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Data Sheet

July 31, 2026

THORLABS

ThorLabs MX40B-1310 40 Gb/s Max Digital Reference Transmitter, 1310 nm Laser, Limiting Amplifier

The ThorLabs MX40B-1310 is a high-speed digital reference transmitter designed for optical communication systems. It features a 1310 nm laser and a limiting amplifier, supporting data rates up to 40 Gb/s. Ideal for testing and characterizing high-speed optical components and systems.



MODEL

ThorLabs MX40B-1310

CALIBRATION

Available on request

CONDITION

Used

STATUS

In stock

RFQ / SKU

MX40B-1310

LISTING

<https://aumictechlabs.com/products/mx40b-1310-2/>

NIST-traceable cal

SAM registered

30-day returns

NAICS 423690 • 811210 • 541380

This unit

The ThorLabs MX40B-1310 is a 40 Gb/s digital reference transmitter engineered for high-speed optical communication system testing and component characterization. It features an internal 1310 nm fixed-wavelength laser paired with a limiting amplifier delivering 30 dB gain across a 20 GHz small-signal bandwidth. The instrument integrates a Mach-Zehnder intensity modulator with bias control and variable optical attenuation for precise output power management. Its limiting amplifier provides user-adjustable RF output swing from 3 V to 7 V, supporting Return-to-Zero (RZ), Non-Return-to-Zero (NRZ), and On-Off Keying (OOK) modulation formats across the full 40 Gb/s data rate. Technical Specifications Maximum bit rate: 40 Gb/s Internal laser wavelength: 1310 nm (fixed)

Small-signal bandwidth: 20 GHz Low-frequency cutoff: 100 kHz Limiting amplifier gain: 30 dB Amplifier RF output swing: 3 V to 7 V (user-adjustable) Optical output power: 13.5 dBm typical (22.39 mW) RF optical extinction ratio: 13 dB typical maximum Polarization extinction ratio: 18 dB Lambda/2 wave voltage: 5.5 V Electrical return loss: -10 dB typical Response time: 1 s

Key Features

- Mach-Zehnder intensity modulator with integrated bias control
- Variable optical attenuator for power management
- Differential RF signal input
- Intuitive touchscreen interface with USB and RS-232 control
- External laser modulation capability (1250 nm to 1610 nm wavelength range) via loop-back configuration
- RoHS exempt
- One-year warranty; light source warranty limited to one year or specified operating hours

Typical Applications

- High-speed optical component and system characterization
- 40 Gb/s digital signal generation for test and validation
- Modulation format validation (RZ, NRZ, OOK)
- Optical communication system testing at 1310 nm

Compatibility & Integration

The MX40B-1310 accepts external laser sources within the 1250 nm to 1610 nm range through external loop-back configuration, enabling customized wavelength implementations while retaining the unit's modulation and amplification capabilities.

Features & description

From manufacturer datasheet

Features

- Maximum bit rate 40 Gb/s
- Fixed 1310 nm internal laser
- Digital limiting RF amplifier with user-adjustable maximum output swing
- RF amplifier gain 30 dB
- Small-signal bandwidth 20 GHz
- LiNbO3 Mach-Zehnder intensity modulator
- Internal VOA and multi-point optical power monitoring for automatic output-power control
- Automatic modulator bias control (quadrature, peak, null, and manual modes)
- Touchscreen GUI plus remote control via USB and RS-232 (SCPI-type commands)
- Direct internal amplifier-to-modulator connection (no external RF driver loop-back on MX40B)

MX40B1310 Characteristics / Specifications

PARAMETER	VALUE
Model	MX40B-1310
Manufacturer	Thorlabs
Instrument Type	High-Speed Digital Optical Reference Transmitter
Series	MX40B
Amplifier Type	Digital (Limiting)
Usable Bit Rate / Bandwidth	Up to 40 Gb/s
Internal Laser Type	Fixed wavelength
Internal Laser Wavelength	1310 nm
RF Amplifier Gain	30 dB
Small Signal Bandwidth	20 GHz
Low Frequency Cutoff	100 kHz
RF Optical Extinction Ratio	13 dB (at 40 Gb/s)
Modulator Type	Intensity (Mach-Zehnder / LiNbO3)
Modulator Drive Voltage (Vpi)	5.5 Vpp
Optical Insertion Loss	Approximately 7 dB at 1310 nm (approximately 5 dB at 1550 nm)
Optical Output Power (typical series listing)	Approximately 6.5 dBm at 1310 nm (approximately 8.5 dBm at 1550 nm for C-band configurations)
Power Calibration Points	1310 nm, 1550 nm, and 1590 nm
Electrical Return Loss	-10 dB (any RF port, typical)
Laser Safety Class	Class 1M RF Input (Digital / Limiting Mode)
Typical Input Amplitude	400 mVpp
Maximum Input	4 Vpp
Absolute Maximum Input	6 Vpp
MX40B Amplifier RF Input Connector	2.92 mm (K) female
Wavelength Range	1250 nm to 1610 nm
Optical Input Power	20 dBm maximum; 22 dBm absolute maximum

PARAMETER	VALUE
Laser In Fiber / Polarization	Polarization-maintaining (PM) fiber; light linearly polarized along the slow axis
Laser In / Laser Out Connectors	PM FC/PC
Optical Output Connector	FC/PC Control And Monitoring
Front Panel	Touchscreen display and control; value adjustment knob; laser key switch with indicator; On/Standby button; ESD wrist-strap ground jack
Optical Power Monitors	Mon-1 (laser input), Mon-2 (MZM output), Mon-3 (final optical output); values available via I/O
Bias Control Modes	Quadrature (positive/negative slope), Peak, Null, Manual
VOA	Variable optical attenuator for automatic optical output power control and stabilization
Remote Interfaces	USB (Type B) and RS-232 (DB-9) with SCPI-type serial commands; DB-15 general-purpose I/O; laser safety interlock (2.5 mm)
Local Control	Built-in GUI / touchscreen Standard Accessories (Per User Guide) Main unit; power cord; PM loopback fiber optic cable; interlock keys; 2.5 mm interlock pin; 1.25 A 250 VAC fuse; USB TypeA to TypeB cable (SMA RF loopback cable is for MX10B series and is not required for MX40B)
MX40B	C-band tunable internal laser (ITU 50 GHz grid)
Bandwidth	20 GHz - LiNbO3 Mach-Zehnder intensity modulator - Internal VOA and multi-point optical power monitoring for automatic output-power control - Automatic modulator bias control (quadrature, peak, null, and manual modes) - Touchscreen GUI plus remote co
Return loss	10 dB (any RF port, typical)

Full OEM specifications

Complete technical content extracted from the manufacturer datasheet. Sparse OEM tables are reconstructed as tables below; other text is preserved as paragraphs.

Specifications	
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PARAMETER	VALUE
Model	MX40B-1310
Manufacturer	Thorlabs
Instrument Type	High-Speed Digital Optical Reference Transmitter
Series	MX40B
Amplifier Type	Digital (Limiting)
Usable Bit Rate / Bandwidth	Up to 40 Gb/s
Internal Laser Type	Fixed wavelength
Internal Laser Wavelength	1310 nm
RF Amplifier Gain	30 dB
Small Signal Bandwidth	20 GHz
Low Frequency Cutoff	100 kHz
RF Optical Extinction Ratio	13 dB (at 40 Gb/s)
Modulator Type	Intensity (Mach-Zehnder / LiNbO3)
Modulator Drive Voltage (V _{pi})	5.5 V _{pp}
Optical Insertion Loss	Approximately 7 dB at 1310 nm (approximately 5 dB at 1550 nm)
Optical Output Power (typical series listing)	Approximately 6.5 dBm at 1310 nm (approximately 8.5 dBm at 1550 nm for C-band configurations)
Power Calibration Points	1310 nm, 1550 nm, and 1590 nm
Electrical Return Loss	-10 dB (any RF port, typical)
Laser Safety Class	Class 1M
RF Input (Digital / Limiting Mode)	
Specifications	
PARAMETER	VALUE
Typical Input Amplitude	400 mV _{pp}
Maximum Input	4 V _{pp}
Absolute Maximum Input	6 V _{pp}

PARAMETER	VALUE
MX40B Amplifier RF Input Connector	2.92 mm (K) female

Note: Unlike the MX10B series, the MX40B series does not provide front-panel Amplifier RF Out / Modulator RF In ports; the amplifier drives the modulator internally to preserve high-speed signal integrity.

External Optical Input

Specifications

PARAMETER	VALUE
Wavelength Range	1250 nm to 1610 nm
Optical Input Power	20 dBm maximum; 22 dBm absolute maximum
Laser In Fiber / Polarization	Polarization-maintaining (PM) fiber; light linearly polarized along the slow axis
Laser In / Laser Out Connectors	PM FC/PC
Optical Output Connector	FC/PC

Control And Monitoring

Specifications

PARAMETER	VALUE
Front Panel	Touchscreen display and control; value adjustment knob; laser key switch with indicator; On/Standby button; ESD wrist-strap ground jack
Optical Power Monitors	Mon-1 (laser input), Mon-2 (MZM output), Mon-3 (final optical output); values available via I/O
Bias Control Modes	Quadrature (positive/negative slope), Peak, Null, Manual
VOA	Variable optical attenuator for automatic optical output power control and stabilization
Remote Interfaces	USB (Type B) and RS-232 (DB-9) with SCPI-type serial commands; DB-15 general-purpose I/O; laser safety interlock (2.5 mm)
Local Control	Built-in GUI / touchscreen

Standard Accessories (Per User Guide)
Main unit; power cord; PM loopback fiber optic cable; interlock keys; 2.5 mm interlock pin; 1.25 A 250 VAC fuse; USB TypeA to TypeB cable (SMA RF loopback cable is for MX10B series and is not required for MX40B)

Related Series Options
MX40B: C-band tunable internal laser (ITU 50 GHz grid)
MX40B-LB: L-band tunable internal laser (ITU 50 GHz grid)
MX40B-1310: Fixed 1310 nm internal laser (this model)
An 850 nm fixed-wavelength laser variant is noted by some distributors as available on request.

Operational Notes
Supply a digital RF data signal to the Amplifier RF In port. Use the included PM loopback fiber to route the internal laser to the modulator Laser In port, or inject an external laser within the allowed wavelength and power limits. Set system wavelength appropriately for power calibration and control. Do not view laser apertures with optical instruments while emitting; observe Class 1M laser safety practices.

Notes
This manual OEM source was compiled from Thorlabs MX10B/MX40B Series Optical Transmitters User Guide

documentation covering the MX40B-1310, and from Thorlabs MX40B series product specification listings for the 40 Gb/s digital (limiting amplifier) reference transmitter family.

Laser Safety

Laser Safety Class: Class 1M RF Input (Digital / Limiting Mode) Typical Input Amplitude: 400 mVpp
Maximum Input: 4 Vpp Absolute Maximum Input: 6 Vpp MX40B Amplifier RF Input Connector: 2.92 mm (K) female Note: Unlike the MX10B series, the MX40B series does not provide front-panel Amplifier RF Out / Modulator RF In ports; the amplifier drives the modulator internally to preserve high-speed signal integrity.

Available from Aumictech

Used and refurbished unit evaluated in-house. Calibration: Available on request. Used · In stock.

Request a quote: sales@aumictech.com · +1 (484) 841-9341

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<https://aumictechlabs.com>

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Generated July 31, 2026

Technical content from manufacturer specifications. Unit photo/stock from Aumictech listing when available. Specifications subject to OEM documentation and unit condition.