-5 |
| 16               | 1-6588517-6 |
| 17               | 1-6588517-7 |
| 18               | 1-6588517-8 |
| 19               | 1-6588517-9 |
| 20               | 2-6588517-0 |
| 25               | 2-6588517-5 |

**Note:** Attenuation Tolerance, Ambient  
 $\geq 5$  dB:  $\pm .10 \times$  nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -55$  dB

### Singlemode In Line Attenuators, Medium Duty (900 $\mu$ m cable), Fixed Value LC to LC



### Dual Window In Line Attenuators Operating Wavelength 1310/1550 nm ±25 nm

| Attenuation (dB) | Part Number |
|------------------|-------------|
| 1                | 6588564-1   |
| 2                | 6588564-2   |
| 3                | 6588564-3   |
| 4                | 6588564-4   |
| 5                | 6588564-5   |
| 6                | 6588564-6   |
| 7                | 6588564-7   |
| 8                | 6588564-8   |
| 9                | 6588564-9   |
| 10               | 1-6588564-0 |
| 11               | 1-6588564-1 |
| 12               | 1-6588564-2 |
| 13               | 1-6588564-3 |
| 14               | 1-6588564-4 |
| 15               | 1-6588564-5 |
| 16               | 1-6588564-6 |
| 17               | 1-6588564-7 |
| 18               | 1-6588564-8 |
| 19               | 1-6588564-9 |
| 20               | 2-6588564-0 |
| 25               | 2-6588564-5 |

**Note:** Attenuation Tolerance, Ambient  
 $\geq 5$  dB:  $\pm .10 \times$  nominal  
attenuation value  
 $< 5$  dB:  $\pm 0.50$  dB  
Reflectance  $\leq -50$  dB

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

## Lensed Wavelength Division Multiplexer and Demultiplexer (LWDM) Products

### Singlemode and Multimode Lensed WDM's

#### Features

- High isolation
- Wide bandpass
- Excellent reflectance
- Small footprint

#### Applications

- Two-way, single-fiber video links
- Instrumentation

#### Available Collateral

- Customer Drawings

#### Customizable Features

- Lead Lengths
- Connector Type
- Labels
- Optical Specifications



Tyco Electronics' Multiplexers allow use of a single fiber for simultaneous transmission of two signals of different wavelengths.

Tyco Electronics' Demultiplexers separate the combined wavelengths from the single fiber into individual fibers. The universal MUX/DEMUX's are available for multimode as well as singlemode applications.

Through the use of high-quality dichroic coatings, which act as bandpass filters, numerous wavelength combinations from 800-1600 nm can be accommodated.

Unlike the narrow bandpass of fused multiplexers, the minimum bandpass of these devices around the central wavelength is  $\pm 50$  nm. This feature makes these multiplexers ideal for use in broadband communication applications.

These devices are unique in that their optical performance is independent of polarization effects of the light source.

The 11.9 mm [7/16 inch] thick encapsulated devices with monolithic lens structures tolerate vibration and shock; their low profile permits easy printed circuit board mounting.

#### Specifications — Multimode

##### Insertion Loss (per FOTP-180) —

|                    | Maximum |
|--------------------|---------|
| Without connectors | 1.3 dB  |
| With 2 connectors  | 2.3 dB  |

##### Change in Transmission over operating temperatures $\pm 0.5$ dB

**Directivity** —  
(50/125, 62.5/125 only) —  
Minimum:  $>45$  dB

**Wavelength Bandpass (nm)** —  
Minimum: 100 nm

**Isolation** —  
35 dB Minimum

**Fiber Types** — 50/125 and 62.5/125

#### Specifications — Singlemode

##### Insertion Loss (per FOTP-180) —

|                    | Maximum |
|--------------------|---------|
| Without connectors | 1.3 dB  |
| With 2 connectors  | 2.3 dB  |

##### Change in Transmission over operating temperatures $\pm 0.5$ dB

**Directivity** —  
Minimum:  $>55$  dB

**Wavelength Bandpass (nm)** —  
Minimum: 100 nm

##### Return Loss (Reflectance) —

|                    |               |
|--------------------|---------------|
| Port 1             | $\leq -40$ dB |
| Port 2             | $\leq -55$ dB |
| Port 3             | $\leq -55$ dB |
| Without connectors |               |

**Isolation** —  
35 dB Minimum

**Polarization Sensitivity** —  $<0.1$  dB

**Fiber Types** — (Corning SMF-28)

#### Temperature

**Multimode** —  
 $-40^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$  (Operating)  
 $-40^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$  (Storage)

**Singlemode** —  
 $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  (Operating)  
 $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  (Storage)

**Weight** — 42 grams [1.5 oz.]

**Pigtail** — 0.5 meter, [3 mm] OD cable, 900  $\mu\text{m}$  OD cable.

Terminations and connectors available on request.

## Lensed Wavelength Division Multiplexer and Demultiplexer (LWDM) Products (Continued)

### Singlemode and Multimode Lensed WDM's (Continued)

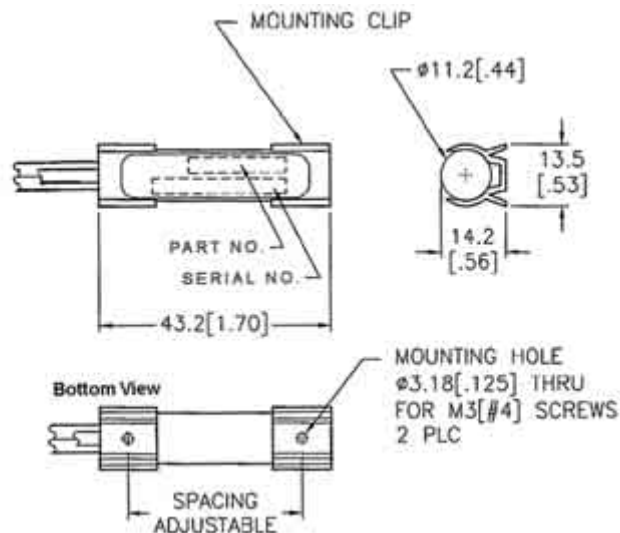
#### Part Numbers

| Fiber              | Cable Diameter | Connector | 850/1310 nm | 1310/1550 nm |
|--------------------|----------------|-----------|-------------|--------------|
| 50/125 Multimode   | 3 mm           | ST        | 5099102-2   | 5099105-2    |
|                    | 3 mm           | None      | 5099108-1   | —            |
|                    | 900 $\mu$ m    | ST        | 9-5099102-2 | —            |
|                    | 900 $\mu$ m    | None      | 9-5099108-1 | 9-5099111-1  |
| 62.5/125 Multimode | 3 mm           | ST        | 5099102-3   | 5099105-3    |
|                    | 3 mm           | None      | 5099108-2   | —            |
|                    | 900 $\mu$ m    | ST        | 9-5099102-3 | 9-5099105-3  |
|                    | 900 $\mu$ m    | None      | 9-5099108-2 | 9-5099111-2  |
| Singlemode         | 3 mm           | FC/APC    | —           | 5099717-4    |
|                    | 3 mm           | None      | —           | 5099717-5    |
|                    | 3 mm           | FC/UPC    | —           | 5099717-6    |
|                    | 3 mm           | ST/UPC    | —           | 5099717-7    |
|                    | 3 mm           | SC/UPC    | —           | 5099717-8    |
|                    | 900 $\mu$ m    | FC/APC    | —           | 9-5099717-4  |
|                    | 900 $\mu$ m    | None      | —           | 9-5099717-5  |
|                    | 900 $\mu$ m    | FC/UPC    | —           | 9-5099717-6  |
|                    | 900 $\mu$ m    | ST/UPC    | —           | 9-5099717-7  |
|                    | 900 $\mu$ m    | SC/UPC    | —           | 9-5099717-8  |

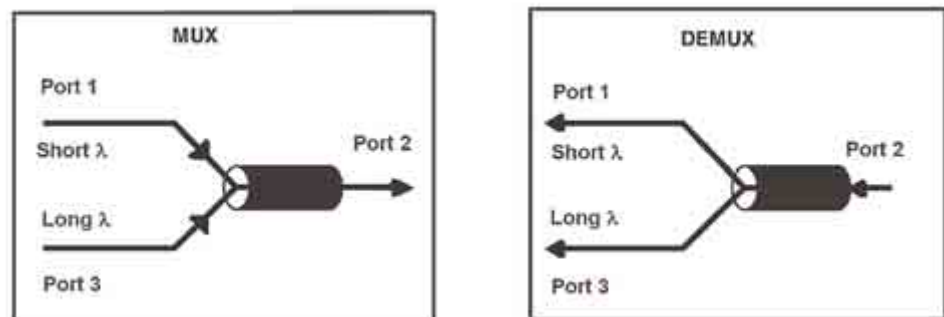
**Note:** Mux specific versions available when higher return loss required. Contact your local Tyco Electronics Sales Office.  
Cable length is 0.5 meter.

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

For custom mounting options,  
please contact your local  
Tyco Electronics' Sales  
Representative.



### Application



## 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  $\mu$ m  
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

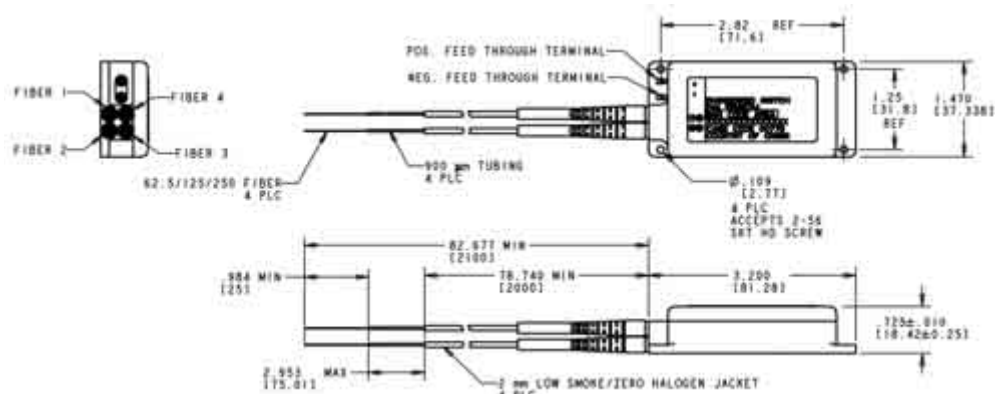
**Actuation Voltage** —  
100mA (maximum)



Tyco Electronics' "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.

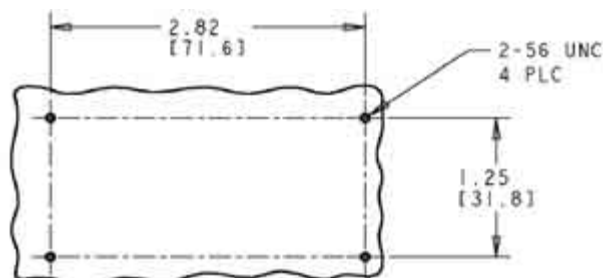
This switch is designed for extreme environments that require absolute product quality on optical installations and optical signal integrity.

#### Product Dimensions:



#### NOTE

Dimensions are inches  
over millimeters



Recommended Mounting Layout

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



## Switches (Continued)

**Multimode**  
**1 x 2 SPDT Switch**  
**Dual 1 x 2 DPDT Switch**  
**2 x 2 Bypass Switch**

### Product Facts

- Low profile
- Utilizes pivoting mirror
- Wide wavelength range
- Low insertion loss
- Excellent repeatability
- Environmentally stable
- Shock and vibration resistant
- Board or chassis mounting
- Optical & electrical leads exit from one end for easy cable routing

Tyco Electronics Low Profile Fiber Optic Switches are miniature, board mountable devices that permit the switching of an optical signal from one fiber to another. Switching is accomplished by a slight pivoting motion of a spherical mirror which reflects the optical signal to the appropriate fiber. This patented imaging technology provides very low optical loss.

Tyco Electronics' Fiber Optic Switches can be terminated with any Tyco fiber optic connector, and they are

available in the following configurations:

#### ■ 1 x 2 SPDT Switch

#### ■ Dual 1 x 2 DPDT Switch

Tyco Electronics' SPDT and DPDT Switches permit the transfer of optic signals from an input fiber to either of two output fibers. Switches are applied to the positive terminal. The switch reverts to its original state when power is removed.

#### ■ 2 x 2 Bypass Switch

Tyco Electronics' Bypass Switches provide bypass protection for fiber optic ring networks. They also provide bypass protection for fiber optic ring networks per IEEE 802.5 and ANSI FDDI standards.

A self-test path permits testing the node's transmitter against its receiver when the switch is in the bypass mode. This transmitter - receiver path is attenuated to prevent saturation of the receiver, while maintaining minimal light loss in the bypass path.



### Specifications

| Configuration                                        | 1 x 2 and Dual 1 x 2                                                                                 | 2 x 2 Fully Reversing Bypass                                                                         |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Switching speed                                      | 10 milliseconds maximum                                                                              | 10 milliseconds maximum                                                                              |
| Operating wavelength                                 | 750–1450 nanometers                                                                                  | 750–1450 nanometers                                                                                  |
| Insertion loss at 1300 nm<br>(Includes 2 connectors) | 1.8 dB max. per FOTP-34, Method A2                                                                   | 1.8 dB max. per FOTP-34, Method A2<br>5 dB on loopback path max                                      |
| Crosstalk                                            | ≤45 dB per FOTP-42                                                                                   | ≤45 dB per FOTP-42                                                                                   |
| Switch driver                                        | 5 V at 80mA max.                                                                                     | 5 V at 80mA max.                                                                                     |
| Drop In/Drop Out                                     | Drop In: 4.0 V minimum                                                                               | Drop In: 4.0 V minimum                                                                               |
| Voltage                                              | Drop Out: 0.5 V minimum                                                                              | Drop Out: 0.5 V minimum                                                                              |
| Fiber types                                          | Graded index 50/125, 62.5/125<br>(others available upon request)                                     | Graded index 50/125, 62.5/125<br>(others available upon request)                                     |
| Lead length                                          | 1 meter                                                                                              | 1 meter                                                                                              |
| Temperature range                                    | Operating –10°C to +65°C per FOTP-3, C2<br>Storage –30°C to +70°C per FOTP-188, 4                    | Operating –10°C to +65°C per FOTP-3, C2<br>Storage –30°C to +70°C per FOTP-188, 4                    |
| Connector styles                                     | ST Style<br>(others available upon request)                                                          | ST Style<br>(others available upon request)                                                          |
| Electrical interface                                 | Bent pins for PCB soldering<br>Straight pins for soldering, or<br>Tyco Electronics modular connector | Bent pins for PCB soldering<br>Straight pins for soldering, or<br>Tyco Electronics modular connector |
| Durability                                           | >1 million cycles                                                                                    | >1 million cycles                                                                                    |
| Weight (unconnectorized)                             | <1 oz.                                                                                               | <1 oz.                                                                                               |

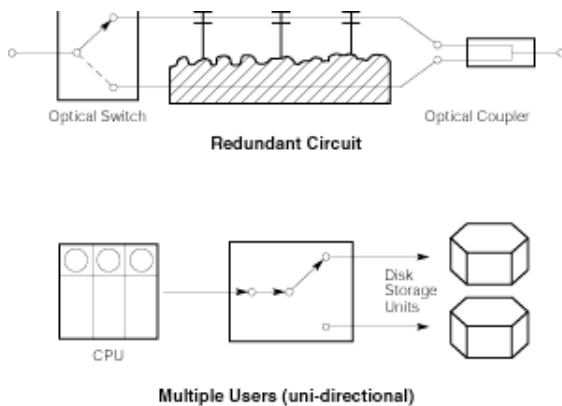
## Switches (Continued)

**Multimode**  
**1 x 2 SPDT Switch**  
**Dual 1 x 2 DPDT Switch**  
**2 x 2 Bypass Switch** (Continued)

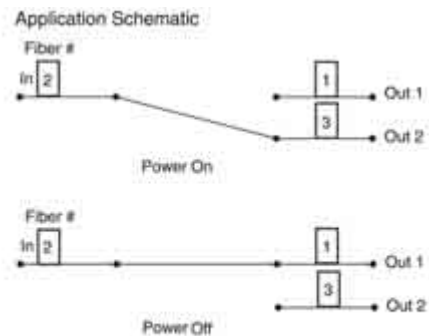
### 1 x 2 SPDT

### Application Information

#### Possible Application

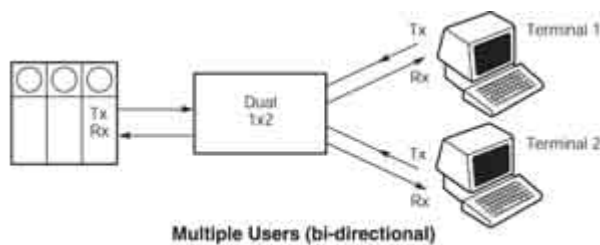


#### Schematic



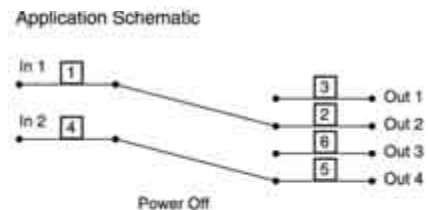
### Dual 1 x 2 DPDT

#### Possible Application

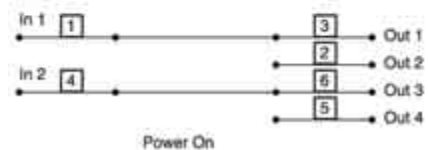


#### Schematic

##### Position 1

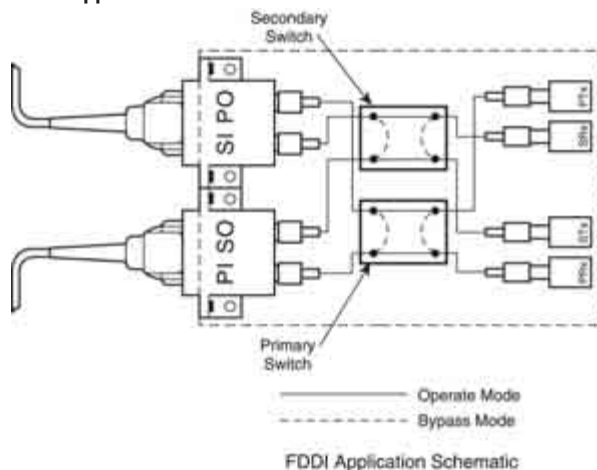


##### Position 2

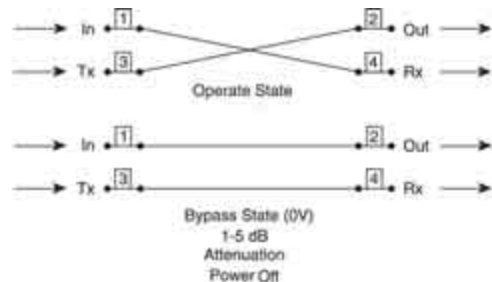


### 2 x 2 Bypass Fully Reversing

#### Possible Application



#### Schematic

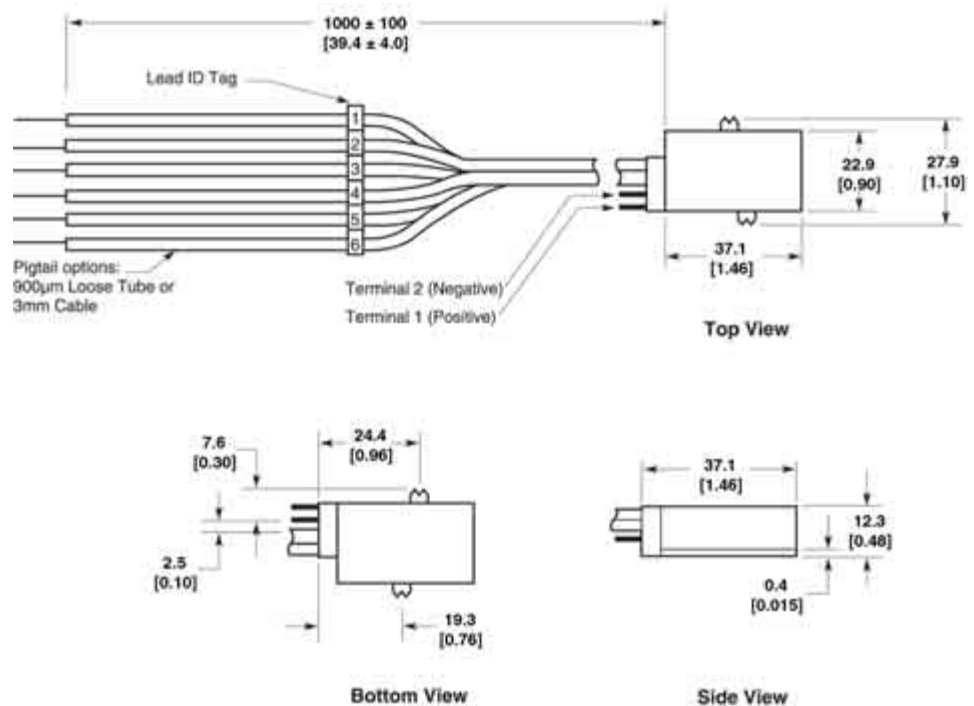


## Switches (Continued)

**Multimode**  
**1 x 2 SPDT Switch**  
**Dual 1 x 2 DPDT Switch**  
**2 x 2 Bypass Switch** (Continued)

### Dimensions

| Switch          | Fiber Leads Used |
|-----------------|------------------|
| 1 x 2 SPDT      | 1,2,3            |
| Dual 1 x 2 DPDT | 1,2,3,4,5,6      |
| 2 x 2 Bypass    | 1,2,3,4          |



### Part Number Information

| Switch Type: | Electrical Interface | Fiber Connector | 900 µm Loose Tube Cable |                     | 3 mm Cable Jacket |                     |
|--------------|----------------------|-----------------|-------------------------|---------------------|-------------------|---------------------|
|              |                      |                 | Fiber Size 50/125       | Fiber Size 62.5/125 | Fiber Size 50/125 | Fiber Size 62.5/125 |
| 1 X 2        | Bent Pin             | None            | —                       | —                   | 5099403-1         | 5099403-2           |
|              |                      | ST Style        | 5099414-1               | 5099414-2           | 5099415-1         | 5099415-2           |
|              |                      | SC Style        | —                       | —                   | 8-5099403-1       | 8-5099403-2         |
|              | Straight Pin         | None            | 5099420-1               | 5099420-2           | —                 | 5099421-2           |
|              |                      | ST Style        | —                       | —                   | 5099427-1         | 5099427-2           |
|              |                      | SC Style        | 8-5099420-1             | 8-5099420-2         | —                 | 8-5099421-2         |
| Dual 1 X 2   | Bent Pin             | None            | 5099973-1               | 5099973-2           | 5099974-1         | 5099974-2           |
|              |                      | ST Style        | —                       | —                   | —                 | —                   |
|              |                      | SC Style        | 8-5099973-1             | 8-5099973-2         | 8-5099974-1       | 8-5099974-2         |
|              | Straight Pin         | None            | 5099979-1               | 5099979-2           | —                 | —                   |
|              |                      | ST Style        | 5099981-1               | 5099981-2           | 5099982-1         | 5099982-2           |
|              |                      | SC Style        | 8-5099979-1             | 8-5099979-2         | —                 | —                   |
| 2 X 2 Bypass | Bent Pin             | None            | —                       | —                   | 5099405-1         | 5099405-2           |
|              |                      | ST Style        | 5099416-1               | 5099416-2           | 5099417-1         | 5099417-2           |
|              |                      | SC Style        | —                       | —                   | 8-5099405-1       | 8-5099405-2         |
|              | Straight Pin         | None            | —                       | —                   | 5099423-1         | 5099423-2           |
|              |                      | ST Style        | —                       | —                   | 5099429-1         | 5099429-2           |
|              |                      | SC Style        | —                       | —                   | 8-5099423-1       | 8-5099423-2         |

| Fiber Type: | 50/125 | 62.5/125 |
|-------------|--------|----------|
|             | -1     | -2       |

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

## Switches (Continued)

### Multimode Bypass Switches

#### Product Facts

- Increases reliability of mission-critical network applications
- Low insertion loss — 1.8 dB typical, including connectors
- Choice of 62.5/125  $\mu\text{m}$ , 50/125  $\mu\text{m}$
- Choice of FSD MIC, ST-style, or duplex SC connectors and ports
- Rack or panel-mount versions
- Compact size with all front-mounted connections to conserve space
- High-speed optical switching
- Simple to install



Tyco Electronics' Bypass Switch is a second-generation device that allows a dual-attach station to be bypassed without loss of ring integrity. The switch module contains two fully reversing optical bypass switches that direct the optical signals to the appropriate fiber according to signals on the device's electrical interface.

A spherical mirror, which is pivoted at high speeds between two stable positions, reflects light into

specific fibers in either the operate or bypass state. Signal attenuation is very low on the network path. In the bypass state, the path from transmitter to receiver is attenuated to prevent receiver saturation. Holding the switches in the operating (non-bypass) state requires a 5-VDC, 160-mA power. Both switches return to the bypass state if the power is removed. Switching occurs in less than 10 ms.

The modules are easy to install between a dual-

attached station and the ring. Pigtailed optical-fiber cables connect the switch module to the node, while the primary and secondary ring cables connect to the switch's A and B ports.

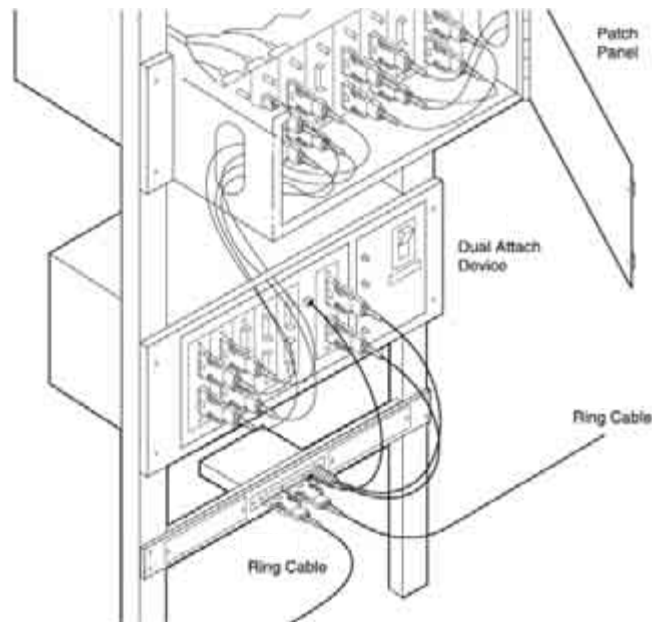
The electrical connection is supplied by one of three standard electrical interfaces. A status LED lights when the switch is in the operate state. The bypass switch can be either booth panel or rack mounted.

### Singlemode Bypass Modules

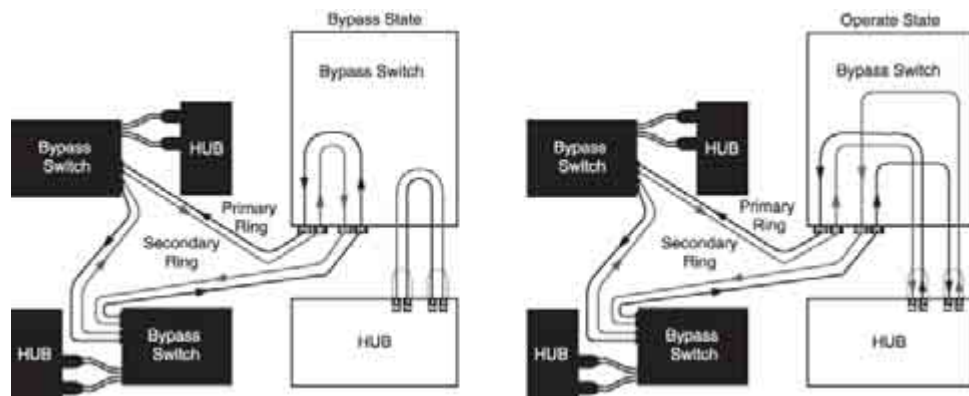
Tyco Electronics offers Singlemode Bypass Modules designed to meet your optical path protection needs. For more information, please consult your local Tyco Electronics Sales Representative or call Tyco Electronics Product Information Center at 1-800-522-6752.

## Switches (Continued)

### Multimode Bypass Switches (Continued)



### Switch Operation: Bypass and Operate States



### Insertion Loss

| Operate Mode            | Power On    |
|-------------------------|-------------|
| PI Line to PRX Station  | 1.8 dB Max. |
| SI Line to SRX Station  | 1.8 dB Max. |
| PTX Station to PO Line  | 1.8 dB Max. |
| STX Station to SO Line  | 1.8 dB Max. |
| Bypass Mode             | Power Off   |
| PI Line to PO Line      | 1.8 dB Max. |
| SI Line to SO Line      | 1.8 dB Max. |
| PTX Station to PRX Line | 5.0 dB Max. |
| STX Station to SRX Line | 5.0 dB Max. |

**Note:** FOTP-34, Method A2. IL values given for ST/SC options.

### Specifications

**Switching Speed** — 10 ms max.

**Operating Wavelength** —  
750 - 1450 nm

**Crosstalk** — ≤45 dB (FOTP-42)

**Switch Driver** — 5 V at 160 mA

**Fiber Type** — 62.5/125 µm or  
50/125 µm graded index

**Operating Temperature** —  
-10°C to +65°C (FOTP-3, Condition C2)

**Storage Temperature** —  
-30°C to +70°C (FOTP-3, Condition C2)

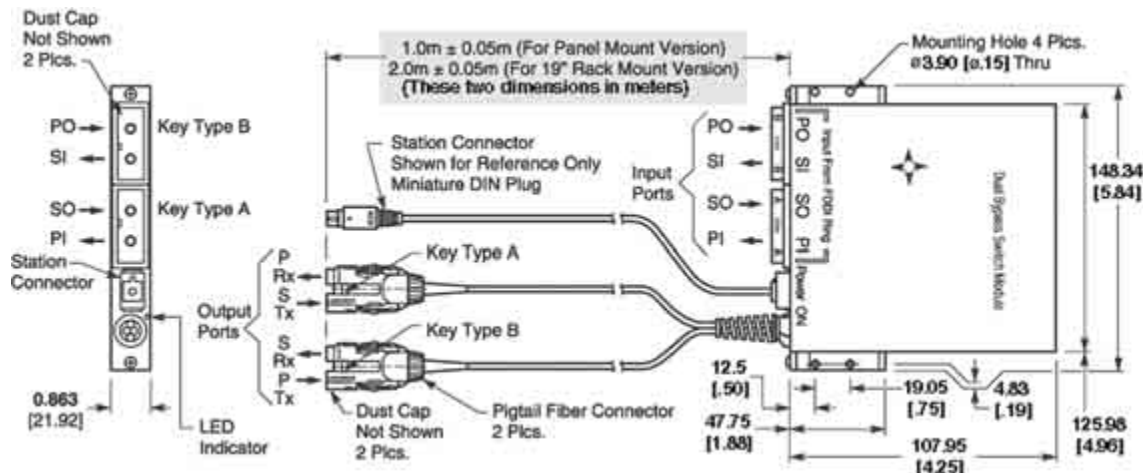
**Durability** — >1 million cycles

**Weight** — 12 oz [340 g]

## Switches (Continued)

### Multimode Bypass Switches

(Continued)



### Switch Module Base Part Numbers

| Input Port Interface | Mounting | Part Numbers           |          |         |         |                 |         |
|----------------------|----------|------------------------|----------|---------|---------|-----------------|---------|
|                      |          | Optical Fiber Pigtails |          |         |         |                 |         |
|                      |          | 62.5/125 µm Fiber      |          |         |         | 50/125 µm Fiber |         |
|                      |          | FSD MIC                | ST-style | SC      | LC      | FSD MIC         | SC      |
| FSD MIC              | Panel    | 5209161                | 5209162  | 5209163 | —       | 5209167         | —       |
|                      | Rack     | 5209164                | 5209165  | 5209166 | —       | 5209170         | —       |
| ST                   | Panel    | —                      | 5209174  | 5209175 | —       | —               | —       |
|                      | Rack     | —                      | 5209177  | —       | —       | —               | —       |
| Duplex SC            | Panel    | —                      | —        | 5209187 | 1918973 | —               | 5209193 |
|                      | Rack     | 5209188                | —        | 5209190 | —       | —               | 5209196 |

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

### Switch Module Dash Numbers: Electrical Interface

| Dash Number | Station Connector                           |
|-------------|---------------------------------------------|
| -3          | 6-pos. Shielded Modular Plug                |
| -4          | 6-pos. Shielded Miniature Circular DIN Plug |
| -6          | 4-pos. Modular Plug                         |

**Note:** The electrical cable consists of an 8-position modular plug at one end for connecting to the switch and one of the connectors listed at the other end.

### Ordering Information

Select the required switch module. To the base part number for the module, add the dash number for the electrical interface you require for the station connector. Example: 5209163-3 is a switch with FSD MIC receptacles on ring ports, duplex SC connectors on the fiber pigtails, and a 6-position modular plug on the electrical cable.

**For other connector  
interfaces, contact your local  
Tyco Electronics Sales  
Representative**



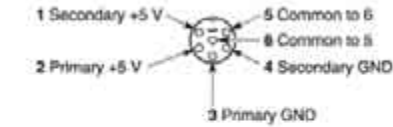
## Switches (Continued)

### Multimode Bypass Switches

(Continued)

### Station Connector and Pinouts

Contact ID Shown from Mating End of Station Connector



6-Position  
Miniature DIN



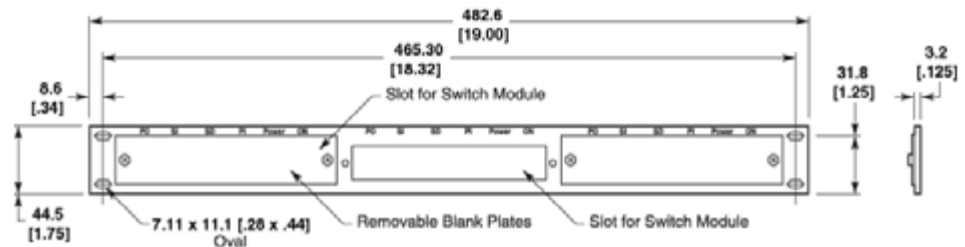
6-Position  
Shielded Modular Plug



4-Position  
Modular Plug

### To Order the Electrical Interface Powercord Separately:

| Part Number | Station Connector                  |
|-------------|------------------------------------|
| 5209503-1   | 6-pos. Modular Plug                |
| 5209504-1   | 6-pos. Shielded Miniature DIN Plug |
| 5209506-1   | 4-pos. Modular Plug                |



### Rack-Mount Panel

Part Number 209197-1 Mounts in a 19-inch rack and accepts up to three switch modules.

**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.

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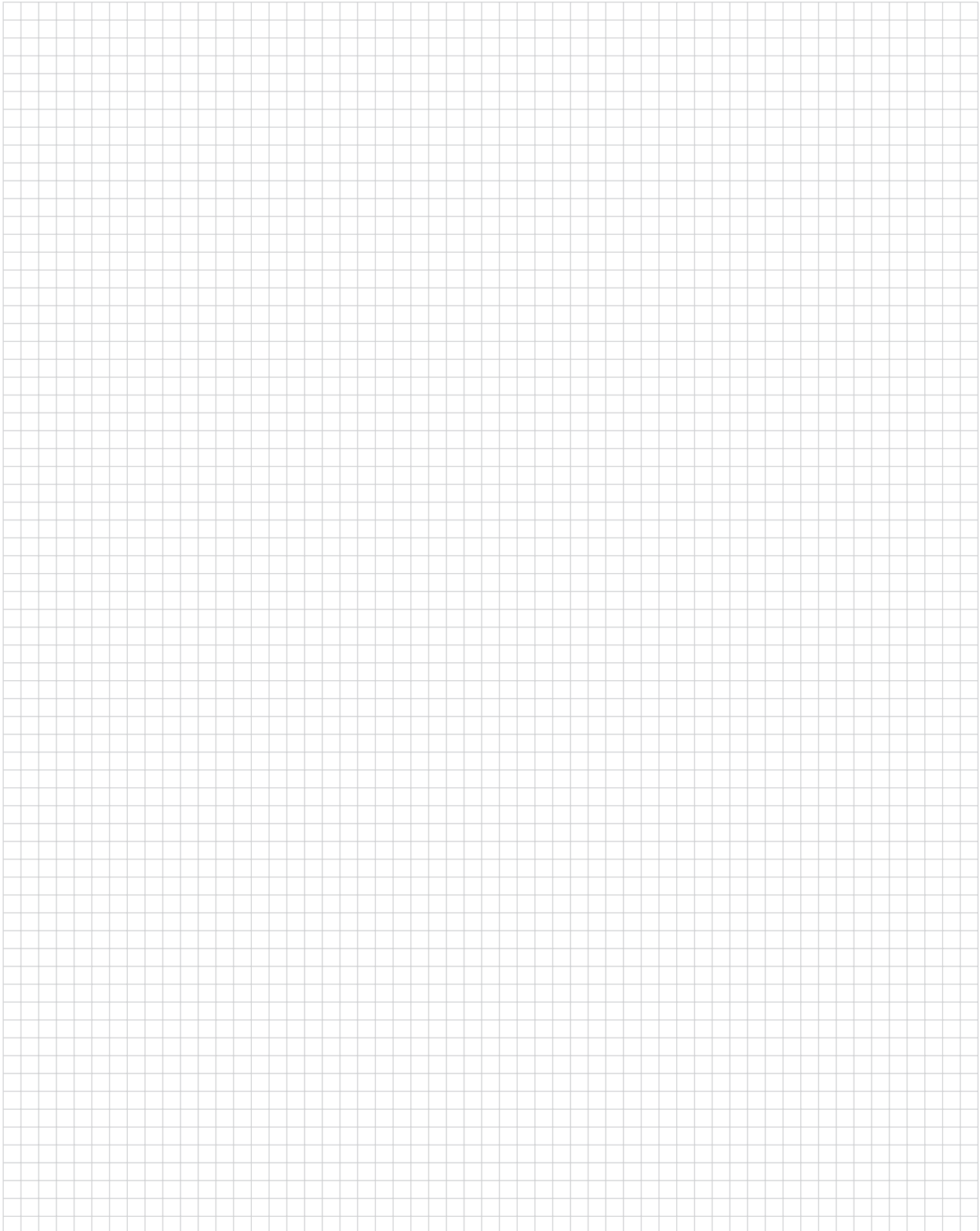
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**Engineering Notes**

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