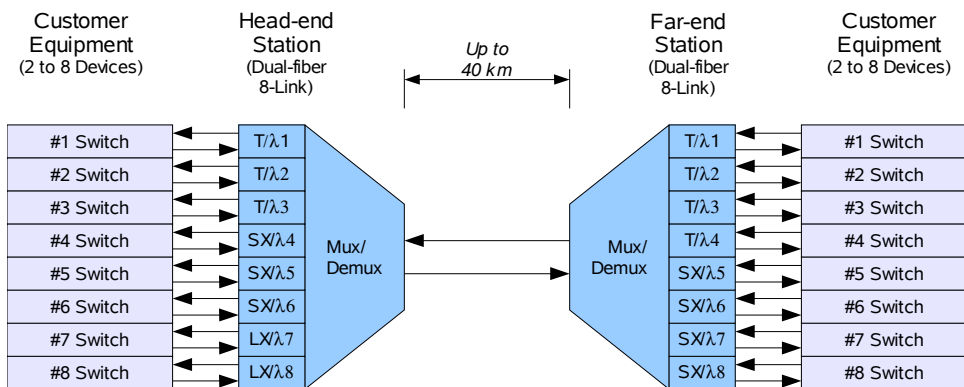


Introduction:

Fiberdyne has integrated Gigabit Ethernet Media Converters with Wavelength Division Multiplexing (WDM). Each *Gigabit Multiplexer System* includes two stations. Each station includes the conversion electronics, the power modules, and the passive optics, typically housed in a rack-mount, 3U-high chassis. Customer interfaces can include any available 1000Base format. Additionally, these interfaces can be mixed. Multiple full-duplex links, from any format, can be multiplexed onto one fiber pair or onto a single fiber. The multiplexing uses Coarse WDM (CWDM) or Dense WDM (DWDM) techniques.



Conceptual Usage:



Example: connect 8 Gigabit Ethernet links (any format) across a fiber pair.

The Fiberdyne Gigabit Multiplexer System (GMS) adds bandwidth to existing fiber, by multiplexing data signals onto those fibers. The above diagram shows eight gigabit switches connected to eight remote switches. These eight full-duplex links are transported by only two fibers. Alternatively, if only one fiber is available, then transmits/receives can be combined and transported over that one fiber. This diagram also shows, that the Fiberdyne GMS stations can host a variety of customer interfaces (e.g. 1000Base-T, 1000Base-SX and 1000Base-LX). These interfaces can be mixed, to match the formats of existing equipment.

Features:

- Complies with IEEE 802.3z/ab (Gigabit Ethernet)
- Multiplexed-link distance: 40 km (CWDM) or 60 km (DWDM)
- Power Monitor Panel shows status power supply module(s): Main and Aux
- Status LEDs: Power, Link and Activity
- Connectors: LC/UPC (fiber) or RJ-45 (1000Base-T)
- Packaging: 3U-high chassis; fits TIA-standard, 19-inch or 23-inch racks

Standard Configuration:

- Rack-mount chassis, 3U high
- SFP (Small Form-factor Pluggable) Ethernet interfaces
- Power Supply Modules are Hot-Swappable and Field-Replaceable
- Upgrade Ports for future expansion (i.e. add more links to a multiplexed link)

Options:

- Dual-fiber or Single-fiber solutions:
 - Dual-fiber: multiplex 2 to 8, full-duplex links onto a fiber pair
 - Single-fiber: multiplex 2 to 4, full-duplex links onto a single fiber

Note: with DWDM, more links are possible with separate optical module; the powered chassis can host 19 converter rack-cards.

- Customer interfaces: 1000Base-T, -SX, -LX, "-ZX," "-C," and "-D"

Note: "-ZX" (1550-nm), "-C" (CWDM) and "-D" (DWDM) are not IEEE 802.3 standards. However, they are common extensions of the standards.

- Mix and match customer interfaces within a chassis
- Redundant Power Supply capable: two slots for power modules.
 - 120/240 VAC, 50/60 Hz
 - 48 VDC

General Specifications:

<i>Item Description</i>	<i>Unit</i>	<i>Value</i>
Temperature – Operating *	°C	0 to 50
* Humidity (non-condensing)	%	10 to 90
Power – Redundant	W	120
Package Size (without mount tabs)	inch	17"W x 12"D x 5.25"H

Input Specifications:

<i>Input Type</i>	<i>Value</i>
1000Base-T	Cat 5 UTP (Unshielded Twisted-Pair) RJ-45
1000Base-SX	Multimode 850-nm, LC
1000Base-LX	Multimode/Single-mode 1310-nm, LC
1000Base "ZX"	Single-mode 1550-nm, LC Max Input Power: -3 dBm
1000Base "CWDM"	Single-mode Wavelengths per ITU-T G.694.2, LC Max Input Power: -3 dBm
1000Base "DWDM"	Single-mode Channels per ITU-T G.694.1, LC Max Input Power: -6 dBm

Output (Multiplexed Link) Specifications:

<i>Item Description</i>	<i>Unit</i>	<i>CWDM</i>	<i>DWDM</i>
CWDM Wavelength or DWDM Channel	nm	per ITU-T G.694.2	per ITU-T G.694.1
Optical Power Output	dBm	0 (max)	+2 (max)
Power Budget, Mux Signal **	dB	18 (min)	28 (min)

** Note: power budget is reduced by 0.3 dB for each multiplexed wavelength. Therefore, for an 8-link CWDM system, the rated distance is 40 km.

Gigabit Multiplexer System

Fiberdyne Labs, Inc.
Product Specification

Part Number Build Matrix

F	G	M	-	X	X	X	-	X	X	-	XXXX/XXXX
1	2	3	-	4	5	6	-	7	8	-	9 – 12 / 13 - 16
F	G	M	-				-			-	/

FGM = Fiberdyne Labs “Gigabit Multiplexer System”

Digit #	Description	Options *
4 th	Fiber Solution for Multiplexed Link	D = Dual-fiber (duplex fiber) S = Single-fiber (simplex fiber)
5 th -6 th	Number of Full-duplex Links across Multiplexed Link	Example: 02 = 2 TX and 2 RX 03 = 3 TX and 3 RX 04 = 4 TX and 4 RX 05 = 5 TX and 5 RX For more links, enter two-digit number.
7 th	Customer Interface	T = 1000Base-T, Twisted Pair S = 1000Base-SX, 850-nm, MM L = 1000Base-LX, 1310-nm, MM/SM Z = 1000Base, 1550-nm, SM C = 1000Base, CWDM, SM D = 1000Base, DWDM, SM X = multiple port types **
8 th	Multiplexed Link Configuration	C = CWDM D = DWDM
9 th - 12 th	Lowest CWDM Wavelength or DWDM Channel	Example: 1470 for CWDM multiplexed links CH23 for DWDM multiplexed links

Digit #	Description	Options *
13 th - 16 th	Highest CWDM Wavelength or DWDM Channel	Example: 1610 for CWDM multiplexed links CH59 for DWDM multiplexed links

* *Note:* for custom configurations, “Special Instructions” must be used.

** For example: if an “8-link system” requires two different “customer interfaces,” put an “X” in the 7th digit. Then, add the following to the order description: “Special Instructions (7th digit): 5 T and 3 SX interfaces.”

Example: Dual-fiber, 8-link, CWDM, Gigabit Multiplexer System

- Dual-fiber Solution (duplex fiber for multiplexed link)
- Eight (8) full-duplex links (i.e. 8 TX and 8 RX) across multiplexed link
- 1000Base-SX customer interface
- CWDM wavelengths across multiplexed links
- 1470 – 1610 nm (8 wavelengths per multiplexed fiber)

Part # **FGM-D08-SC-1470/1610**

Example: Single-fiber, 12-link, DWDM, Gigabit Multiplexer System

- Single-fiber Solution (simplex fiber for multiplexed link)
- Twelve (12) full-duplex links (i.e. 12 TX and 12 RX) across single-fiber link
- 1000Base-T customer interface
- DWDM wavelengths across multiplexed links
- Channels 23 thru 46 (24 wavelengths across the single multiplexed fiber)

Note: for this configuration, the powered chassis will host the conversion electronics. However, the optical multiplexing will occur in a separate 1U-high, passive-optical module.

Part # **FGM-S12-TD-CH23/CH46**

Cross-reference: part-number structure changed, when DWDM option was added.

- the 5th digit was inserted for a *two-digit* “Number of Full-duplex Links.”
- the 8th digit was inserted, to differentiate “CWDM” from “DWDM” systems.
- Therefore, the following sample, part-number cross-references are provided.
 - **FGM-D8-S-1470/1610** becomes **FGM-D08-SC-1470/1610**.
 - **FGM-S2-T-1550/1610** becomes **FGM-S02-TC-1550/1610**.