FIBERDYNE LABS
Fiber Optic
Networking Products

Application Note

Mux/Demux verses Add/Drop

<u>Keywords</u>

Application, Coarse WDM, CWDM, Dense WDM, DWDM, Fiber-optics, Multiplex, Demultiplex

<u>Summary</u>

Multiplex is the act of combining signals onto a single fiber. Demultiplex is the act of separating those signals. An Add/Drop module does both, and relays the unaffected signals to the next node.

<u>Scenario</u>

Customer establishing a CWDM or DWDM network, but does not know when to use the three types of modules: Mux, Demux and Add/Drop.

<u>Question</u>

What is the difference between the three modules? What is their typical usage?

<u>Notes/Answer</u>

Imagine a controlled highway, like the United States Interstate system. Entry to and exit from the highway is limited to interchanges. The highway begins or ends, where multiple roads meet. Additionally, imagine, that the cars equate to signals, on a fiber. This scenario will show how Mux, Demux and Add/Drop modules are differentiated. The three modules types are analogous to the beginning, the end and the interchanges, of a controlled highway.

Start Highway	Interchange (Exit)	End Highway
Multiplexer	"Drop" and "Add"	Demultiplexer
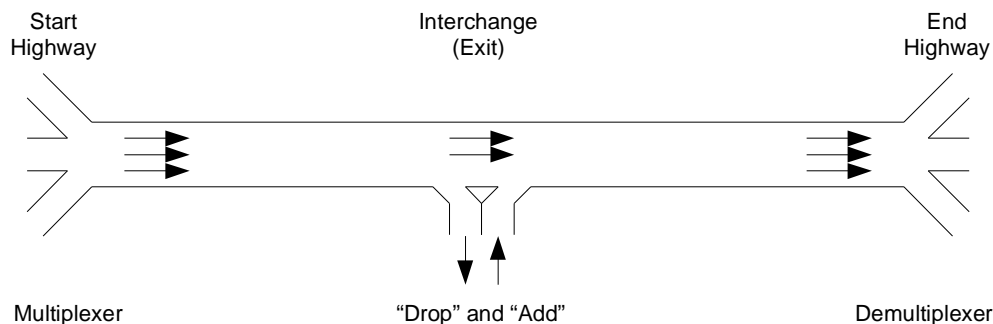
The Mux module serves the same purpose as the beginning of the highway. Multiple roads combine into the one controlled highway. Each road is like a different wavelength, or channel. The Mux module combines, or *multiplexes*, multiple wavelengths onto a single fiber.

At the other end of the highway, the highway splits, or separates, into multiple roads. The Demux module also separates, or *demultiplexes*, the different wavelengths from the single fiber. The outputs are distributed onto multiple fibers.

At points along the controlled highway (i.e. interchanges), traffic exits and enters the highway. These interchanges serve the same purpose as Add/Drop modules. Specific traffic leaves (demultiplexes from) and enters (multiplexes onto) the highway. All other traffic proceeds along the highway. (Note: traffic is actually dropped, and then new traffic is added. Therefore, the same wavelength/channel can be used for dropped and added signals.)

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