

MENTHOR

10GHz to 18GHz over Fibers
8 Tx Channels



Overview

The MENTHOR is a Multichannel optical transmitter dedicated to microwave transmission up to 18 GHz designed mostly for Cryostat Farms architecture for Quantum Computers.

The MENTHOR allows long distance qubit drive removing all microwave losses and lower passive heat load in the cryostat. The unit is optimized to generate a high performance and high stability optical analog signal from its internal laser source and a user supplied RF modulation signal.

The MENTHOR is ideal for industrial applications. The Series MENTHOR is completely interoperable with Viqthor's RFSOC RF Signal Processor MIMOTHOR, sharing a common architecture, interface and SPCI-based command set. Used together, these two products enable complete Microwave Multi-Channel digital Processor over optics.

Features

- Analog modulation up to 18 GHz
- Dither-free bias controller
- Low RIN
- High harmonics suppression

Applications

- Cryostats Farm Quantum Computers
- Transmission system test
- Phase Array Antenna Link
- Radio Over Fiber



All built-in for Turnkey use

Eight C-band, 10 mW optical sources including their low RIN DFB lasers, their low noise current drivers and temperature controllers.

An integrated modulation stage optimized for analog modulation. This stage is built around a high bandwidth, analog intensity modulator co-located with the laser and a high bandwidth linear RF amplifier. The modulator is characterized by its high harmonic suppression and flat bandwidth curve, the amplifier by flat group delay and gain curves with reduced ripple all over the bandwidth.

The MENTHOR is controlled from the front panel thanks to the LCD interface with a simple rotary knob and buttons. It comes also with a simple GUI solution, Windows based and implemented through the Ethernet interface of the user PC. Remote programming is of course featured.

Options

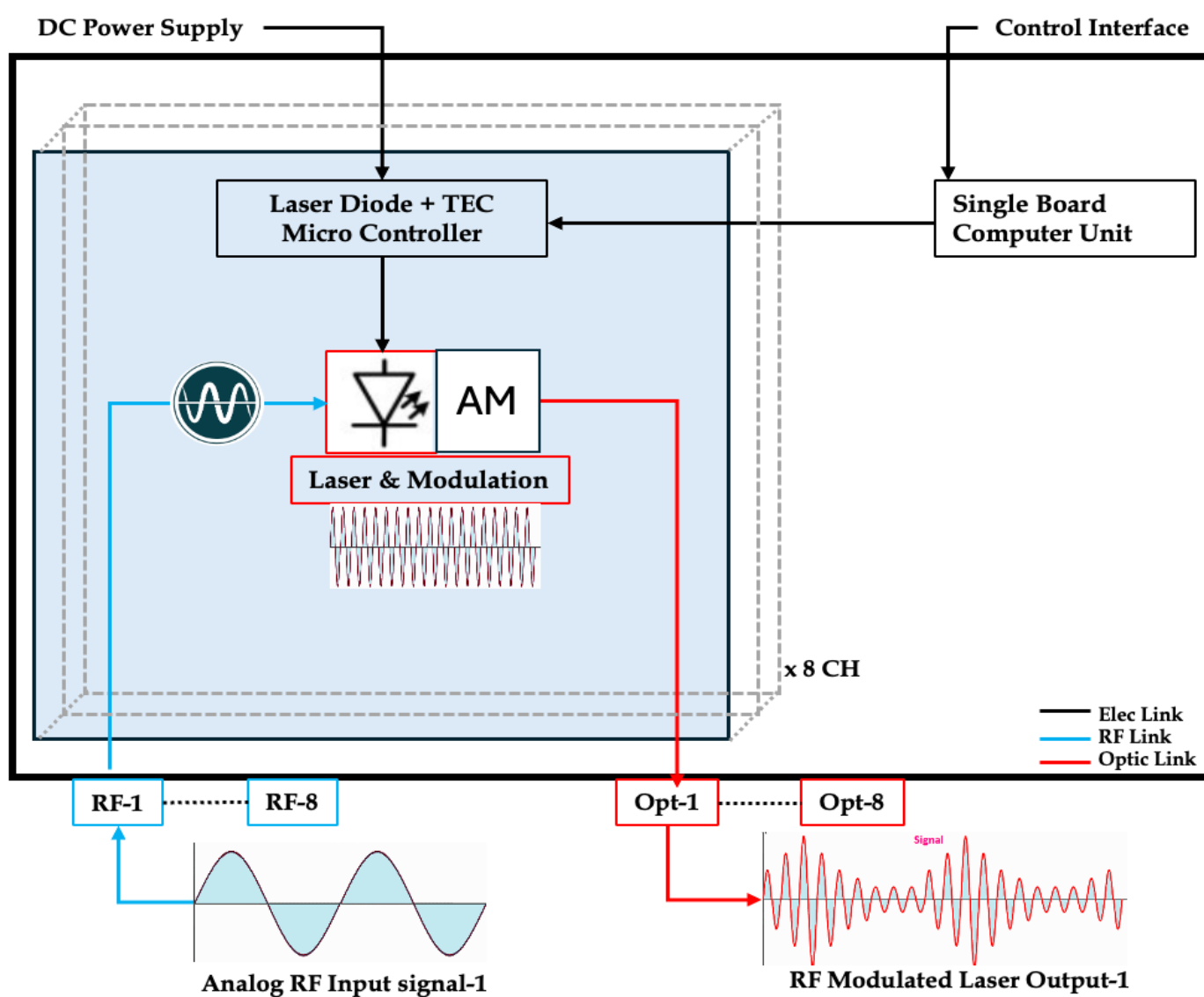
Optical Power Splitters 1 to N

8 Analog inputs for external locking

C or O band operation (mixed combination possible)



Block Diagram





Optical and Electrical Specifications

Parameter	Symbol	Min	Typ	Max	Units
Optical Parameters					
Internal Laser source type			DFB		
Modulation type			Amplitude		
Peak wavelength	λ_c	1545	1550	1555	nm
Optical Output Power	Popt	3	5	10	dBm
Optical Return Loss	ORL		30		dB
Line Width	LW		3		MHz
Side-mode suppression ratio	SMSR	30			dB
Relative Intensity Noise	RIN		-150	-130	dB/Hz
Optical Isolation	ISO		30		dB
Polarization Extinction ratio	PER	17	20	25	dB
Electrical Parameters					
RF Input Power Level	RF in	-50	5	16	dBm
RF input Frequency range		0.01	12	18	GHz
Bandwidth (-3dB,I=60mA)	S21		16		GHz
Return loss	S11		-10	-6	dB
Input 1 dB Compression			18		dBm
Extinction Ration			10		dB
Input Impedance Matching	Ω		50		ohm
Spurious Free Dynamic Range	SFDR		100		dBm/H2/3
Coupling type			DC coupled		



Mechanical and Environmental Specifications

Optical Chassis 2U	(L x H x D)	448.9 x 88.1x 495.5
Number of RFoF links		8
Number of RF input Channels		8
Number of Digital Input Ouput Channels		8
Number of Optical Output Channels		8
RF input connector type		SMPM-Male
Digital Input Ouput connector type		MMCX
Optical fiber type		Single mode fiber- 9µm /125µm
Optical output connector type		FC/APC Square Hole Mount Style



Operating Conditions

	Unit	Value	Comment
Digital Remote Control		Ethernet 1 Gbps auto	RJ45 connector
TCP/IP		Fixed IP & mask	through front panel GUI
Remote control Language		SCPI like Text Commands	On port 5025
Operating Temperature	°C degrees	10 to 30	up to 95% humidity non-condensing
Storing Temperature	°C degrees	-20 to +40	
Main Electrical Power	AC V	90-240	Auto switch power supply 50/60 Hz
Size	cm	Width x Height x 40	19 inch Rack 4U
Weight	kg	7	