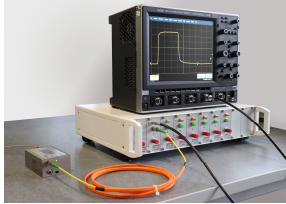# Shielded optical Transmission link DC-500 MHz

Montena MOL500T optical link is designed for real-time measurement of electric signals from DC up to 500 MHz in harsh electromagnetic environment.

The shielded optical transmitter has a 1 MΩ / 50 Ω BNC input which enables connecting any sensing device (current probe, HV probe or specific means for HF measurements). It also makes an ideal oscilloscope front-end for the remote measurement of floating potentials in industrial applications and ensures a total galvanic insulation of the operator, for safe operation in high voltage areas.

The input electric signal is conditioned and converted into an optical signal in the transmitter module and sent to the receiver module through a single mode fibre. The receiver module converts back the optical signal into an electric signal. The optical signal transmission is regulated with an automatic level control that maintains precise and constant performance independently of the optical losses.
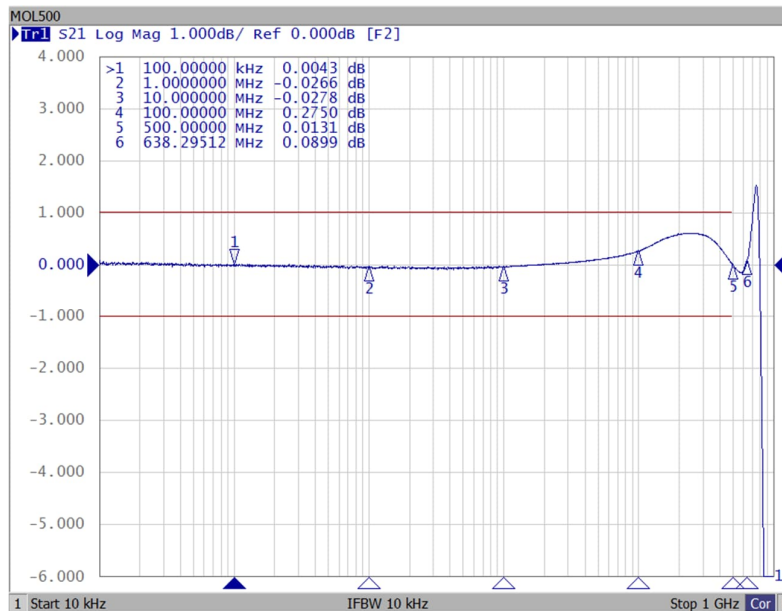
The battery powered optical transmitter comprises a remote-controlled attenuator stage (1:1 / 10:1 / 100:1) to adjust the received signal level for an optimal use of the dynamic range. The transmitter can remotely be put in a low power standby mode to save battery power when not used. A LED indicator shows the operating state.

Configurable settings can be remote controlled using either FibREmote software for PC and Android devices, or a set of API commands.

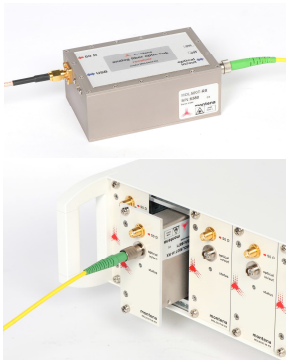| SYSTEM	SPECIFICATIONS
Type	**MOL500T**
Bandwidth	DC to 500 MHz
Flatness	± 1 dB
System attenuations	1:1 / 10:1 / 100:1 , remotely selectable
Input impedance	1 MΩ or 50 Ω , remotely selectable
Output impedance	50 Ω
Maximum output dynamic	± 0.7 Vp
Instantaneous dynamic range	58 dB
Output noise floor	-139 dBm/Hz
Output noise level	0.6 mV typ.
TX input to RX output propagation delay	Typ. 1.5 ns + propagation delay of the fibre (~5 ns/m)
Optical losses compensation	Automatic
Laser diodes wavelength (TX / RX)	1310 nm / 1550 nm
Optical power in fibre	5 mW (laser class 1)
Immunity to external electric fields	> 500 kV/m (pulse acc. to MIL-STD 461 RS105). More information available on demand.
Maximum link distance	≥ 1 km

Typical frequency response

The plot below shows the typical bandwidth between 10 kHz and 1GHz. Under 10 kHz, the frequency response is flat down to DC.

The compact optical transmitter is battery powered and especially shielded for a very high immunity to electromagnetic fields.

OPTICAL TRANSMITTER	SPECIFICATIONS
Type	**MOL500T-TX**
Number of channels per module	1
Input attenuator ratios	1:1 / 10:1 / 100:1 , remotely selectable
Input impedance	50 Ω or 1 MΩ //16pF , remotely selectable
Max. input power (CW)	0.4 W (input = 50 Ω)
Absolute max. input voltage[1]	1:1 ± 3 Vp 10:1 ± 30 Vp 100:1 ± 125 Vp
Input clamping voltage[1]	1:1 ± 0.7 Vp 10:1 ± 7 Vp 100:1 ± 70 Vp
Power supply	by internal LiPo batteries or by the power supply adapter
Battery autonomy	50 hours. Standby: about 5 months
Built-in test generator	500 Hz, 0 V - 0.5 V bipolar square signal
RF input connector	BNC female (option: SMA female; see chapter 'Ordering information')
Laser diodes wavelength (TX / RX)	1310 nm / 1550 nm
Optical power in the fibre	5 mW max. (laser Class 1)
Optical connector	FC/APC
Operating temperature	-10 °C to +50 °C
Dimensions	99 x 64 x 41 mm (L x W x H), excluding connectors
Weight	380 gr

1) Value at the input connector (i.e., the transfer function of the probe that may be connected to the input is not included).

The optical receiver is available in two versions:

A compact stand-alone receiver for point-to-point application, battery powered and especially shielded for a very high immunity to electromagnetic fields. It has one USB interface for system configuration and supervision.

A plug-in module to be inserted in a single or multi-slot MOL-MF-xx chassis. Each module is powered and controlled from the chassis backplane.

OPTICAL RECEIVER	SPECIFICATIONS	
Type	MOL500T-RX (stand-alone receiver)	MOL500T-RX (plug-in receiver)
Number of channels per module	1	1
RF output connector	BNC female / 50 Ω	SMA female / 50 Ω
Output power[1] at 1dB compression	< 10 kHz : +9 dBm 10 kHz - 200 MHz : +10 dBm 200 - 500 MHz : +2 dBm	< 10 kHz : +9 dBm 10 kHz - 200 MHz : +10 dBm 200 - 500 MHz : +2 dBm
Output noise floor	-139 dBm/Hz	-139 dBm/Hz
Output noise level	0.6 mV typ.	0.6 mV typ.
Maximum output dynamic	± 0.7 Vp	± 0.7 Vp
Power supply	by internal LiPo batteries	by the MOL-MF-xx chassis
Battery autonomy	50 hours. Standby: about 3 months	n/a
Optical signal	1550 nm / 2 mW max. (laser Class 1)	1550 nm / 2 mW max. (laser Class 1)
Optical losses compensation	automatic	automatic
Optical connector	FC/APC	FC/APC
Control connector	Mini-USB	USB Type A on MOL-MF-xx chassis
Operating temperature	-10 °C to +50 °C	-10 °C to +50 °C
Dimensions (excluding connectors)	99 x 64 x 41 mm (L x W x H)	40 x 172 x 84 mm (2U)
Weight	380 g	240 g

Note 1: for input power, add transmitter attenuation to input level
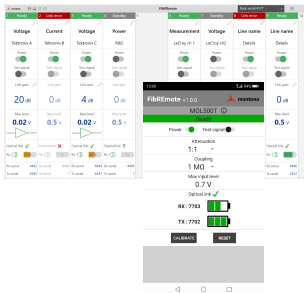
The MOL-MF-10 is a 19" chassis 2U for up to ten plug-in receiver modules. The modules are powered and controlled from the chassis backplane.

The MOL-MF-1 chassis enables stand-alone operation of one plug-in receiver module.

CHASSIS	SPECIFICATIONS	
Type	MOL-MF-10	MOL-MF-1
Number of slots	10	1
Control connector	USB Type A	USB Type A
Dimensions (W x D x H)	448 x 356 x 110 mm	50 x 200 x 110 mm (W x D x H)
Power rating	85 - 264 V, 47 - 65 Hz	100 - 230 V, external power adapter
Weight	about 5 kg	about 500 g

The system is delivered with montena FibREmote software for PC and Android devices. The application allows simple configuration and monitoring of the optical link(s).

Configurations can be stored and recalled at any time to facilitate the configuration of large test setups.

Ordering information

Standalone point-to-point link

TYPE	DESCRIPTION
MOL500T-B	Single channel point-to-point optical link DC – 500 MHz, <u>BNC</u> inputs/ outputs, including one optical transmitter on battery, one optical receiver on battery, two battery chargers 90-264 V, one FibREmote software for PC and Android devices, and one carrying case
MOL500T-S	Single channel point-to-point optical link DC – 500 MHz, <u>SMA</u>(f) inputs/ outputs, including one optical transmitter on battery, one optical receiver on battery, two battery chargers 90-264 V, one FibREmote software for PC and Android devices, and one carrying case

Optical link with plug-in receiver module

TYPE	DESCRIPTION
MOL500T-MB	Single channel optical link for chassis MOL-MF-xx, DC - 500 MHz, <u>BNC</u> inputs / SMA(f) outputs, incl. one optical transmitter on battery, one optical plug-in receiver module and one battery charger 90-264 V
MOL500T-MS	Single channel optical link for chassis MOL-MF-xx, DC - 500 MHz, <u>SMA(f)</u> inputs/outputs, including one optical transmitter on battery, one optical plug-in receiver module and one battery charger 90-264 V

Chassis for plug-in receiver modules

TYPE	DESCRIPTION
MOL-MF-10	19" chassis 2U for up to 10 plug-in receiver modules, 85 - 264 V, including one power supply cable, one USB cable and one FibREmote software for PC and Android devices.
MOL-MF-1	Chassis for one plug-in receiver module, including one power supply adapter 100 - 230 V with 3 mains plugs for US/Japan, Europe and UK, one USB cable and one FibREmote software for PC and Android.

Fibre optic cables

TYPE	DESCRIPTION
FCLBxxx	Fibre optic cable, diameter: 3 mm xxx = the cable length Available lengths are 10, 20, 50, 100, 200, 500, 1000 m
FCLBxxx-RU	Rugged fibre optic cable, diameter: 7.5 mm xxx = the cable length Available lengths are 10, 20, 50, 100, 200, 500, 1000 m

Related products / accessories

TYPE	DESCRIPTION
MOL-CRG-DCDC	Optional DC/DC charger for one transmitter or receiver module, Vin: 10-30 Vdc *Enables long term operation using an external 12 V or 24 V battery*