



The ModBox-VNA-850nm-30GHz is a wide bandwidth Optical Transmitter designed to extend Vectorial Network Analyzers applications into the optical domain.

When associated with a Vectorial Network Analyzer, they make up a high performance and easy to use test equipment for photoreceivers or any high speed optoelectronic device characterization.

The ModBox-VNA-850nm-30GHz incorporates an 852 nm low noise DBR laser source and a modulation stage based on a large bandwidth LiNbO₃ analog modulator with an automatic bias control circuit.

FEATURES

- Analog modulation up to 40 GHz
- dither-free bias controller
- Low RIN
- High harmonics suppression

APPLICATIONS

- Transmission system test
- Components characterization
- Receiver frequency test
- R&D laboratories

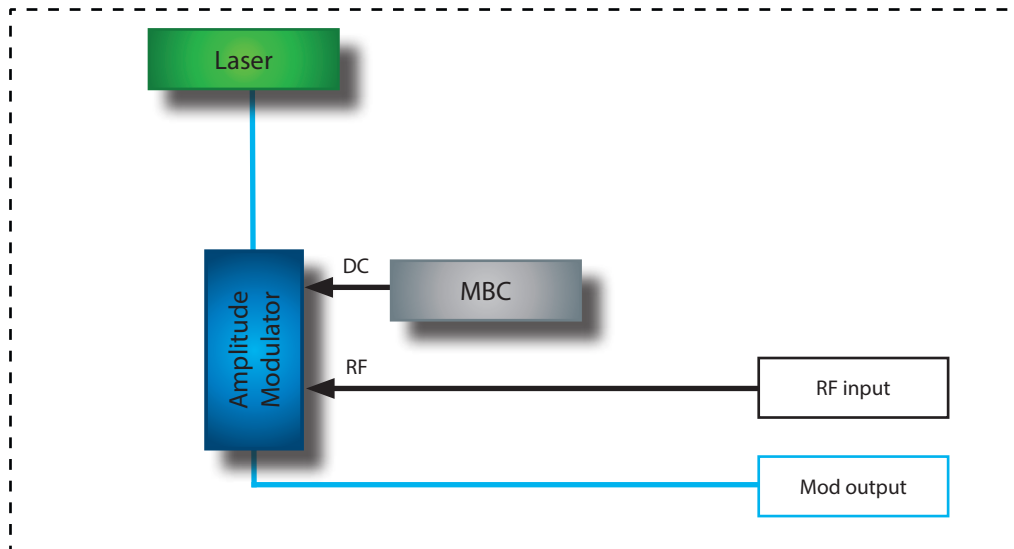
OPTIONS

- C, L, O bands operation
- Multi-Channel

Performance Highlights

Parameter	Min	Typ	Max
Operating wavelength	852 nm		
Modulation format	Analog Modulations		
Frequency	-	30 GHz	40 GHz
Modulated output power	5 dBm	-	-

Functional Block Diagram



The ModBox-VNA-850m-30GHz features:

- A chirp-free X-cut LiNbO₃ (Lithium Niobate) Mach-Zehnder modulator for very high linearity and very wide electro-optical bandwidth.
- A modulator bias controller. The internal LiNbO₃ modulator is a X-cut device with very low drift. However an automatic bias control circuit is provided to lock the operating point of the modulator at the quadrature point whatever the environmental conditions. The bias control circuit is dither free and therefore does not add any spurious content to the small signal modulation generated by the VNA. It is pre-set for operation in quadrature, in the linear portion of the modulator transfer curve. The system can operate over a large power dynamic range thanks to its software controllable gain parameters)
- An 852 nm low RIN DBR laser. For ease of use, an external patch cord is delivered to connect the laser output to the modulator input optical port. Wavelength and power are tunable through the front panel controls or the ModBox software interface.

Input Electrical Specifications User supplied, not a ModBox specification

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input electrical termination	-	AC coupled	Single ended			-
Signal type	-	-	Analog, sine			-
Input voltage ⁽¹⁾	V_{IN}	Amplitude Modulation	-	100	-	mVpp
Bandwidth	BW	-	-	-	70	GHz
Impedance matching	Z_{IN-RF}	-	-	50	-	Ω

(1): The ModBox-VNA-850nm-30GHz does not feature an internal RF amplifier. The VNA characterization is usually performed in a “small signal mode”, therefore a RF amplifier is not necessary. Omitting the amplifier allows to obtain a smoother and flatter transfer function.

Output Optical Specifications Specifications below are given with embedded 852 nm laser.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Modulation Frequency	-	-	-	-	40	GHz
Wavelength	λ	Embedded by default	-	852	-	nm
Wavelength laser tuning range	$\Delta\lambda$	Diode chip temperature control	-	0.8	1	nm
Modulated output power	OP_{OUT}	-	5	6	-	dBm
Optical output power adjustment	ΔOP_{OUT}	Diode Injection current control	0	-	100	%
Optical output power stability	δOP_{OUT}	Over 12 hours	-	-	1	%rms
Side Mode Supression Ratio	SMSR	-	40	45	-	dB
Spectrum linewidth	$\delta\lambda$	FWHM	-	3	15	MHz
Relative Intensity Noise	RIN	16 dBm	-	-	-163	dB/Hz
Polarization extinction ratio	PER	-	17	20	-	dB
Optical return loss	ORL	-	-40	-	-	dB
Electrical return loss	ERL	-	-	-12	-10	dB

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	28	dBm

Interfaces, Dimensions and Compliance

Interfaces	
Optical connectors and fibers	(FC-SC)/(APC-UPC) - Polarization maintaining fiber Corning PM 85-U25D
Electrical connector	K female (2.92 mm)
Control	Smart Interface (front panel), GUI (USB typeB)
Power supply	100-120V/220-240 automatic switch 50-60Hz (Rear panel)
EMC / Optical norms	EN61326-1 Ed. 2006 / EN 60625-1
Dimensions / Weight	Rack 19" x 3U, Depth=375mm / 6 kg



Ordering information

ModBox-VNA-850nm-30GHz-XX

VNA = Optical Vectorial Network Analyser extension
 850nm = embeds laser, 852 nm
 30GHz = Analog Modulation up to 30 GHz and beyond
 XX = Output connectors, FA : FC/APC - SA : SC/APC

About us

ixBlue Photonics produces specialty optical fibers and Bragg gratings based fiber optics components and provides optical modulation solutions based on the company lithium niobate (LiNbO₃) modulators and RF electronic modules.

ixBlue Photonics serves a wide range of industries: sensing and instruments, defense, telecommunications, space and fiber lasers as well as research laboratories all over the world.