ModBox

ModBox-C/LBand-20GHz

C/L-Band, 20 GHz Modulation Unit

The ModBox-AN-C/LBand-20GHz is a wide bandwidth Optical Transmitter designed for analog transmission up to 20 GHz.

The ModBox-AN-C/LBand-20GHz incorporates a low noise DFB laser source, a modulation stage based on a wide bandwidth $LiNbO_3$ analog modulator combined with a linear RF driver.
An automatic bias control system ensures operation in the linear transfer region of the modulator.
An optical input on the front panel allows the use of an external laser source.



FEATURES

- Analog modulation up to 20 GHz
- Low RIN
- High harmonics suppression

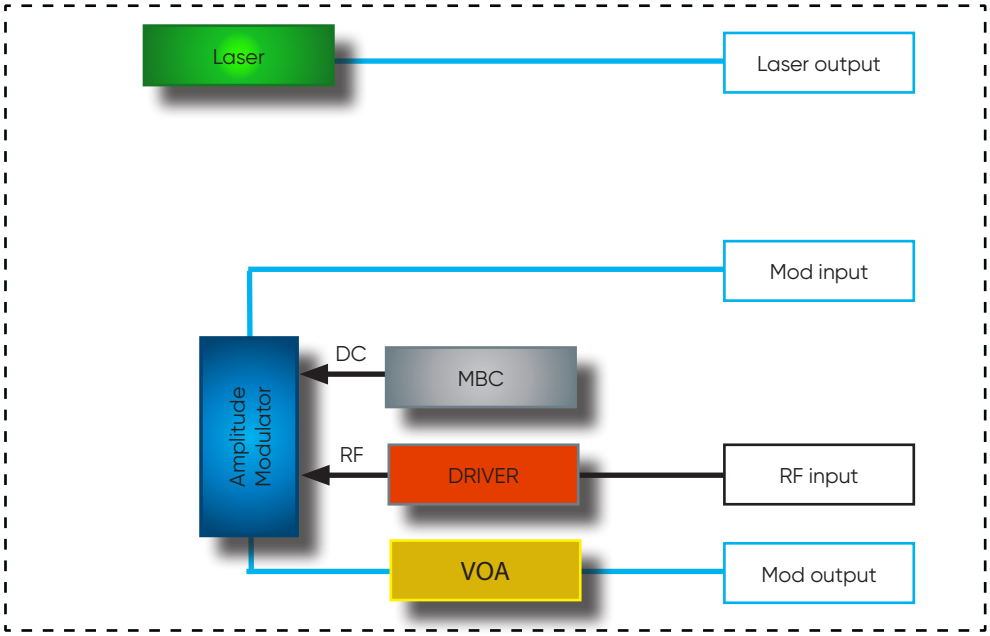
APPLICATIONS

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

PERFORMANCE HIGHLIGHTS

Parameter	
Operating wavelengh	C/L-Band
Embedded laser	Tunable
Modulation formats	Analog
Frequency	Up to 20 GHz
Modulated output power	Superior to 7 dBm

FUNCTIONAL BLOCK DIAGRAM



The ModBox-AN-C/LBand-20GHz features:

• A chirp-free X-cut $LiNbO_3$ (Lithium Niobate) Mach-Zehnder modulator for very high linearity and very wide electro-optical bandwidth, it operates within the full C/L-Band.

• An RF amplifier optimized for analog modulation featuring a flat group delay and gain curve with reduced ripple over the bandwidth.

• 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 low RIN tunable C/L-Band laser. Wavelength and power are tunable through the front panel controls or the ModBox software interface.

• A calibrated variable Optical Attenuator (VOA) to precisely control the modulated optical output signal.

The ModBox-AN-C/LBand-20GHz is controlled from the front panel thanks to Graphical User Interface (windows OS).
It comes also with a set of TCP commands for remote control through the Ethernet port.

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INPUT ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input electrical termination	-	AC coupled		Single ended		
Signal type	-	-		Analog		
Input voltage [1]	V_{IN}	Analog mode	-	0.200	0.500	Vpp
Bandwidth	BW	-	0.1	20	-	GHz
Impedance matching	Z_{IN-RF}	-	-	50	-	Ω

INPUT OPTICAL SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operation	λ	CW	1527.60	-	1608.80	nm
Polarization	-	-		Linear and controlled		
Power	OP_{IN}	-	-	-	20	dBm

OUTPUT OPTICAL SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Modulation frequency	-	-	-	20	-	GHz
Wavelength	λ	With embedded laser (C-Band)	1527.60	-	1565.50	nm
		With embedded laser (L-Band)	1570.01	-	1608.76	nm
Modulated output power	OP_{OUT}	With embedded laser	7	8	-	dBm
Optical output power adjustment	ΔOP_{OUT}	By the use of VOA	-40	-	0	dB
Optical output power stability	δOP_{OUT}	Over 8 hours	-	-	1	%rms
Spectrum linewidth	δλ	FWHM	-	-	100	kHz
Relative intensity noise	RIN	-	-	-	-145	dB/Hz
Optical return loss	ORL	-	-40	-	-	dB
Electrical return loss	ERL	-	-	-	-8	dB

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	0	dBm
Optical input power	OP_{IN}	-	20	dBm

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INTERFACES, DIMENSIONS AND COMPLIANCE

Interfaces	
Optical connectors and fibers	FC/APC - Polarization maintaining fiber, Corning PM15-425D
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 1M 



ORDERING INFORMATION

Modbox-AN-C/LBand-20GHz

AN = Analog Transmitter

C/LBand = operation in the C-Band or L-Band band with an embedded C-Band or L-Band Tunable laser

20GHz = Analog Modulation up to 20 GHz

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