Low Loss Optical Interconnects for Harsh Environments

Optik-D™ Series

IL = 0.06 dB (typ)

Conforming to ARINC 801
The Optik-D is intended for use in the Combo-D family of connector products. For a full understanding of this product family and its accessories, please reference the Combo-D and Accessories catalogs found at www.connectpostronic.com.

**WHY FIBER?**

- High bandwidth
- EMI immune
- Reduced wiring bulk and weight
- Improved data security
- Safe in explosive environments
- Minimal losses over long distances
- Eliminates ground loops
- Future proof applications

**WHY OPTIK-D?**

- Ultra low insertion loss of 0.06 dB (typical) means less optical power is required, which can mean the difference between an inexpensive LED laser and a costly solid state laser
- Suitable for harsh environments
- More cost effective than D38999 and ARINC 600-based systems
- Wide availability of accessories
- Compatible with other ARINC 801 termini
- Hybrid connector allows for combination of optical, power, signal and/or coax in a single connector
**Description** | **Value**
--- | ---
Type | Multi-mode (Contact technical sales for single mode options)
Ferrule | 1.25mm Zirconia Ceramic
Ferrule Holder | Brass alloy
Ferrule Holder Plating | Electroless nickel, 200 microinches
Rear Body & Crimp Sleeve | Corrosion resistant steel alloy
Passivation | Per SAE-AMS-QQ-PP-35 or ASTM-A-967
Cable Diameter | 1.6 to 2.8 [0.065 to 0.110]
End Face Geometry | Meets Telcordia GR-326
Insertion Loss (IL) | 0.06 dB (typical)
Minimum Loss | 0.004 dB
Maximum Loss | 0.08 dB
Return Loss (RL) | > 45 dB
Minimum Return Loss | > 45 dB
Temperature Range | -55° to 125°C
Locking System | Jackscrews (required)
Plastic Optical Fiber (POF) | The current Optik-D terminus is intended for glass fiber only. For high volume applications, a POF terminus can be provided. Contact technical sales for more information.
Cable Compatibility | Loose jacketed (pull-proof), 1.6mm to 2.8mm [0.065” to 0.110”] ø Contact technical sales for details regarding tight jacketed and 900 µm cable use

The low loss performance of this system is based on a **tight tolerance** guide pin and bushing that act jointly to keep the fiber cores precisely aligned.

The guide pins and bushings are installed at the factory and are required for proper performance.

**Pull-proof** termini allow for the use of the connector without a backshell.
During the terminus installation process, ensure that the terminus key is aligned with the keyway on the adapter and that the terminus is not rotated during installation.

Although not shown in this view, jackscrews are required for proper performance.

All items shown here except the termini are installed at the factory prior to shipment.

Guide pins and bushings are mandatory for proper performance and occupy a size 8 contact position as shown here.

The guide pin is installed on the male connector and the bushing is installed on the female connector.

Contact technical sales for options to have the guide pin and bushing installed in a different location.

Red circle indicates location of guide pin or bushing.
The terminus design includes a key that aligns with a corresponding keyway in the rear body of the adapter. Each terminus ships with a factory-installed dust cover and a crimp sleeve.

Contact technical sales for other types of available termini including those with alternate ferrule diameters and those intended for use with non-pull-proof cable.

OT1260LMX/AA
Crimp sleeve not shown

For all related shell dimensions, please consult the Combo-D catalog, C-004.
ARINC 801 Termination Kits

This kit contains all of the tools and consumables required for terminating ARINC 801 termini.

Includes:
- Epoxy curing oven
- 200X handheld microscope
- Front epoxy injection tool
- ARINC 801 crimp tool with die set
- ARINC 801 polishing puck
- FiberSure multi-purpose optical strip tool
- Kevlar shears
- Carbide scribe tool
- ARINC 801 oven cure adapters
- ARINC 801 insertion and removal tools
- Tweezers
- Permanent marker
- Metal 6-inch ruler
- Optical cleaning fluid
- Optical cleaning wipes
- Epo-Tek 353ND epoxy
- All necessary polishing films
- Debris container

ARINC 801 Inspection & Cleaning Kits

Designed with input from the commercial air transport industry, this kit is intended to inspect and clean ARINC 801 fiber optic connectors found onboard the aircraft.

Includes:
- HD-2 display with video probe
- 1.25mm visual fault locator
- ARINC 801 cleaning sticks
- ARINC 801 cleaning tool
- Fiber optic cleaning wipes
- Fiber optic grade cleaning fluid
- Video probe tips for ARINC 801 and 1.25mm

ARINC 801 End Face Cleaning Tool

US Conec IBC brand cleaners use a novel dry cleaning strand to gently sweep and lift away contaminates from the end face including:

- Arizona road dust
- Alcohol residue
- Distilled water residue
- Skin oil residue
- Vegetable residue
  - Graphite
  - Salt water residue
  - Hand lotion
  - T-shirt lint

Insertion / Removal Tool

The Optik-D Series uses a widely available plastic tool for the insertion and removal of the terminus from the adapter.

Contact technical sales regarding availability of an LC adapter that allows for use of industry standard LC tooling for termination, inspection and cleaning purposes of the ARINC 801 optical terminus.

This prevents from having to purchase and manage multiple sets of tooling if customers already own LC tooling.
<table>
<thead>
<tr>
<th>TEST</th>
<th>TEST CONDITION</th>
<th>GROUP A ENVIRONMENTAL</th>
<th>GROUP B MECHANICAL PART 1</th>
<th>GROUP C MECHANICAL PART 2</th>
<th>GROUP D MATING ABILITY</th>
<th>REQUIREMENT</th>
<th>RESULTS</th>
<th>VALUE (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation &amp; Splicing</td>
<td>TIA/EIA-455-171A</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>IL = 0.30 dB Max</td>
<td>Pass</td>
<td>0.06</td>
</tr>
<tr>
<td>Return Loss</td>
<td>TIA/EIA-455-107A</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>RL = 20 dB Min</td>
<td>Pass</td>
<td>&gt; 45</td>
</tr>
<tr>
<td>Thermal Cycling</td>
<td>TIA-455-3B</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection</td>
<td>Pass</td>
<td>-0.02</td>
</tr>
<tr>
<td>Humidity</td>
<td>MIL-DTL-24308G EIA-364-31B Method IV</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection</td>
<td>Pass</td>
<td>-0.02</td>
</tr>
<tr>
<td>Temperature Life</td>
<td>TIA/EIA-455-4C</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection</td>
<td>Pass</td>
<td>0.05</td>
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<tr>
<td>Salt Spray</td>
<td>MIL-DTL-24308G EIA-364-26B Condition B</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection</td>
<td>Pass</td>
<td>-0.04</td>
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<tr>
<td>Thermal Shock</td>
<td>MIL-DTL-24308G EIA-364-32F Method A Condition 1</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection</td>
<td>Pass</td>
<td>-0.01</td>
</tr>
<tr>
<td>Vibration</td>
<td>MIL-DTL-24308G EIA-364-28F Condition IV</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection Discontinuity Test</td>
<td>Pass</td>
<td>-0.01</td>
</tr>
<tr>
<td>Shock</td>
<td>MIL-DTL-24308G EIA-364-27C Condition E</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection Discontinuity Test</td>
<td>Pass</td>
<td>-0.01</td>
</tr>
<tr>
<td>Maintenance Aging</td>
<td>EIA-364-24B</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Insertion Force = 8 lbs Max</td>
<td>Pass</td>
<td>n/a</td>
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<tr>
<td>Mating Durability</td>
<td>MIL-DTL-24308G EIA-364-09C</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection</td>
<td>Pass</td>
<td>0.01</td>
</tr>
<tr>
<td>Cable Pull-Out</td>
<td>TIA-455-6B Method 1</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>CIT = ± 0.5 dB Visual Inspection Pull Force = 53.4 N for 5 sec</td>
<td>Pass</td>
<td>0.01</td>
</tr>
<tr>
<td>Termini Retention Force</td>
<td>EIA-364-38C Method A</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Pull Force = 53.4 N for 1 hour Visual Inspection</td>
<td>Pass</td>
<td>n/a</td>
</tr>
<tr>
<td>Return Loss</td>
<td>TIA/EIA-455-107A</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>RL = 20 dB Min</td>
<td>Pass</td>
<td>&gt; 45</td>
</tr>
</tbody>
</table>

* Test conditions were modified in some cases where the original test condition exceeded the performance limitations of the connector or termini. A full test report is available upon request.
* In order to pass the test plan requirements, the optical discontinuity could not exceed 1 µsec.
* Testing performed at 1300 nm.
Specify a part number by selecting an option from each step.

<table>
<thead>
<tr>
<th>STEP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Example</td>
<td>CBF</td>
<td>5W5</td>
<td>F</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### STEP 1 - SERIES

CBF – Optik-D Series

### STEP 2 - CONNECTOR VARIANTS – Face view of male or rear view of female

| Shell Size 2 | 3W3 | 3WK3 |
| Shell Size 3 | 5W5 | 9W4 |
| Shell Size 4 | 17W5 | 13W6 | 8W8 |
| Shell Size 5 | 24W7 |

### STEP 3 - CONNECTOR GENDER

M – Male
F – Female, open entry signal contacts (if applicable), use with 3W3, 3WK3, 5W5 or 8W8.
S – Female, PosisBand closed entry signal contacts (if applicable), not for use with use with 3W3, 3WK3, 5W5 or 8W8.

### STEP 4 - ELECTRICAL CONTACT TERMINATION TYPE (IF APPLICABLE)

0 - Use with 3W3, 3WK3, 5W5 or 8W8, order termini separately (see page 5).
*1 1 - Crimp, signal 0.5mm² [20 AWG], uses CBC Series step molding.
*1 2 - Solder cup.
*1 4 - Solder tail, right angle (90°) PCB with 11.43 [0.450] contact extension.
*1 5 - Solder tail, right angle (90°) PCB with 7.19 [0.283] contact extension.
*1 59 - Solder tail, right angle (90°) PCB with 13.84 [0.545] contact extension.
*1 Not for use with 3W3, 3WK3, 5W5 or 8W8.

### STEP 5 - MOUNTING STYLE

0 - Mounting Hole, Ø 3.05 [0.120].
*2 R2 - Bracket, mounting, right angle (90°) metal, swaged to connector with 4-40 thread fixed female jackscrews and alignment bar.
*2 R6 - Bracket, mounting, right angle (90°) metal, swaged to connector with 0.120 [3.05] Ø mounting hole and alignment bar.
*2 R7 - Bracket, mounting, right angle (90°) metal, swaged to connector with 4-40 threads and alignment bar.
*2 R8 - Bracket, mounting, right angle (90°) metal, swaged to connector with 4-40 locknut and alignment bar.
S5 - Swaged locknut, 4-40 threads
*2 Not for use with Code 0, 1 or 2 in Step 4.

**Typical Multi-mode Fiber Anatomy**

Many optical cables also have strength members between the jacket and the buffer for greater durability.
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>0</td>
<td>T2</td>
<td>S</td>
<td>/AA</td>
<td></td>
</tr>
</tbody>
</table>

**STEP 10 - SELECTIVE LOADING**

Use this step to specify which size 8 positions will NOT be populated with optical termini.

I.E. CBF8W8M00ANES-A1A8 would yield an 8W8 with positions A1 and A8 empty so that electrical size 8 contacts can be used in those positions.

**STEP 9 - ENVIRONMENTAL COMPLIANCE OPTIONS**

/AA - RoHS Compliant

An RoHS compliant connector with stainless steel shells will also have stainless steel hardware (backshell not included).

**STEP 8 - SHELL OPTIONS**

0 - Zinc plated, with chromate seal.
S - Stainless steel, passivated.
X - Tin plated.
Z - Tin plated and dimpled (male connectors only).

**STEP 7 - JACKSCREW LOCKING SYSTEMS**

T2 - Fixed Female Jackscrews.
E2 - Rotating Male Screw Locks.

**STEP 6 - BACKSHELLS AND ADDITIONAL ACCESSORIES**

0 - None
Y - Backshell, top opening, plastic with rotating male jackscrews.
   Available in shell size 5 only.
Z - Backshell, top and side opening, robust and extended height, plastic with rotating male jackscrews.
H - Backshell, top opening, metal.
AN - Backshell, lightweight aluminium, nickel finish.
N - Push-on fastener for right angle (90°) mounting brackets.

2D DRAWINGS & 3D MODELS

Once you have made a connector selection, contact us if you would like a 3D model or 2D drawing. If the drawing does not already exist in our database, we can create one for you. We also have a variety of drawings available from our website, www.connectpositronic.com.

Gore-Tex® gasket tape can be used as a protective layer between the fiber and the backshell cable clamp to prevent chafing.