

Seven Steps to Navigating WDM

Upgrading Your Fiber Efficiency

WDM allows you to increase bandwidth using simultaneous data streams — or wavelengths — across a single optical fiber. Choosing the right solution for your network is easier than you might think. **Follow the steps below to identify your needs and start using your fiber more efficiently.**



Bandwidth needs have skyrocketed due to growth in the number of users and increasing demand for more connectivity.

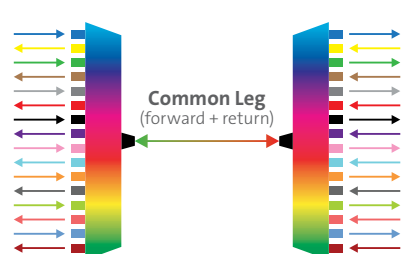
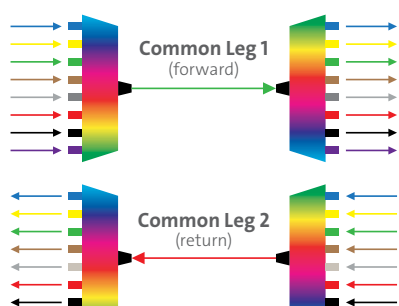
1

Determine the Ideal Number of Common Fibers

There are two main configurations for the fiber that carries the multiplexed wavelengths, which is called **the Common Leg**: 2-fiber and 1-fiber.

2-Fiber

With a 2-fiber configuration, downstream traffic is multiplexed on one fiber and upstream traffic on the other. Because there are dedicated fibers for both streams, the same wavelength can be used for both. A 2-fiber configuration is perfect for network operators who prefer generally easier channel management, with low SKU numbers for transceivers and less inventory management.



1-Fiber

A 1-fiber configuration manages downstream and upstream traffic on a single fiber, requiring two wavelengths to prevent interference. If you're interested in a bandwidth increase on exhausted fiber or leasing dark fiber, a 1-fiber solution might be right for you.

Establish the Number of Channels Desired

Once you've decided between a 2-fiber and 1-fiber configuration, it's time to think about the **total number of channels** you'd like for your network. The two predominant varieties of WDM solutions are Course WDM (CWDM) and Dense WDM (DWDM). CWDM is a good option for networks with relatively few services to support and offers up to 18 channels per fiber pair. DWDM, as the name implies, can support many more, offering 40 or 80 channels per fiber pair, depending on spacing between channels.

2

Channels are the wavelengths or services you will be combining through WDM.

The specific number of channels you choose will heavily influence the form factor of your hardware solution in the form of the overall number of MUX and DEMUX filters. These filters perform the basic functions of WDM, with **MUX filters combining the wavelengths and the corresponding DEMUX filters separating them again.** A 2-fiber configuration's hardware solution is referred to as MUX and DEMUX because it has one set of dedicated filters for each function. A 1-fiber configuration is referred to as MUX or DEMUX (or A-Side and B-Side) because the transmit and receive ports are transposed on either side to match respective functions for source or remote.

After you establish the total number of channels for your network, you can determine the number of MUX and DEMUX transceivers you'll need.

3

Consider Your Upgrade Needs

Once you've figured out how you'll accommodate your needs today, it's important to think about how those needs will grow and evolve over time. Whether you ultimately decide to go with a CWDM or DWDM solution, an **Upgrade (UPG) port** can help you add capacity to your network without interrupting service.



If you opt for a CWDM solution, a UPG port can be used to cascade additional channels that weren't originally available on your first device. This is an easy operation performed simply by connecting the port to the Common Fiber (COM) of a new device. For DWDM, the UPG port can be used to cascade additional C-band channels that weren't originally used on your first device.

Expand Your Capabilities with EXP

Similar to the UPG port, the **Express (EXP) port** allows you to add capabilities to your WDM hardware without interrupting your service. There are, however, some differences depending on whether you have a CWDM or DWDM solution.

4

CWDM

Because of the way CWDM operates, you do not need an EXP port if you've decided to include a UPG port. Both perform the same function of cascading additional CWDM channels. You can opt for an EXP port instead of a UPG port, but it's not necessary to have both.

DWDM

DWDM solutions can benefit from having both a UPG and an EXP port. For DWDM, the EXP port is used to cascade channels outside of the C-band such as CWDM overlay channels. This provides the opportunity to further expand the reach and efficiency of your network.

5

Decide if You Need Monitoring

If you'd like to connect your network to a power meter or OTDR to see wavelength-specific information, a **Monitor port** is the ancillary function for you.

Useful for multiple testing purposes, the Monitor port is used to tap a small percentage of power from the COMMON signal — usually less than 5%. This functionality can take the form of independent directional receive (RX) or transmit (TX) Monitor ports. It can also be combined into a single TX+RX port for bidirectional transmission on a single fiber.



Choose Additional Channel Ranges (xWDM)

The next step, exclusively when building a xWDM solution, is to decide if you need to add **wideband options**.

6

Wideband comes in two varieties and your selection will determine which channels are available to you.

1310

The first option is 1310 nm, which provides access to: 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, and 1611 nm.

1550

The second is 1550 nm, and it provides access to: 1271, 1281, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, and 1491 nm.

7

Put It All Together

To determine the perfect WDM solution for your needs, calculate the total number of channels and ancillary functions you want using the table below. Once you've done that, simply compare the number of required ports to the capacity of the hardware with the desired connectivity option.

FUNCTION	QUANTITY
Number of Common Fibers	
Number of MUX Channels	
Number of DEMUX Channels	
Upgrade (UPG) Option	
Express (EXP) Option	
Number of Optional Monitor Ports	
Optional 1310 nm or 1510 nm Wideband Ports	
TOTAL	

Still not 100% sure about what WDM solution is right for you? We're here to help. Contact Corning today to put our dedicated team of engineers and subject matter experts to work for you.

