Best Practice for Cleaning Multimode and Singlemode Transceiver Optics

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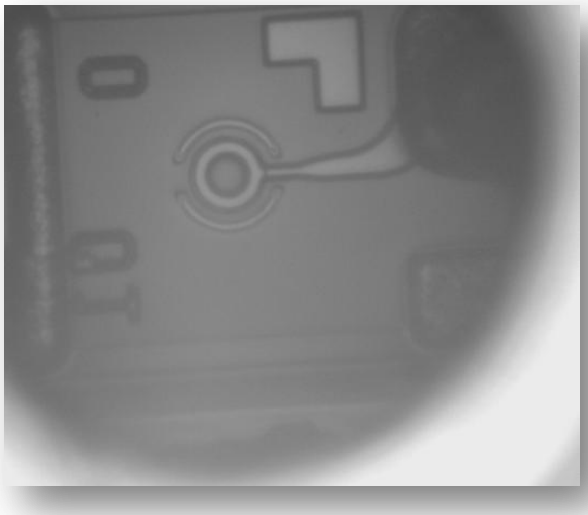
1.0 Introduction:

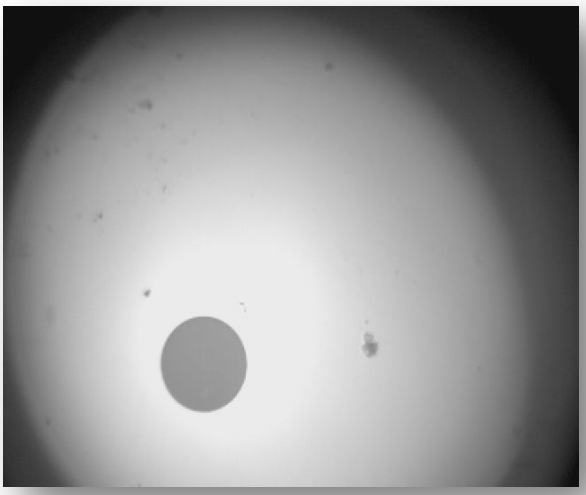
The purpose of this document is to communicate Panduit's recommended best practices for cleaning lens and fiber stub type transceivers. Please note that although the following cleaning practices have proven generally to be effective and safe, ***Panduit HIGHLY recommends that you refer to the transceiver manufacturer's documentation and follow their recommended cleaning procedures for the transceiver that is in need of cleaning to avoid damage.***

2.0 Transceiver Optics:

The power coupling optics in most common transceivers today are based on aspheric plastic lens or a stub fiber that is lensed on the device side to provide coupling between the photoemitter/photodetector and the fiber in the equipment patch cord connector. Generally the former is associated with multimode transceivers and the latter with singlemode transceivers. The pictures below were taken using a Westover P5000 digital microscope looking into the barrel of a transceiver receptacle to illustrate the visual differences between the two packaging technologies.



850nm Multimode Transceiver (Lens Optics)



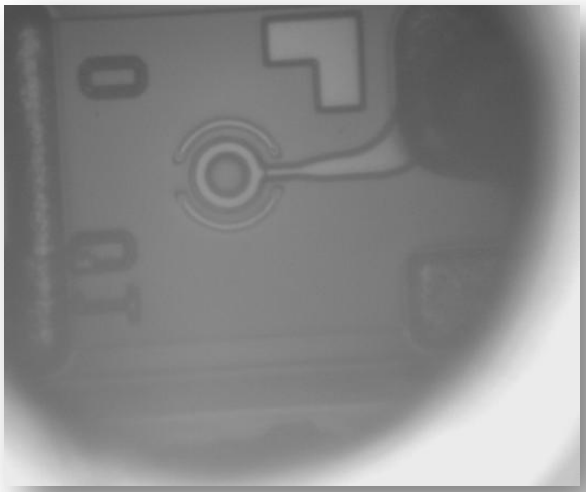
1310nm Singlemode Transceiver (Fiber Lensed Stub Optics)

3.0 Cleaning

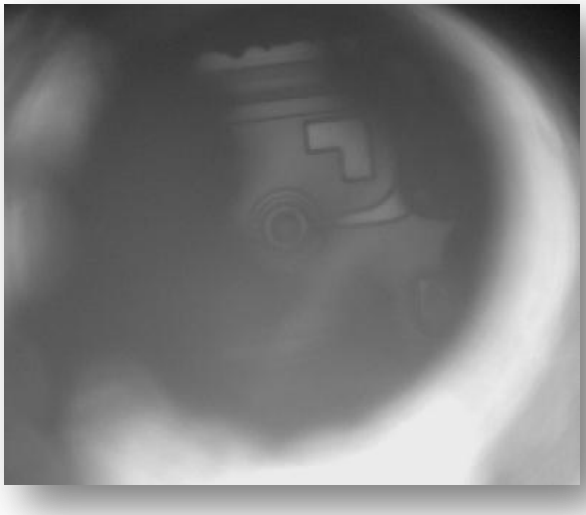
3.1 Lensed Optics *(Multimode)*

The anti-reflection coating and the lens itself on a lensed optics package are susceptible to scratches from cleaning processes that physically make contact with the lens. Therefore, cleaning using clean dry air is recommended as a first resort. Care should be taken to avoid any propellants from the air delivery system from reaching the lens to avoid further contamination or lens damage. Cleaning using any solvents such as alcohol is not recommended as this may also damage the lens. As a second option, in the event that dirt remains on the lens after attempting to clean it with dry air, cleaning with a dry high quality swab intended for fiber optics applications is offered.
Using a dry swab gently attempt to clean the lens with a minimal amount of pressure. The pictures below show a dirty lens and the same lens after gently cleaning with a dry swab.

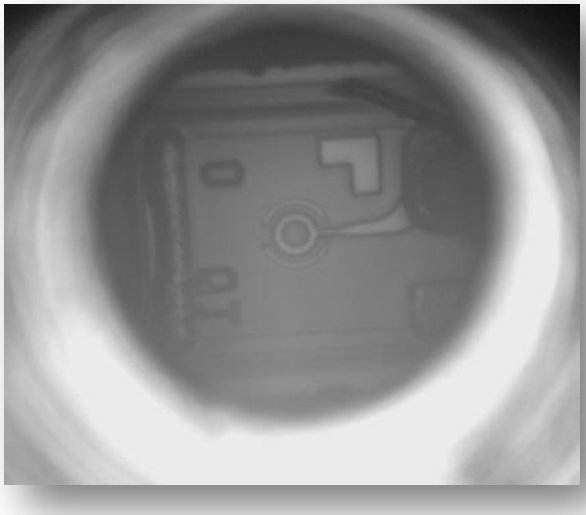
400x View Dirty Lens



400x View Cleaned Lens



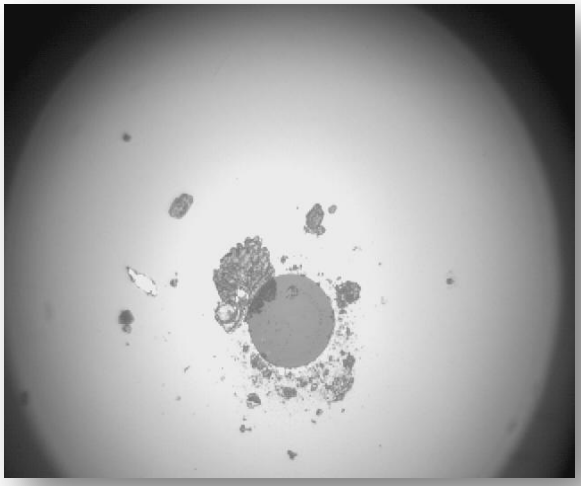
200x View Dirty Lens



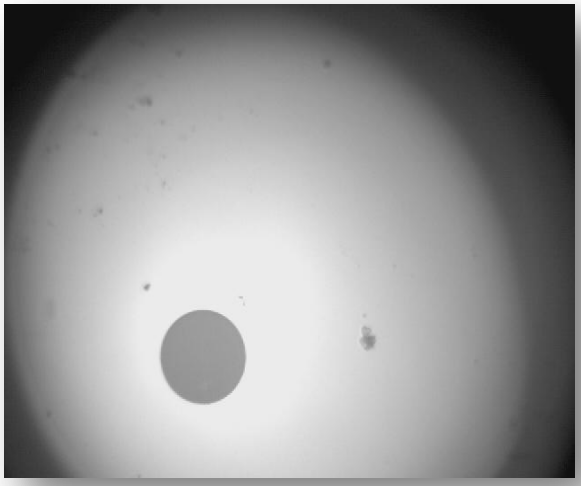
200x View Cleaned Lens

3.2 Lensed Stub Optics *(Singlemode)*

Stub optics are less susceptible to scratches from contact type cleaning methods than lensed optics. Therefore, both cleaning options, given appropriate care and precautions, may be attempted as a matter of preference. The following pictures show dirty stub optics before cleaning and the same optics after gently cleaning with a dry swab.



400x View Dirty Pigtail



400x View Clean Pigtail

In summary, fiber stub optics transceivers should be cleaned with clean dry air as a first resort to minimize the opportunity for lens damage. Careful use of a dry swab should the use of dry air fail can be attempted as a second option. Stub optics may be cleaned with either method as a matter of preference and availability of tools. To reemphasize, it is always best to follow the cleaning recommendation of the transceiver manufacture.

4.0 Manufacturers Recommendations

4.1 Transceiver Manufacturers

Finisar
http://www.finisar.com/optical_modules_96
http://www.finisar.com/download_qxAeCSCleaning TOSAs and ROSAs.pdf

Avago
http://www.avagotech.com/docs/5988-8137EN

Excelight
http://www.excelight.com/pdf/docs/AN1201 Cleaning Procedure for Receptacles.pdf

4.2 OEM Equipment Manufacturers

Cisco
http://www.cisco.com/application/pdf/paws/51834/cleanfiber2.pdf

HP
http://ftp.hp.com/pub/networking/software/ProCurve-Fiber-Optics-Cleaning-Guide.pdf