LMD-CL-12-R

DEVICE

12 GHz Lightwave Modulator with Integrated Driver

OVERVIEW

The Optilab LMD-CL-12-R is a high performance analog lightwave transmitter designed for broad bandwidth RF over Fiber (RFoF) applications, up to 12 GHz and beyond. Utilizing an external laser input (DFB, tunable laser, fiber laser, etc.), this optical seed couples directly into a 12 GHz optical modulator, with a broadband 12 GHz RF driver to maximize the RF link gain performance. Paired with one of Optilab's high speed photoreceivers, RFoF optical links can be established seamlessly into existing electrical RF networks. The LMD-CL-12-R incorporates a built-in Automatic Bias Control board which allows for stable long-term operation, with up to 4 bias operating modes and adjustable RF gain through the front panel interface and LabVIEW software.

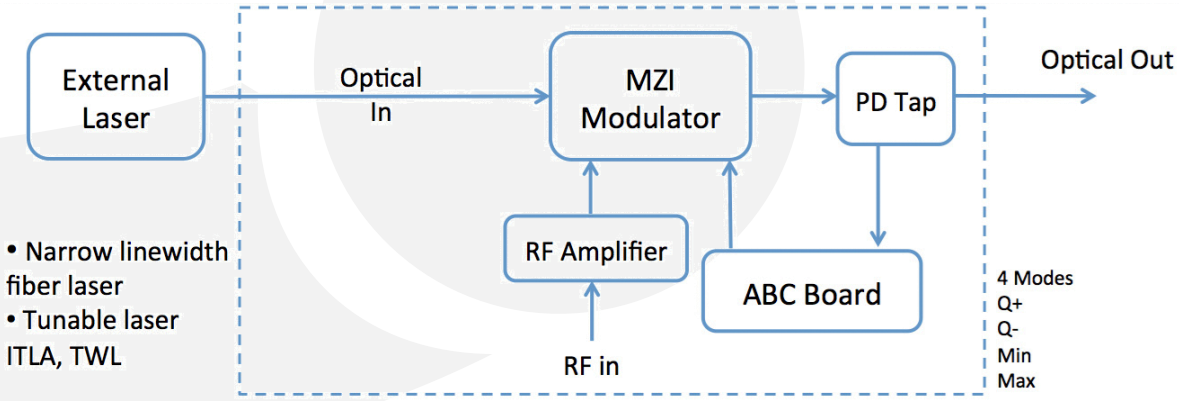
FEATURES

- 12 GHz analog 3 dB bandwidth
- 15 Gb/s digital transmission
- Integrated modulator driver
- 1525 nm to 1610 nm wavelength range, 1310 nm (S-band) available
- Auto bias mode for analog, NRZ, RZ, BPSK
- Accepts external laser via PM input
- Customizable Options:
  - PM output fiber
  - High extinction ratio
  - Low drive modulator, for RZ, pulse generation

USE IN

- Analog photonics link
- 12 GHz RFoF transmission
- Optical communications to 15 Gb/s
- RF/IF signal distribution
- Active mode lock (PM version)
- Picosecond pulse generation
- Satellite communication

FUNCTIONAL DIAGRAM



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SPECIFICATIONS

GENERAL

Operating Wavelength	1520 nm to 1610 nm
Laser Source	External input, DFB, tunable laser
Optical Input Level	+20 dBm max.
RF Return Loss	> 10 dB @ 10 GHz
Impedance	50 Ω typ.
Analog Frequency Range	20 kHz to 18 GHz
Optical Insertion Loss	4 dB typ., 5 dB max.
S21 Bandwidth, 3 dB	12 GHz typ.
Modulator Bias Mode	4 Automatic bias control modes, selectable by software
Modulator Extinction Ratio	25 > 30 dB (HE version)
Modulator V_{PI} (half wave)	6.5 V typ. @ 10 GHz, 3.0 V typ. @ 10 GHz (low drive for RZ or BPSK)

MODULATION

Input RF Voltage Range	250 mW to 750 mW typ.
Modulator Driver Output Voltage	3.5 V p-p, 7.5 V p-p, adjustable
Rise/Fall Time	< 40 ps
Digital Bit/Rate	15 Gb/s max.
Optical Extinction Ratio	13 dB @ 12 Gb/s

MECHANICAL

Operating Temperature	-10 °C to +60 °C
Storage Temperature	-50 °C to +90 °C
Power Supply Requirements	110/220 VAC, 50 - 60 Hz
Optical Connectors	FC/APC, others optional
Fiber Type	PANDA Input, SMF-28 Output; PANDA input/output (PM version)
RF Input Connector	SMA Connector
Remote Control	USB 2.0 software included
Alarm	Bias mode status, over temperature
Dimensions	424 mm x 425 mm x 44 mm

BIAS CONTROL MODE

Mode	Operation Conditions	Modulation Format
Q+	Set to quadrature point of positive slope	Analog, NRZ
Q-	Set to quadrature point of negative slope	Analog, NRZ
Min.	Set to min. point of modulator curve	Pulse, RZ BPSK
Max.	Set to max. point of modulator cure	Pulse, RZ

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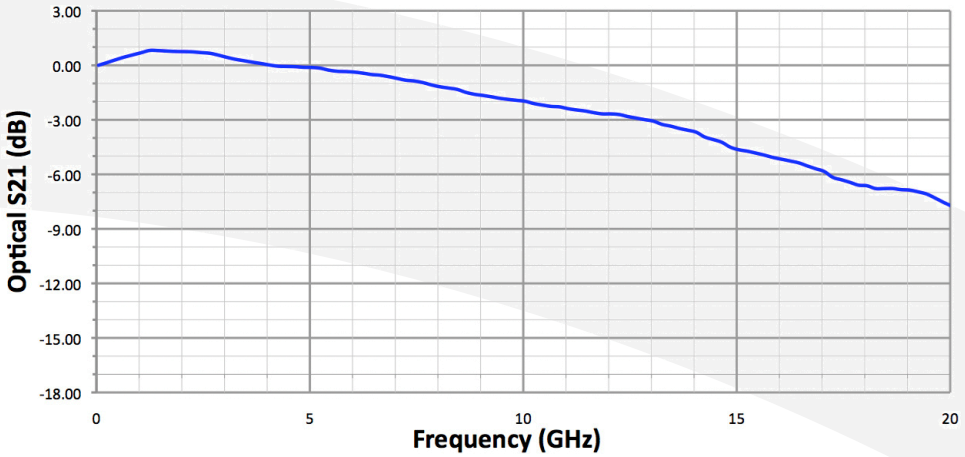
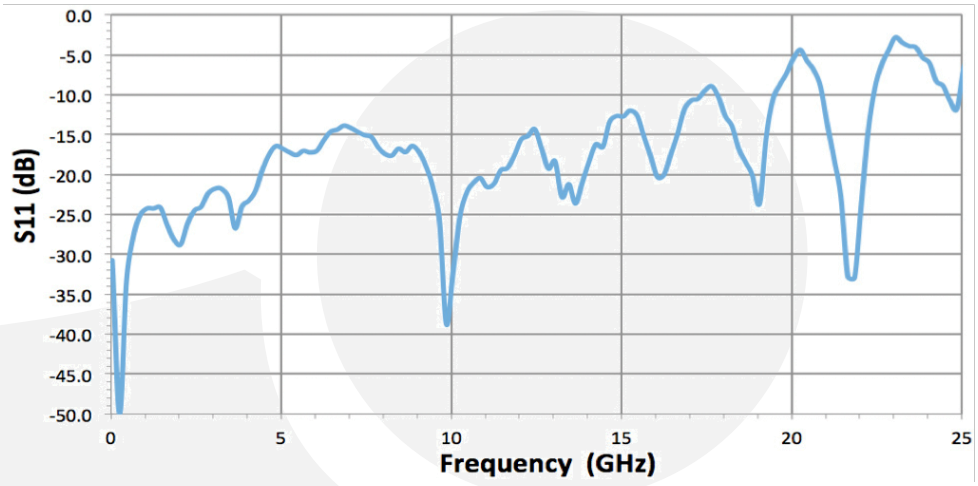
ORDERING OPTIONS

LMD-CL-12-R-XX

XX
- PM: Polarization Maintaining Output
- HE: High Extinction Ratio Modulator
- LD: Low Drive Modulator

TYPICAL S21 AND S11 BANDWIDTH





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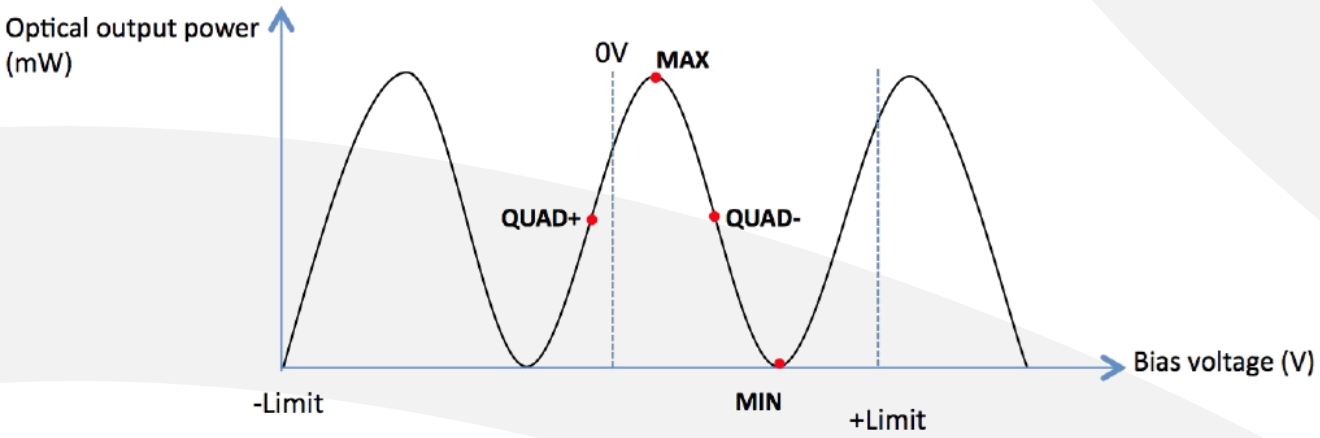
BIAS SETTING MODES

Based on a sophisticated phase measurement of a small dither signal, the LMD-CL-12-R provides four selectable operating modes: quadrature (Quad +), inverted quadrature (Quad -), minimum (Min), or maximum (Max) points.



DETAILED LAYOUT

No.	Feature
1	RF Power Indicator
2	RF In
3	Optical In
4	Optical Out
5	RF Key Switch
6	LCD Display
7	Interface Buttons
8	USB Socket
9	Fans
10	AC input Socket and Main Power Switch

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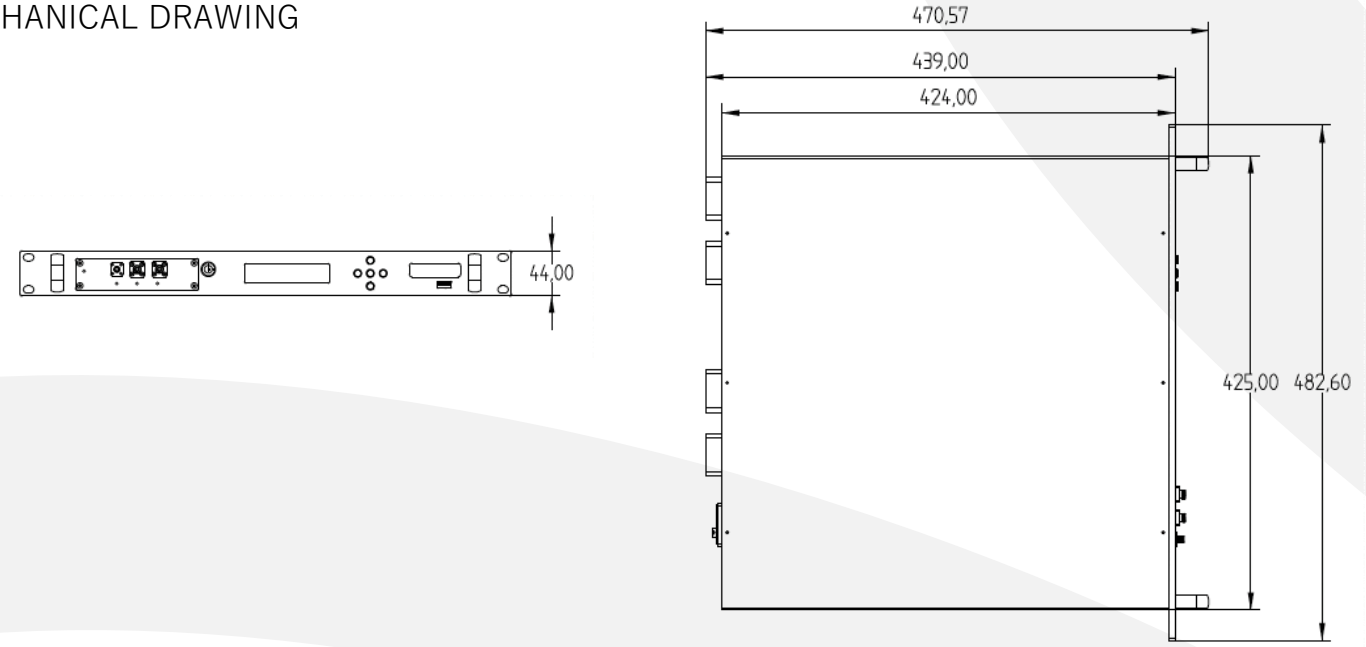
MECHANICAL DRAWING



REMOTE LABVIEW INTERFACE

Optilab offers remote interface via Labview software, for parameter adjustment and status monitoring, con- tact Optilab for more details.