

## CWDM LGX MODULES

### INSTALLATION INSTRUCTIONS FOR PLUGIN OPTICS CWDM MODULES



#### OVERVIEW

LGX stands for Light Guide Cross-connect and has long been a widely used form factor in fiber optic networking. Many fiber cross-connect panels, pedestals, and fiber enclosures include LGX compatible mounting slots for flexibility of deployment. Plugin Optics LGX modules are carrier grade, purpose-built modules that can be deployed in environmentally controlled (indoor) applications as well as outside plant (outdoor, OSP) applications making it a truly versatile way to address fiber capacity issues within your network.

#### CWDM OVERVIEW

Wavelength Division Multiplexing (WDM) is used to allow the multiplexing (combining) and demultiplexing (separating) of individual fiber optic circuits to be deployed onto a single fiber or fiber pair. Combining optic circuits onto a single fiber pair can drastically increase, for a very low cost, the overall capacity of your fiber optic network. Coarse Wavelength Division Multiplexing (CWDM) uses 18 ITU standard wavelengths between 1270nm and 1610nm that are spaced 20nm apart. CWDM transceivers are manufactured to be within specifications at +/- 5nm of the center frequency so most CWDM filter ports are built to accommodate +/- ~6nm of the center wavelengths. As an example, a 1530nm CWDM port that has a passband width of +/- 6.5nm will allow circuit wavelengths of 1524.5nm to 1536.5nm. Plugin Optics modules are built to accommodate not only CWDM wavelengths but also wideband optics.

Wideband (WB) ports on a filter are very similar to CWDM filter ports in that they allow, or block circuits based on wavelength. Unlike CWDM that have a +/- 6.5nm passband wideband ports allow +/- ~20nm from its center wavelength. The most common wideband optics used today are 1310nm and 1550nm. These optics likely already exist on a fiber route and are the least expensive optics to deploy. Plugin Optics CWDM+ filters often include these ports so that existing circuit optics don't have to be replaced to add the capacity that CWDM provides. Once the existing circuit(s) are rolled onto the filter, which usually takes just a few minutes on each end, the new CWDM circuits can be added without effecting the existing circuits.

The above diagram, Figure 1, represents a single LGX filter at one end of the fiber span. One filter would typically be deployed on each end of a pair of single-mode fibers.

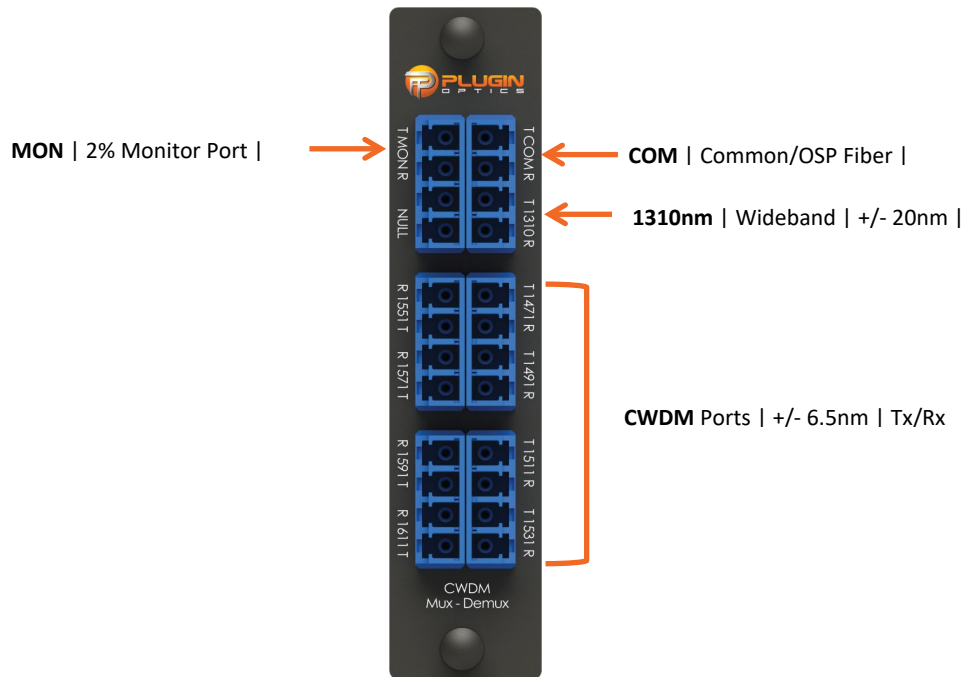


Figure 2: LGX Filter Port Labels

Figure 2 above shows the port types and labels shown on CWDM modules including the MON, COM, wideband, and CWDM ports.

## INSTALLING THE MODULES

Installation of LGX modules is quick and simple. Prior to sliding the module into its slot simply pull out the two Nylatch fasteners located at the top and bottom of the LGX module faceplate. Insert the module into the slot and while applying inward pressure to the module press each Nylatch in until you hear a slight clicking sound. Installation is complete. Refer to Figure 3 below.



Figure 3: Nylatch Fasteners

## CONNECTING THE FIBERS

Now that the CWDM filters are installed in the chassis it's now time to connect the fibers. Before working on any fiber cabling system please be sure to follow all laser safety measures and steps listed in your project engineering documentation and/or methods and procedures (MOP). This includes any fiber cleaning guides or procedures established by your company.

**Note:** It is recommended that each fiber connector, new or old, is cleaned before it is connected to the filter. Dirt on the fiber connectors can create undue loss, add time to troubleshooting, and can damage the filter ports.

In most cases these filters will be connected during a scheduled maintenance window, especially if there are any existing circuits that will be included in this project. Be sure that all MOP steps are followed to ensure there is not an unscheduled outage.

**Pro Tip:** Before installing the new filters, it helps to know the loss of the fiber between the existing optics. If available log into the devices, on the working circuits, and record the receive levels each optic is showing. This data is critical if these circuits do not come back up after inserting the filter.

### Making the Connections:

- 1- Common/Trunk Fibers: Connect preinstalled jumpers between the COM port of the filters and the fiber panel that connects to the trunk or OSP fibers. Be sure that the assignments allow for a single cross over between sites so that the TX COM leaving one site connects to the RX COM of the other.
- 2- Existing Circuits: Connect the preinstalled jumpers between the existing system optic to the wavelength port, on the filter, that matches its wavelength. Be sure that the Tx of the Optic is connected to the Rx of the filter and vice versa. Once this connection is made confirm that the existing circuit(s) is up and running. Record the power levels reported at each optic and compare it to the values recorded before the filter was inserted. There should be a small insertion loss added by the filter. Refer to the data sheet for the specification for this loss. Repeat this step for any existing circuit ensuring each one comes back online and is reporting an acceptable power level.
- 3- Add New Circuits: Now that filters are in place and the existing traffic is up and stable its time to add new circuits. Connect preinstalled jumpers between the new circuit system port and the corresponding filter port. Be sure that Tx is connected to Rx (and vice versa) and that the wavelength of the optic being used corresponds to the filter port it is being connected to.

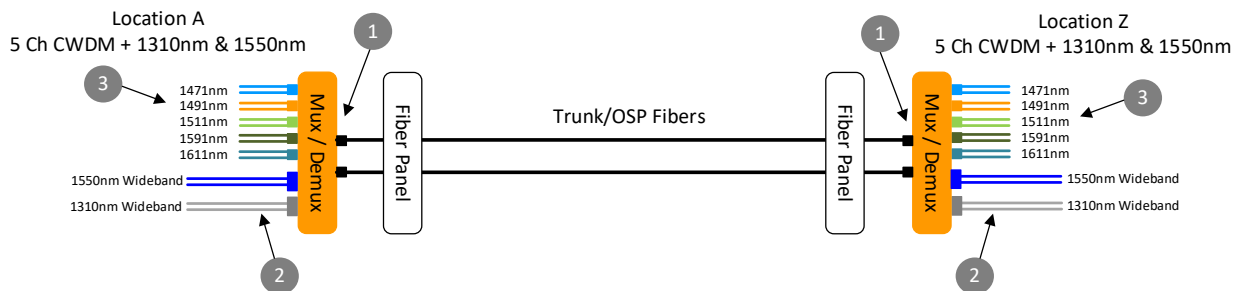


Figure 4: End-to-End Logical Diagram

## TROUBLESHOOTING

CWDM filters are a mature product and have very few failures. Having no electrical power and being built to stand extreme temperatures over time these modules are very reliable. If you are experiencing an issue getting circuits to work after they are inserted, we will be glad to give you a hand, but before you do here is a list of the most common turn up issues.

**Pro Tip:** It is important to have the data sheet or specification for the optics that will be connected to the filter. Understanding the wavelength, it is transmitting, its power budget (or loss tolerance) and distance limitation is important to making sure your network will function properly. Each circuit could have its own set of specifications that need to be satisfied.

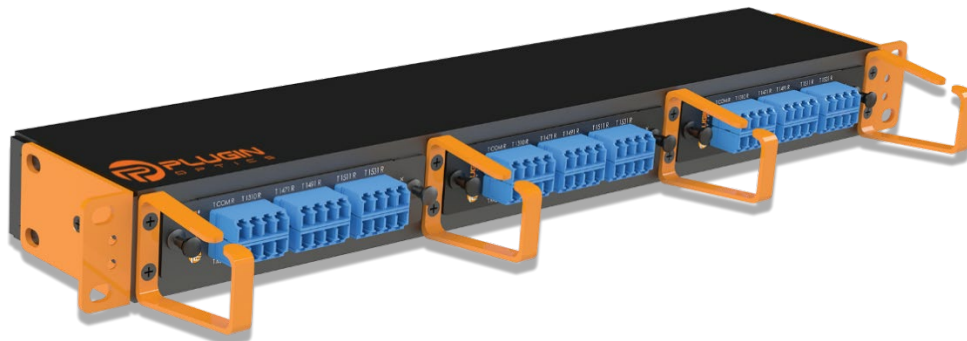
1. **Dirty Fibers:** Fiber jumpers being dirty is the most common item we see in supporting these types of projects. No matter if a fiber is being installed for the first time, or it is simply being disconnected from one port to another, it is important to clean the fibers. Using a swipe type cleaner is usually adequate and can eliminate many troubleshooting cycles. Using a power source and meter on the jumpers, prior to connection, can also add an additional level of surety to each install. Note: If the fiber is clean and checks out but you are still experiencing an issue, isolated to a certain port, try cleaning the filter port with a stick style, “female end” cleaner. While the CWDM modules are polished, cleaned and tested before shipment they can get dirty during installation.
2. **Fibers Crossed/Rolled:** Incorrect polarity, connecting Tx to Tx or Rx to Rx, can cause a circuit to fail. Double check all specifications, assignments, and labels to make sure the polarity is correct.
3. **Optic Wavelength:** With CWDM it is important that the optic that is providing the optical signal is transmitting the correct wavelength. CWDM specified optics that are 1nm off like 1470nm vs 1471nm are ok but wideband 1550nm optics should not be used on an 1551nm CWDM filter port.
4. **Optical Power Budget:** As stated in the Pro Tip, above, satisfying the optic for each circuit is critical to making sure the network will perform as expected. Adding filters along a fiber span adds insertion loss to the existing fiber, patch panel, and splice losses. If by adding filters on a span with too much loss, or not using the correct optics per circuit will result in circuit being unreliable or not work at all. Each optic will have a power budget or list a minimum Tx power (Tx OUT) and a minimum Rx (Rx Sense) value. The difference between these two values is known as the power budget, or loss tolerance. Be sure the loss of the fiber span, and the new filters is within this range for each circuit to be transported across the filter.

Still having issues? Give us a call. We’ll be glad to help you out.

## ORDERING INFORMATION

Below are a few of our most popular CWDM filters. Be sure to have the corresponding data sheet for the module you are using to compare expected loss values post installation. Each channel, CWDM & wideband, will have a different loss value so keep the data sheet handy during installation.

ORDERING INFORMATION	
PART NUMBER	DESCRIPTION
PLO-L1CT-A9C1-LC	LGX, 9 CHANNEL, 8 CWDM CHANNELS, MUX-DEMUX, 1471-1611NM, + 1310 WB, 2% MONITOR, LC-UPC
PLO-L1CT-C7C1-LC	LGX, 7 CHANNEL, 5 CWDM CHANNELS, MUX-DEMUX, 1471-1491-1511-1591-1611, +1310NM & 1550NM WB, 2% MONITOR, LC-UPC



## SAFETY NOTICES

It is important to follow company and local safety guidelines when handling fiber optic cables. Never look into the end of a fiber jumper or cable in the presence of laser light. Exercise extreme caution when installing, testing, or maintaining live circuits. If eyes are exposed to laser light or radiation occurs, immediately seek treatment by a medical professional as exposure is a substantial risk of serious damage to the eye and can result in total vision loss!

Fiber cables and fiber cleaning solvents may contain hazardous or harmful materials. Refer to the Material Safety Data Sheet (MSDS) when working with cleaning solvents or similar products. Also, Fiber optic glass fragments can be very sharp and can be harmful to skin and eyes so be sure to exercise extreme discipline when handling fibers, cables, and solvents. Use company standard procedures to collect and dispose of glass shards and fragments.

When working around the job site, it is important to use all the safety equipment recommended by your company. Items like laser safe protective eyewear, work gloves, steel toe boots and tools in good working order can be the difference between finishing the job in good health, without injury, and with your eyesight.

## SUPPORT

If you encounter issues, please contact us via phone or email. Alternately, you can use the camera on your smartphone to scan the QR code below to review the latest product specs and applications or submit a contact ticket for support.

Plugin Optics Customer Technical Support  
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