ModBox

ModBox-VNA-1064nm-40GHz

Near Infrared 1064 nm, 40 GHz Modulation Unit

The ModBox-VNA-1064nm-40GHz 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-1064m-40GHz incorporates a 1064 nm low noise laser source and a modulation stage based on a wide bandwidth $LiNbO_3$ analog modulator with an automatic bias control circuit.



FEATURES

- Analog modulation up to 40 GHz
- Low RIN
- High harmonics suppression

APPLICATIONS

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

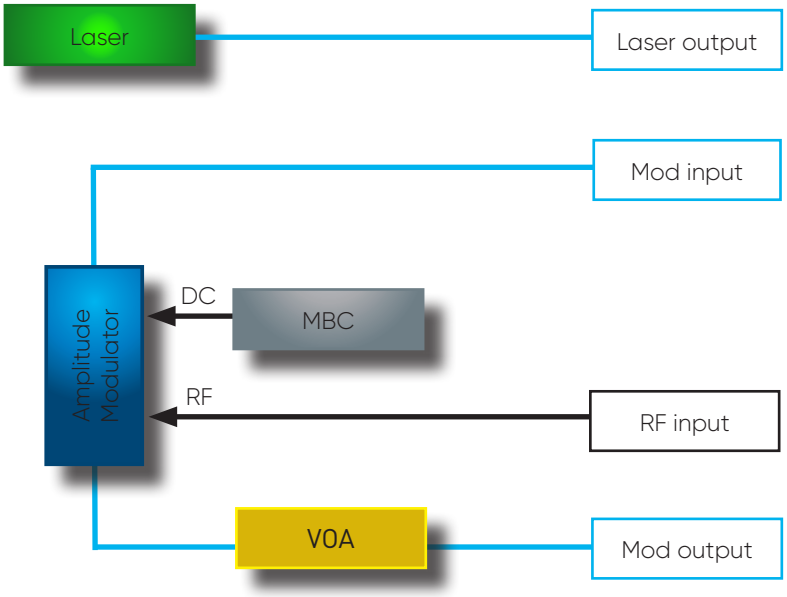
APPLICATIONS

- Multi lasers 976 nm, 920 nm, 1083 nm
- Multi-channel

PERFORMANCE HIGHLIGHTS

Parameter	
Operating wavelengh	980 nm to 1150 nm
Embedded laser	1064 nm
Modulation formats	VNA, NRZ, PAM-4
Frequency	Up to 40 GHz
Modulated output power	Typical 5 dBm

FUNCTIONAL BLOCK DIAGRAM



The ModBox-VNA-1064nm-40GHz features:

• A chirp-free X-cut $LiNbO_3$ (Lithium Niobate) Mach-Zehnder modulator for very high linearity and very wide electro-optical bandwidth, operating from 980 up to 1150 nm.

• A modulator bias controller. The internal $LiNbO_3$ 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 in the linear portion of the modulator transfer curve. The MBC ensures a stable operation over time and shows a very low noise sensitivity yielding a significant reduction of the required dither voltage amplitude.

• A 1064 nm low RIN laser. Wavelength and power are tunable through the front panel controls or the ModBox software interface. Additional lasers can be embedded at centered wavelengths 976 nm, 920 nm, 1083 nm.

• A Variable Optical Attenuator (VOA) to precisely control the modulated optical outpul signal.

The ModBox-VNA-1064nm-40GHz is controlled from the front panel thanks to the Smart Interface touch screen.
The Smart manual interface allows to bias control circuit and laser current settings.
It comes also with a simple GUI solution, Windows based and implemented through the Ethernet 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 / NRZ / PAM-4		
Input voltage [1]	V_{IN}	VNA mode	0.4	0.6	1	Vpp
		NRZ mode	-	5.3	-	Vpp
		PAM-4 mode	-	3.6	-	Vpp
Bandwidth	BW	-	-	-	40	GHz
Impedance matching	Z_{IN-RF}	-	-	50	-	Ω

(1): The ModBox-VNA-1064nm-40GHz 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.

INPUT OPTICAL SPECIFICATIONS User supplied, not a Modbox specification

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operation	λ	CW	680	-	1150	nm
Polarization	-	-		Linear and controlled		-
Power	OP_{IN}	-	-	-	40	GHz

OUTPUT OPTICAL SPECIFICATIONS User supplied, not a Modbox specification

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Modulation frequency	-	-	-	-	40	GHz
Wavelength	λ	-	-	1064	-	nm
Wavelength laser tuning range	Δλ	Diode chip temperature control	-	0.8	1	nm
Modulated output power	OP_{OUT}	With embedded laser	5	6	-	dBm
Optical output power adjustment	ΔOP_{OUT}	By the use of VOA	-40	-	0	dB
Optical output power stability	δOP_{OUT}	Over 8 hours	-	-	0.25	dB
Spectrum linewidth	δλ	FWHM	-	3	15	MHz
Relative Intensity Noise	RIN	16 dBm	-	-	-163	dB/Hz
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
Optical input power	OP_{IN}	-	25	dBm

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INTERFACES, DIMENSIONS AND COMPLIANCE

Interfaces

Optical connectors and fibers	FC/APC - Polarization maintaining fiber, Corning PM98-U25D
Electrical connector	V female (1.85 mm)
Control	Embedded interface (front panel touchscreen) + remote control (Ethernet)
Power supply	100 V - 120 V / 220 V - 240 V automatic switch 50 Hz - 60 Hz (rear panel)
Dimensions / Weight	Rack 19'' x 2U, depth = 495 mm / 5 kg
EMC and optical norms	EN61326-1 Ed. 2006 / NF EN 60625-1
Laser safety	Class 3R 



ORDERING INFORMATION

Modbox-VNA-1064nm-40GHz

VNA = Optical Vectorial Network Analyser extension

1064nm = Operation in the 1064 nm band with a 1064 nm embedded laser

40GHz = Analog Modulation up to 40 GHz