



# Multimode CWDM transmission

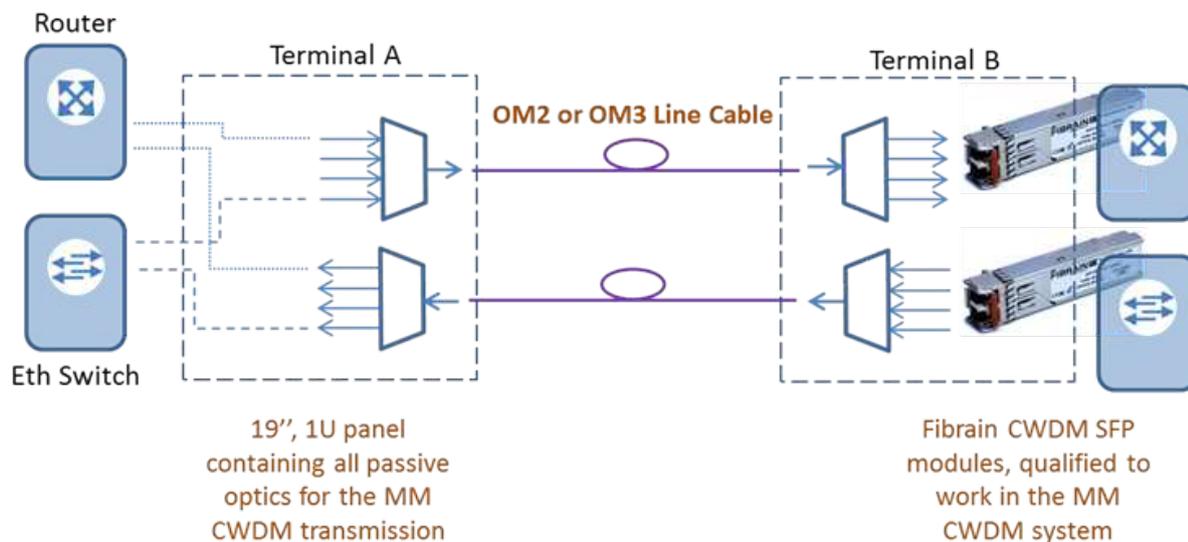
Coarse wavelength division multiplexing (CWDM) technique is well known and widely used in optical telecommunications. **It allows increasing the usable capacity of a single fiber strand by the factor of 18**, as the ITU-T G.694.2 recommendation specifies 18 CWDM channels. Moreover, the current costs of CWDM-compatible filters and lasers are very reasonable, therefore this technique is accessible to almost any operator.

Unfortunately, there is **one notable disadvantage of the currently available CWDM systems – they are working only with single mode fiber**. Multimode CWDM transmission is traditionally not possible, as the CWDM lasers are meant to be used with single mode fiber only. If used in the multimode link, uncontrolled modal dispersion and random loss due to spatial filtering on connectors and bends lead to random, unpredictable outages or prevents setting up any transmission at all. Therefore, the only traditionally available wavelength division multiplexing technique in multimode links was the old good WDM, which makes use of only two wavelengths (850 nm and 1300 nm), hence increasing the fiber capacity only twice, comparing to the single channel transmission.

This limitation is particularly painful considering the relatively high (and still increasing) cost of multimode cables. Typically, **the price of the 24-fiber multimode OM2 cable is about twice the cost of a similar single mode cable**. For the OM3 cables this ratio is even higher, about 2.5. Therefore, it should not be surprising that many operators and owners of the multimode cabling infrastructure would love to have the technical possibility to do CWDM transmission over multimode links to be able to save their precious fiber.

Until recently, this was only a dream, but now the reality has changed. **Fibrain have developed and introduced to the market a passive CWDM system for multimode transmission, compatible with the OM2 and OM3 cables!** Thanks to the unique photonic fibers technology, we have developed the first system which allows transmitting up to 18 CWDM channels over OM2 and OM3 links. Below there is a functional diagram of the passive multimode CWDM system, which shows all of its constituting elements:

- Fibrain CWDM SFPs, qualified to work in the multimode CWDM system,
- Passive panels equipped with multimode CWDM multiplexer and demultiplexer,
- **OM2 or OM3 line cable.**



Multimode CWDM transmission system – application diagram

From the user perspective, **the usage or installation of the passive multimode system is no different than for the standard single mode system**. The black magic is all hidden inside and the user simply plugs in the incoming and outgoing multimode line cable into the appropriate ports on the panel, whereas the client ports are connected as always to the CWDM SFP modules. It is important to note that only qualified Fibrain CWDM SFP modules should be used in such a system.

**The passive multimode CWDM system supports 1GbE transmission over the OM2 and OM3 cables over a few kilometers distances.** The type of the active box (for example an Ethernet switch or an IP router) is not important, as long as it has SFP ports. If you are interested in more technical details please contact your sales support or drop us an email at [info@fibrain.com](mailto:info@fibrain.com).