

60/110 GHz Fiber Optical Transmitter/Converter

(0.01 to 60/110 GHz, analog/digital, auto bias)



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The EOCV series Fiber Optical Transmitters (Electrical-to-Optical Converters) provide high-fidelity analog and digital optical signals from electrical inputs, supporting a wide frequency range of DC to 20 and 40 GHz. These user-friendly turnkey modules feature a corresponding Thin Film Lithium Niobate Fiberoptic Modulator (TLNM), a DFB laser with driver, an automatic bias controller, high-performance control circuits, and a DC power supply, all integrated into a convenient plug-and-play benchtop unit. The TLNM modulators employed in the EOCV series use smaller and shorter waveguides compared to conventional LiNbO₃ modulators, offering greater efficiency in converting RF signals into optical signals. Their low RF driving voltage eliminates the need for an external RF amplifier, making the system compatible with standard function generators for laboratory applications.

The benchtop unit features a front switch to select between three modulator bias modes: Peak and Null for high on/off contrast, and Quadrature for superior linearity in E-O conversion. The laser output power is also adjustable via a front rotating knob, allowing users to fine-tune output settings. Designed for RF-over-Fiber applications, as well as the testing and characterization of optical-to-electrical (O-E) devices, the EOCV series offers a versatile and reliable solution for advanced optical communication and signal processing needs.

Features

- Up to 110GHz
- Low Drive Voltage
- Wide Temperature Operation
- High Fidelity
- No Drift
- Constant Optical Output
- High Stability

Applications

- RFoF Transmission
- Analog Photonics
- Testing
- Sub-nanosecond Pulse Generation
- Optical Communication to 40Gb/s
- Active Mode Lock
- EF/IF Signal Distribution
- Satellite Communication

Specifications

Parameter	Min	Typical	Max	Unit
Operation Wavelength	1520		1567	nm
Optical Output Power	1	5	15	mW
Optical Return Loss	40		45	dB
Optical Extinction Ratio	DC	20	23	dB
	RF	16	18	
RF Driving Voltage		2	2.5	V
V _p at 40kHz	2.5	3	3.5	V
Bandwidth	DC	65	110	GHz
RF Return Loss	10		12	dB
RF Port Resistance (DC)			50	Ω
RF Input Power			30	dBm
RF Input Connector		2.92 K		
Fiber Type		PM 1550		
Fiber Connector		FC/APC		
Power Input	100		240	VAC
Power Consumption			3	W
Weight		0.5		Kg
Operating Temperature	-20		60	°C
Storage Temperature	-45		85	°C

Notes:

Operate over the maximum RF power input will burn the device

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link](#):

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Rev 12/16/24

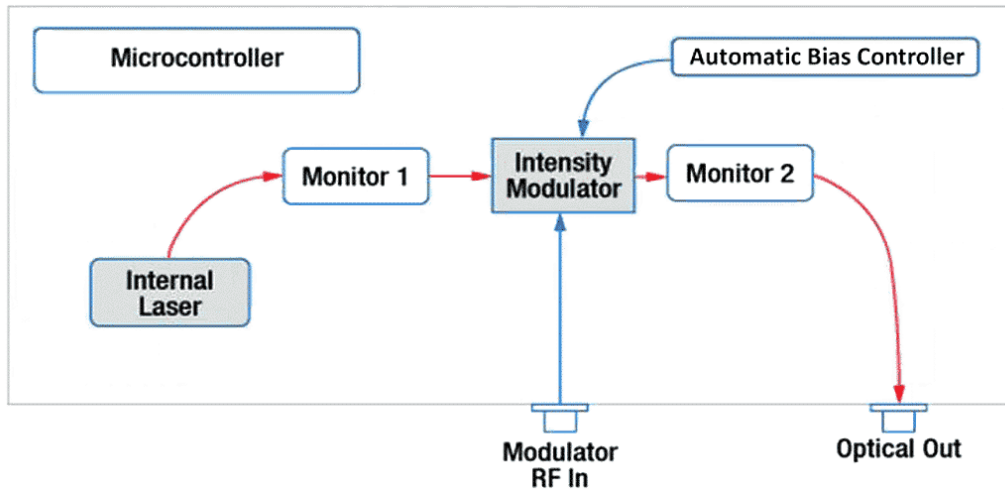
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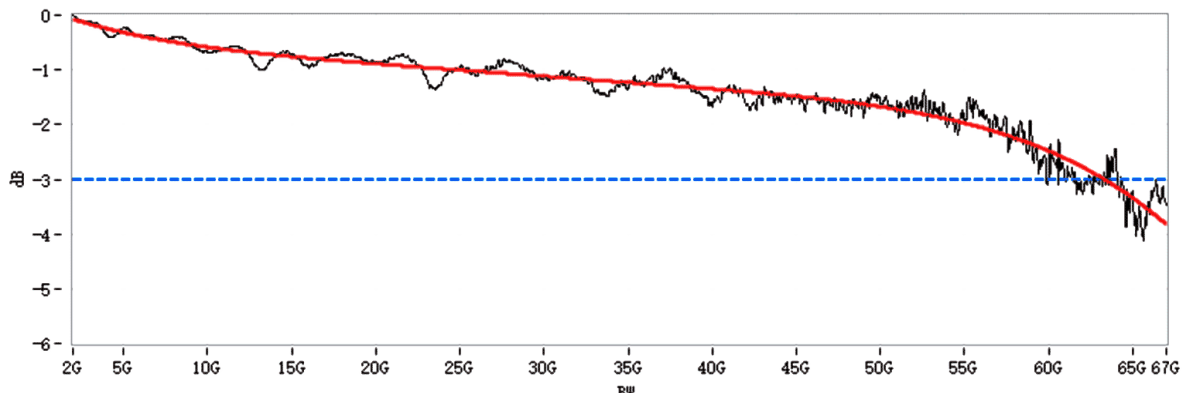
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Optical Path Diagram

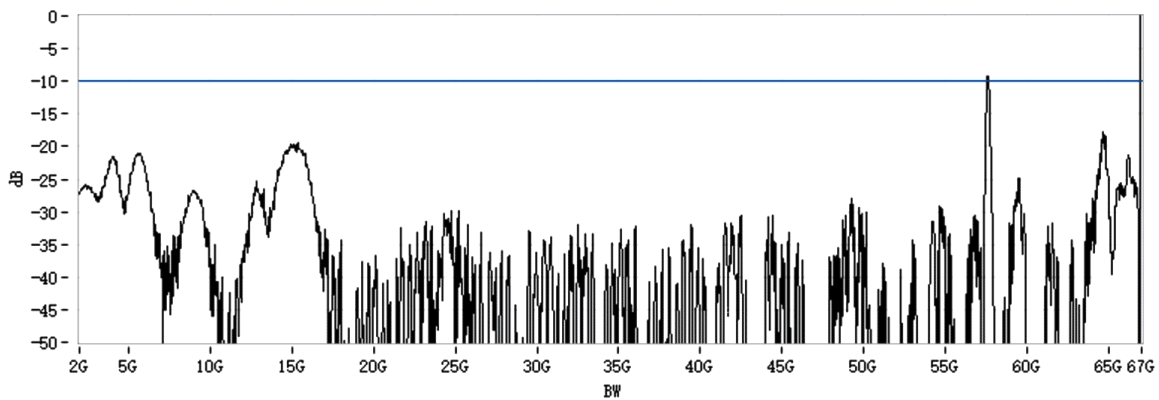


Typical RF Performance S11 and S22

S21



S11



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Dimensions (Unit: mm)

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Ordering Information

Prefix	RF Frequency	Laser Wavelength *	Tunable Laser	Package	Configuration	Fiber Connector
EOCV-	60GHz = 6 110GHz = 1	1550 nm = 15500 1551.11 nm = 55111 1562.22 nm = 56222 Special = 00000	None = 1	Benchtop = 3 Rack = 2 Special = 0		FC/APC = 2 Special = 0

Note:

* Laser on the ITU grid can be selected

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Operation Instruction

1. Power On

Plug in the AC power cord. Turn on the power switch to activate the unit.



2. Set the Laser Power

Adjust the laser power knob to select the desired output power, displayed in milliwatts (mW) on the front panel.

3. Select Modulator Bias Mode

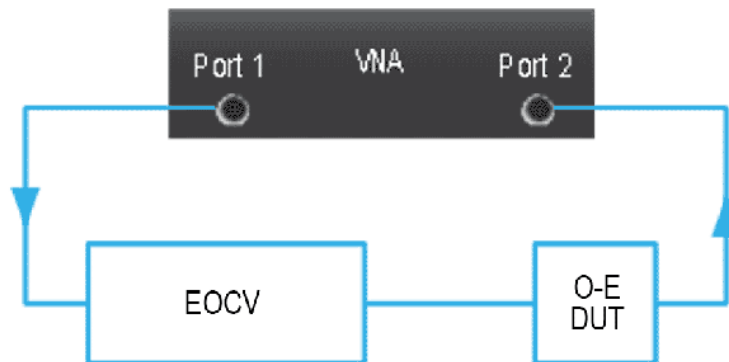
Use the modulator mode switch to choose the desired operation mode: Peak, Null, or Quadrature.

4. Input the RF Control Signal

Ensure the RF input power/voltage does not exceed the maximum rating. Gradually increase the RF control input voltage while monitoring the modulation depth to avoid overloading the modulator.

5. Using the EOCV with a Vector Network Analyzer (VNA)

The EOCV is well suited for high-frequency testing of electro-optic devices (DUTs) using a Vector Network Analyzer (VNA). The system operates as follows: System Setup: Connect Port 1 of the VNA to the EOCV's input. The EOCV converts the electrical signal from the VNA into an optical signal and couples it into the O-E DUT. The electrical output of the O-E DUT is fed into Port 2 of the VNA. Measurement: The VNA measures the response of the DUT as a function of frequency. The recorded response combines the characteristics of the EOCV and the DUT. Calibration: For accurate testing, we provide calibration tools to isolate the DUT's response from the EOCV's intrinsic characteristics, ensuring precise measurements.



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Application Notes

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the handling by expanding the core side at the fiber ends.