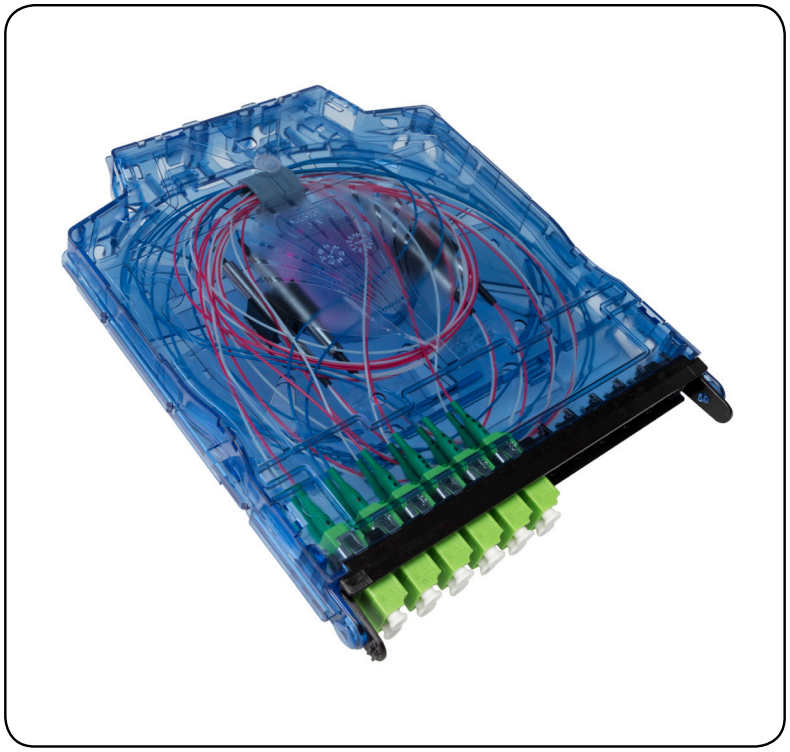
WaveSmart Circulator

Installation Manual

CLEARFIELD



Manual 013299 Rev C - Oct 2019

Table of Contents

Circulator Application 3
Prerequisites: 3
Installation, Test & Turn-up Procedure 3
Blue Cassette 6
xPAK or LGX Cassette 7
Connector Cleaning Procedure 8
Standard Warranty 13
Proprietary Notice 14
Technical Support 14

Direct: 763.476.6866 • National: 800.422.2537 • www.SeeClearfield.com • techsupport@clfd.net
Manual 013299 Rev C - Oct 2019

Circulator Application

The Clearfield WaveSmart Circulator facilitates economical fiber relief (4 strands to 2 strands) on most legacy Optical Transport system spans equipped with 1310 nm or 1550 nm WBO (Wide Band Optic) SONET/Ethernet optics [Discrete/SFP/XFP (Small Form Pluggable/ 10g Small Form Pluggable) based] to carry traffic in a bi-directional format (XMT & RCV) (Transmit and Receive).

Note: *SFP/XFP systems may be better served with a WDM solution. See your Clearfield representative for more information.*

Prerequisites:

1. Verify that system is currently operating within AML/EML (Actual Measured Loss/Expected Measured Loss) limits to ensure a healthy system.

2. Verify the optical transport system can accommodate the additional 1.6 dB IL introduced into the span by the insertion of 2 circulators (0.8 dB per circulator).

3. Verify the laser source is of a SLM DFB (Single-Longitudinal Mode Distributed Feedback) type with adequately narrow spectral width.

4. If the system uses an MLM (Multi-Longitudinal Mode) type laser source, fiber relief can still be obtained by implementing WDM's in place of circulators. See your Clearfield representative for more information.

Installation, Test & Turn-up Procedure

1. Install a Clearfield MOC cassette containing at least two circulator components into an appropriate Clearfield housing at either end of the existing span to be treated. (Symmetrical deployment design).

2. Verify that there is live traffic on the "working" fiber pair and not the "protect" fiber pair. If the traffic is on the protect pair, then as appropriate to the individual optical transport system practices, manually switch live traffic away from protect fiber pair to the working pair.

3. Connect 2 fiber jumpers with appropriate connectors from the Optical Transport (SONET/Ethernet) TX (Protect) to the TX port and RX (Protect) to the RX port of the Clearfield MOC Cassette. Connect them to the ports labeled TX A/B/C/D & RX A/B/C/D respectively at both ends of the span (A&Z). The letters A, B, C, and D designate the individual circulator components within the MOC. "A" is the first component. "B" is the second component.

4. At both ends of the span, connect 1 fiber jumper between the OSP fiber assigned to remain in-service carrying the bi-directional optical "Protect" signal to the Port labeled "OUT A/B/C/D" as appropriate on the Clearfield MOC Cassette.

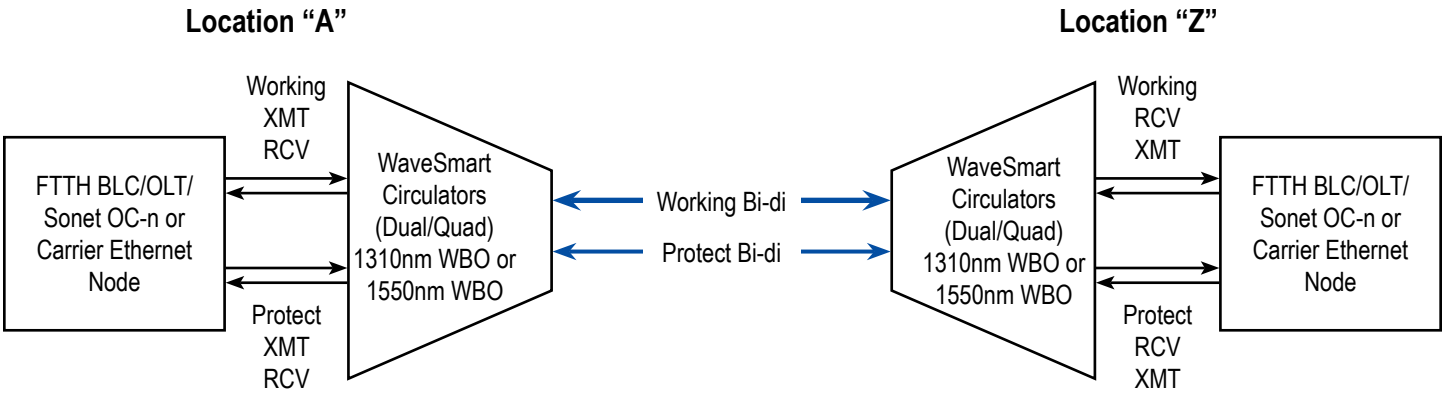
5. Test and verify signal performance is as expected via Link Loss Budget analysis. Remove or add attenuators as needed to maintain proper power margin.

6. Upon successful completion of Step # 5, manually switch the Network Element to “Protect” and verify valid switch via PM (Performance Monitoring) analysis.

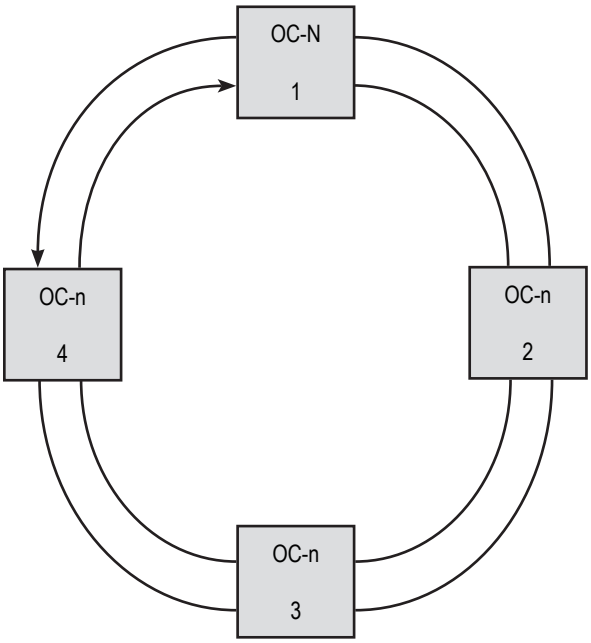
7. Upon successful completion of Step # 6, perform steps 3-5 as above applied to the TX (Working) and RX (Working) fiber pair.

8. Upon successful completion of Step # 7 and verification that the “Working” path is properly operating via PM Analysis, manually switch live traffic back to “Working” and retest via PM one last time. Insure that all alarms clear and that traffic is operating normally.

9. (Optional) Insert a Near End QRSS (Quasi Random Signal Source) VT/STS (Virtual Tributary/Synchronous Transport Signal) level simulated traffic hard loop at the far end and then monitor the BER during exercise, and/or force a manually switch to “Protect” to re-confirm proper operation.



Before

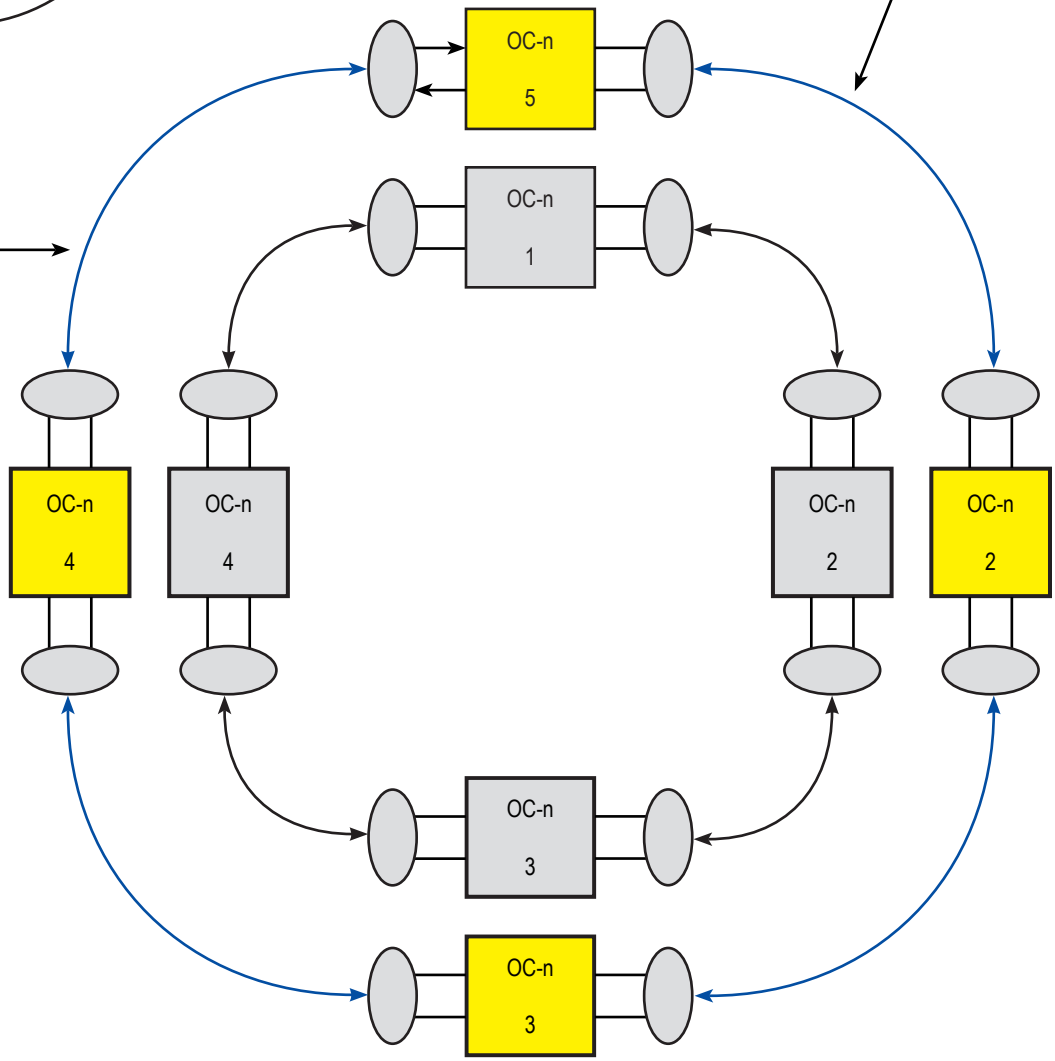


After

New Concentric Ring

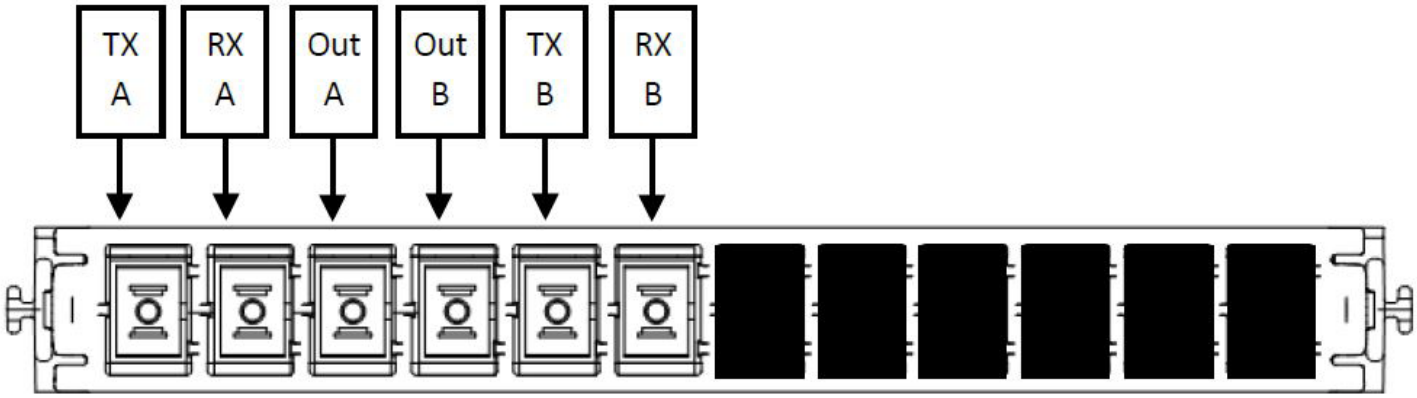
"Recovered" Fiber Strand for Bi-Directional Operation

= Circulator (1310/1550 WBO)

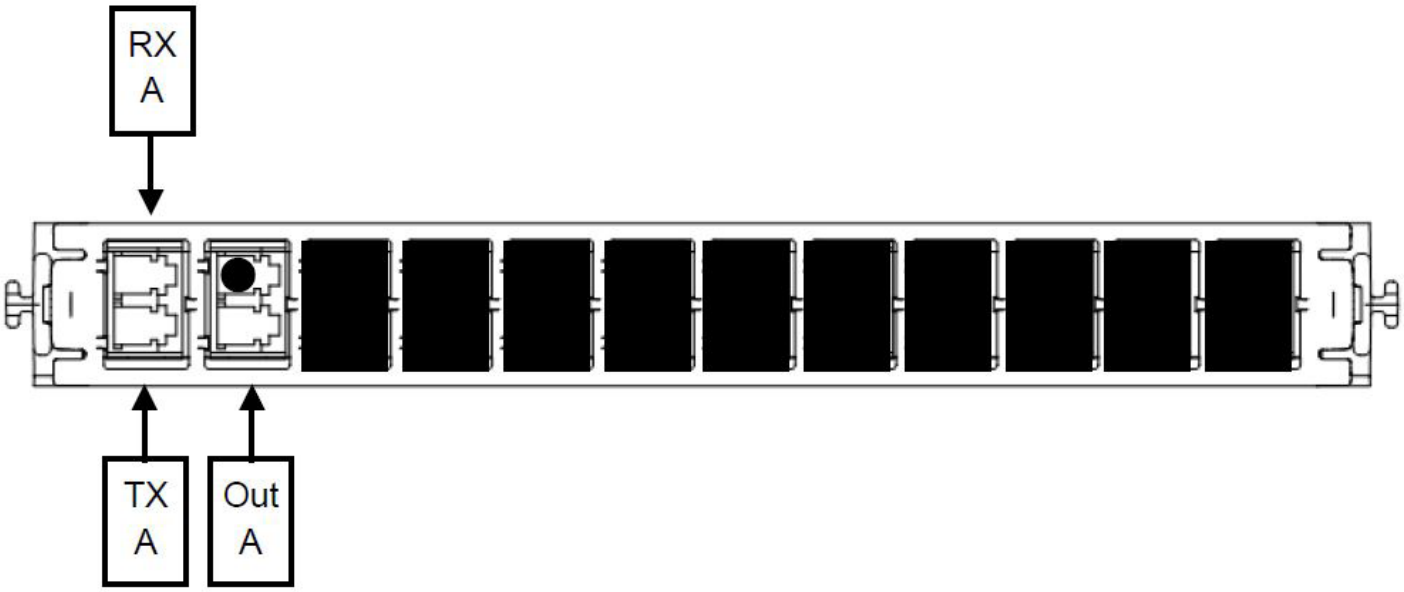


Blue Cassette

SC Adapters, Dual Component



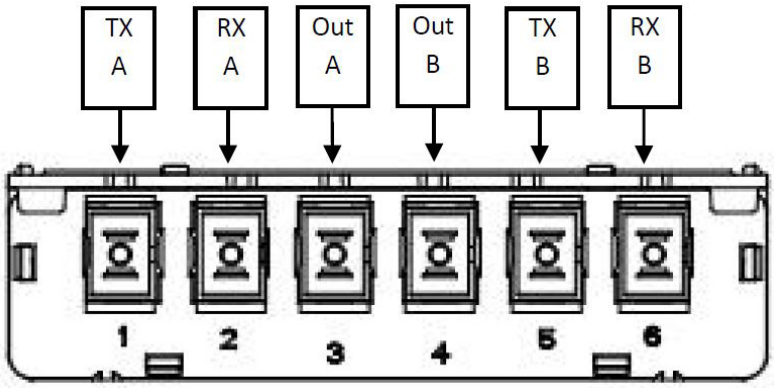
LC Duplex Adapters, Single Component



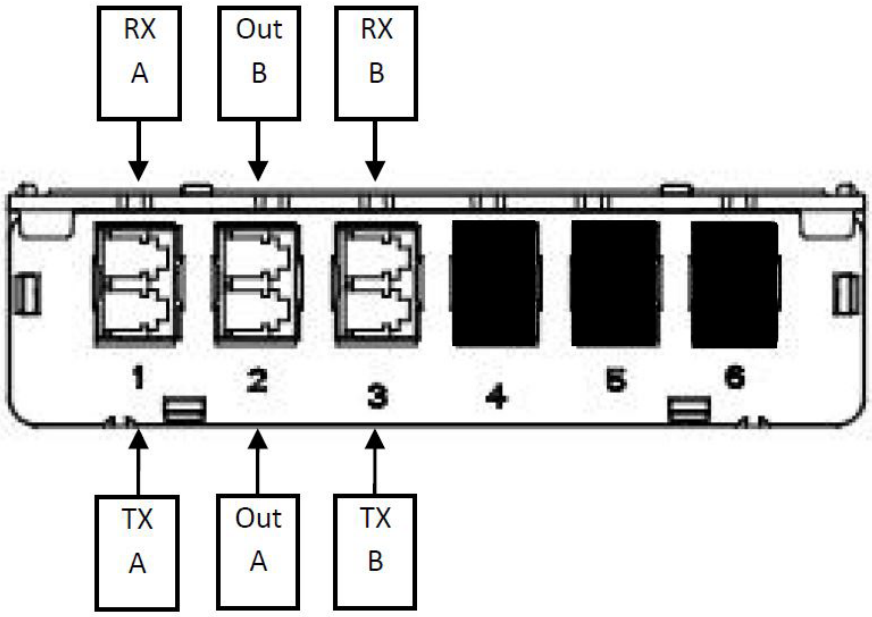
Direct: 763.476.6866 • National: 800.422.2537 • www.SeeClearfield.com • techsupport@clfd.net
Manual 013299 Rev C - Oct 2019

xPAK or LGX Cassette

SC Adapters, Dual Component



LC Duplex Adapters, Dual Component



Connector Cleaning Procedure

Whether factory terminated or field spliced, clean connectors are essential for proper system operation. Even the smallest dust particle can cause transmission problems, so for optimal network performance inspect, and if necessary, clean connectors and adapters prior to mating.

Inspect Then Connect

These are Clearfield recommended products/applications. Use the product you feel will complete your cleaning procedures. Create a “best practice” for your company and follow those procedures.

The use of Chemtronics end face and bulkhead cleaning products and techniques ensures a clean end face, no matter the type of contamination.

Before cleaning any connector, be sure you know what type of contaminate you are cleaning (dry, fluidic, or combination). All the available products are good, it’s the process that you need to be aware of. Using a dry cleaning method to clean “dirt” can lead to scratching of the end face. Learn the process of cleaning properly.

Note: *It is* ***NOT*** *recommended to use isopropyl alcohol to clean the end face.*

Figure 1

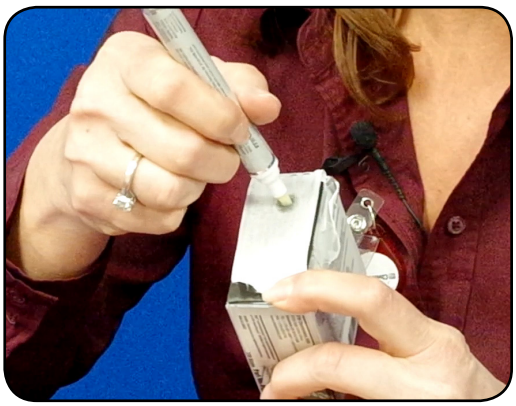


Figure 2

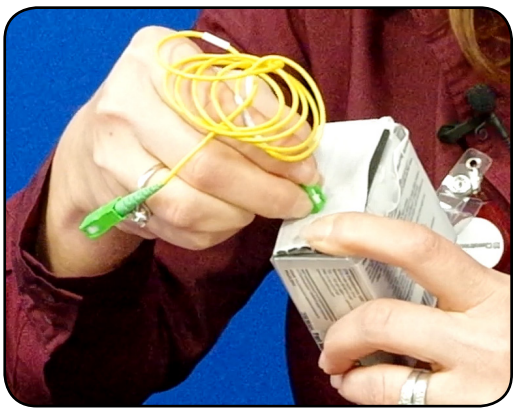


Figure 3

Cleaning an SC/LC Connector

Cleaning the End Face

- Place one wiping paper on QbE-2 FiberSafe™ Cleaning Platen. (**Figure 1)**
- Apply small amount of precision cleaner (about 1” in diameter) with Electro-Wash MX pen on to one end of the wipe. (**Figure 2)**
- Hold end face at a 90 degree angle. For APC connection, adjust by slightly tilting the container or end face. Angle is correct when no drag is felt on the end face. (**Figure 3)**
- Draw end face from wet to dry part of the wipe 3 times. Use just enough pressure to ensure complete contact between end face and the wipe.

Note: DO NOT *retrace previous step.*

Cleaning the Ferrule

- Lightly moisten the fiber optic swab (2.5mm/38542F or 1.25mm/38040) by spotting a small amount (about 1") of Electro-Wash PX or Electro-Wash MX pen onto the QbE. Hold the swab, 1 side down to the wetted area and hold for a count of 1-2-3-4-5. (**Figure 4)**

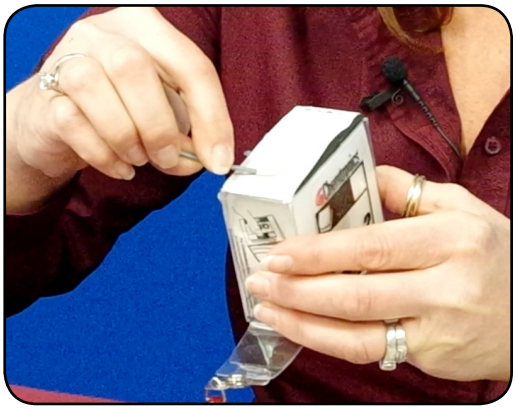


Figure 4

- Insert swab into side of ferrule, wet side to the ceramic ferrule and circle around 2-3 times and remove. Turn swab to dry side and repeat. (**Figure 5)**

Figure 5

Cleaning the Mate Through an Adapter AND the Adapter Itself

- Lightly moisten the fiber optic swab (2.5mm/38542F or 1.25mm/38040) by spotting a small amount (about 1") of Electro-Wash PX or Electro-Wash MX pen onto the QbE. Hold the tip of the swab onto the wetted area and hold for a count of 1-2-3-4-5.
- Insert the swab into the adapter to the connector, press lightly against the connector, twist 2-3 times, remove and discard.
- Dry with a second dry swab.
- Inspect, repeat cleaning if necessary, and test for signal strength.
- Use additional swabs to clean inside the actual adapter. Moisten swab, like above, and insert through hole and remove while twisting. (**Figure 6)**

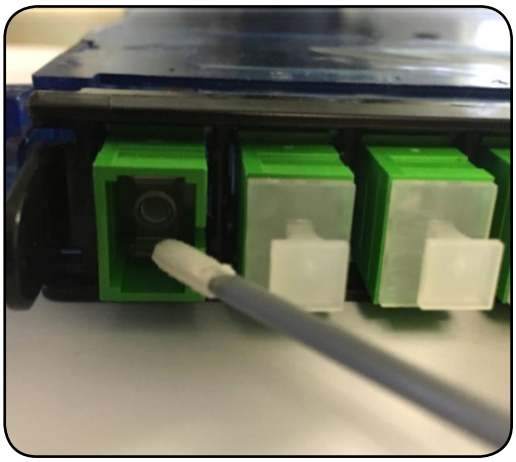
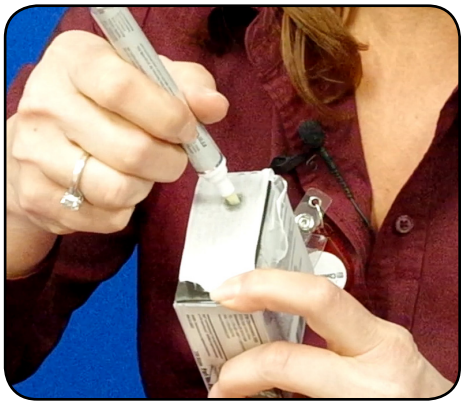


Figure 6

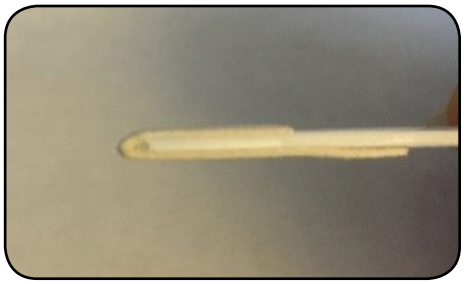
Cleaning an MPO/MTP Connector

Male Connector

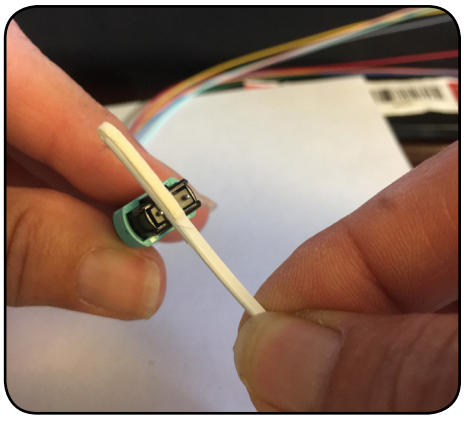
- Use of Chemtronics MTP Connector Cleaning Swabs (CC505F) is recommended. Even after cleaning with a probe cleaner, you should always clean the pins with this (or an equivalent) type swab. Cleans ALL MTP/MPO connector end faces. This swab also cleans the “pins” of the male connector



- Lightly “spot” a QbE-2 wipe on the platen with Electro-Wash PX Fiber Optic Cleaner, the FiberWash or MX Pen.

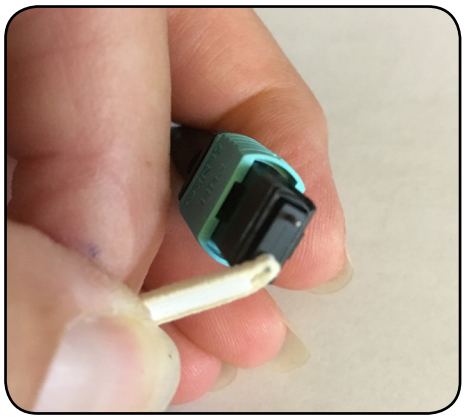


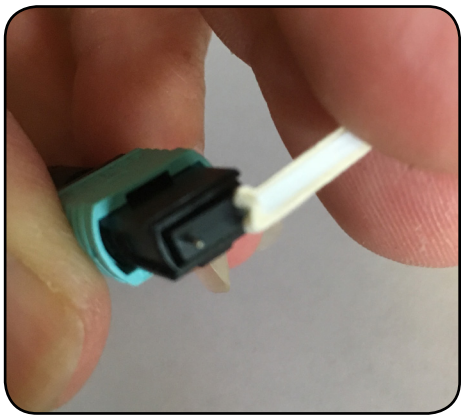
- Lightly touch short side of the MTP/MPO Connector Swab to the wetted area (3-5 secs) to absorb some cleaning solution (DO NOT over saturate the swab).



- Wipe connector areas to be cleaned, sliding pad from bottom of pad across and forward to tip of swab, from 1 side to the other, turn over and use long side to dry in same movement.

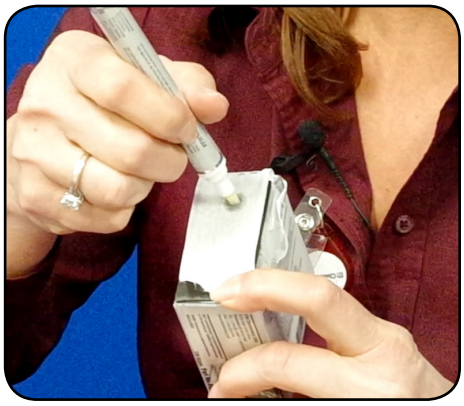
- Use the hole on end of pad to clean one alignment pin, then press the end of the swab into the other pin to clean.
- Check your work with a fiber scope. This can take several attempts to get the endface clean.



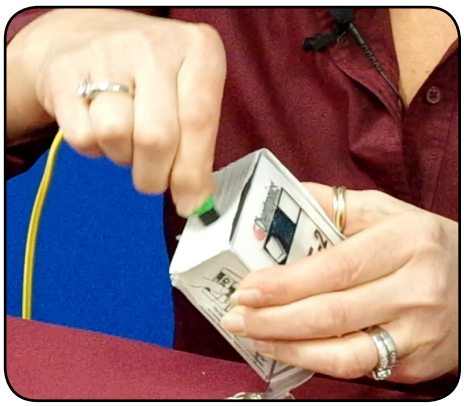


Female Connector (without pins)

- Cleaned like a single fiber connector, using a cleaning platform. The receptacles will be cleaned as long as you are using a combination cleaning process as recommended.
- Again, using a platen, moisten the platen with cleaning solvent on one end to accommodate 3 swipes of the MPO female endface.

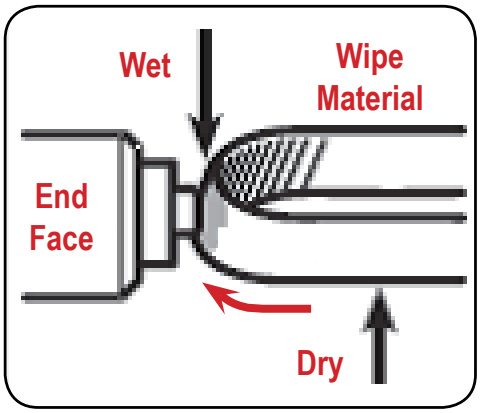


- Holding the connector (If APC, slightly at an angle to accommodate for 8° angle) swiping with medium pressure, from the wet area into the dry area 3 times, without wiping over previous area.
- Inspect, and if clean, make the connection. If NOT, repeat above steps until clean or if determined that the end face is damaged (based on standards of 5 cleanings per connection), replace.

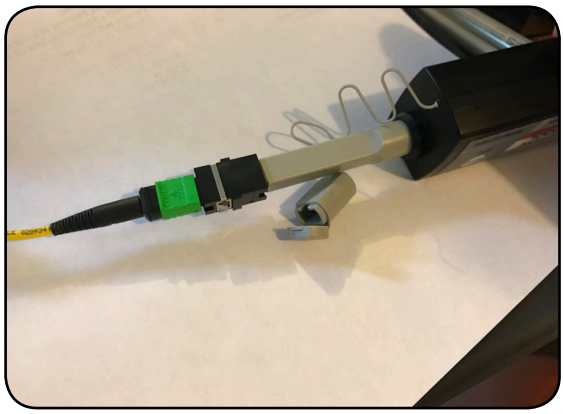


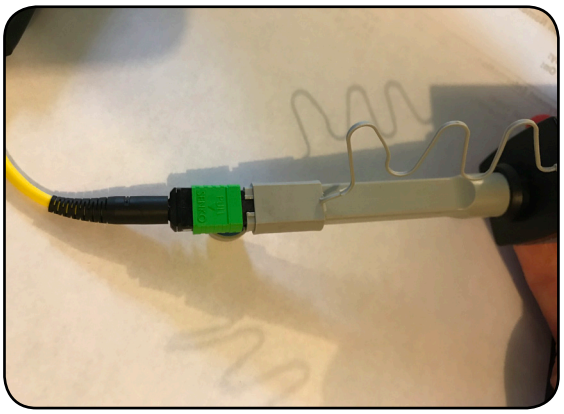
Cleaning Using a Probe-Style Cleaning Tool

- The probe style cleaning tools are capable of cleaning a connector end face separately or through the adapter.
- Slightly engage probe by pulling back but do not allow to click. Lightly "spot" a QbE-2 wipe on the platen with Electro-Wash PX Fiber Optic Cleaner, this will help alleviate "over saturation" of the material.
- Lightly touch the tip of probe and release.



- Insert connector or insert probe though adapter and click 2-3 times to move past the wet area and allow material to dry wipe.





- Inspect connector, repeat if necessary (following standards)
- If cleaning a male connector, clean the pins (see above)

Standard Warranty

Clearfield warrants to the original purchaser of the Product sold hereunder is free from defects in material and workmanship under normal use and service, subject to exceptions stated herein. Product purchased is warranted as follows: Clearfield designed and branded Products are warranted for three (3) years: Products manufactured by Clearfield to customer prints and/or specifications are warranted for one (1) year; and any Product Clearfield acquires from or through a third-party manufacturer or distributor and resells to Customer as the original customer will carry the manufacturer's pass-through warranty, if any. In all cases, the warranty period commences on the date of shipment to the original purchaser.

Warranty Claim Procedure

If any Product purchased from Clearfield is found defective under the above warranty, the following basic procedure must be followed:

1. Customer must contact Clearfield and obtain a Return Materials Authorization
2. Following authorization, the Customer ships the product-freight collect-to Clearfield's manufacturing facility
3. Clearfield shall repair or replace the defective Product at its sole option and discretion, and return the repaired or replacement Product to Customer's site, freight prepaid

Note: If the Product is not found to be defective at Clearfield, the product will be returned to the Customer and the customer billed for freight in both directions.

View our warranty policy here: https://www.seeclearfield.com/warranty.html

Limitations of Warranty

Correction of defects by repair or replacement, at the option of Clearfield Inc, shall constitute the exclusive sole remedy for a breach of this limited warranty. Clearfield shall not be liable under any circumstances for any special, consequential, incidental, punitive, or exemplary damages arising out of or in any way connected with the product or with agreement to sell product to buyer, including, but not limited to damages for lost profits, loss of use, or for any damages or sums paid by buyer to third parties. The foregoing limitation of liability shall apply whether the claim is based upon principles of contract, warranty, negligence or other tort, breach of statutory duty, principles of indemnity or contribution, the failure of any limited or exclusive remedy to achieve its essential purpose, or otherwise.

Clearfield will not be responsible for any labor or materials costs associated with installation or incorporation of Clearfield products at customer sites, including any costs of alteration, replacement or defective product, or any field repairs.

Other Limitations

Clearfield assumes no warranty liability regarding defects caused by:

1. Customer's modification of Product, excepting installation activities described in Clearfield documentation
2. Customer re-packaging of Product for shipment to third parties or destinations other than those originally shipped to by Clearfield, or any defects suffered during shipping where the Product has been re-packaged
3. Customer's installation or maintenance, excepting activities described in and performed in accordance with Clearfield documentation
4. Customer's improper or negligent use or application of Product
5. Other causes external to the Product, including but not limited to accidents, catastrophe, acts of God, government action, war, riot, strikes, civil commotion, sovereign conduct, or the acts or conduct of any person or persons not party to or associated with Clearfield
6. Environmental factors and weathering resulting in aging and damage not necessary or applicable to the function of the product

Proprietary Notice

Its purpose is to provide the user with adequately detailed documentation to efficiently install the equipment supplied. Every effort has been made to keep the information contained in this document current and accurate as of the date of publication or revision.

However, no guarantee is given or implied that the document is error free or that it is accurate with regard to any specification.

Technical Support

Clearfield, Inc. can be contacted for any issues that arise with the supplied product.

If you need to return the supplied product, you must contact the Clearfield, Inc. Customer Service Department to request a Returned Materials Authorization (RMA) number.

Clearfield, Inc.
7050 Winnetka Ave N
Minneapolis, MN 55428

Toll Free: 800.422.2537
Phone: 763.476.6866
Fax: 763.475.8457

Customer Support: sales@clfd.net
Technical Support: techsupport@clfd.net