

12GHz RF over Fiber Mini-S



Key Features:

- Frequency Range: 0.1-12GHz
- Low spurious level
- High SFDR 104 dB/Hz
- Excellent Phase Noise
- Excellent phase linearity

Configurations:

- Standard (stand-alone)
- 1U Generic enclosure (4 units)
- 1U Removable panel enclosure (2/4 units)
- Outdoor (2/4 units)

Applications:

- Distributed Antenna
- Satcom
- Radio telescopes
- Telecommunication:
 - Antenna Remoting
 - Long RF links via fiber
- EW

Options:

- Customized RF Gain, P1dB, Noise Figure by adding internal Pre & Post amplifier(s)
- Extended low frequency bandwidth

RFOptic's analog RFoF compact modules enable long distance transport of wideband RF signals. The Tx unit, uses an optical transmitter, converts wideband RF signals to an Optical signal and the Rx unit converts the Optical signal back to RF signal. The two units are connected by the customer's fiber.

RFOptic's RF over Fiber modules (RFoF) are suitable for telecommunications and radar applications. Satellite, Point-to-Point antennas can be connected from several meters to many kilometers away from the control room. Base stations can be connected through fiber to remote sector antennas.

Broadcasters can easily distribute their full RF streams over fiber to remote locations, therefore eliminating the need for complex equipment to be installed in far and hard to reach locations. With our wide-band units, cable operators can centrally locate their broadcasting equipment, and connect the RF through fiber to the remote location, thus reducing significantly the CAPEX and OPEX of their networks.

RFoF-12GHz-Mini-S Specifications

RF Parameter RF TX-Rx Link	Unit	Specification (typical)
Frequency Range ^[1]	GHz	0.1-12
RF Gain ^[2,3]	dB	-32
Gain Flatness for the entire frequency range ^[5]	dB	±2
1dB Input compression point ^[3]	dBm	17
Noise Figure ^[2,3]	dB	44
SFDR (calculated) ^[3,4]	dB/Hz ^{2/3}	104
Maximum RF input level	dB	23
VSWR Input	-	2:1
VSWR Output	-	2:1
Spurious ^[5]	dBc	≤-80
Phase Noise at 10KHz offset	dBc/Hz	≤-120
Input / Output impedance	Ohm	50
Optical and Electrical and Environmental (Tx, Rx)		
Laser diode optical wavelength	µm	1.55
Receiver photodiode optical wavelength	µm	1.5-1.58
Operating temperature range	°C	0 to +70
Storage temperature	°C	-40 to +85
LED status indicators (Tx/Rx)	-	Blue/Green/Red
Input voltage ^[6]	VDC	5
Power consumption Tx module ^[5,7]	Watt	2.5
Power consumption Rx module ^[5,7]	Watt	0.5
Mechanical (Tx/Rx)		
Dimensions Tx/Rx unit	mm	75*154*33
Weight Tx/Rx unit	grams	450
RF Input / Output connectors	mm	SMA
Optical Connector	-	FC/APC
Power connector and Data/monitor connector ^[8]	-	DB15

[1] Extended low frequency 0.01-12.0 GHz is optional.

[2] Excluding customer fiber loss.

[3] Measured at 10GHz. Gain, IP1dB, typical NF values for RFoF with Pre/Post Amps are indicated in the table on page 3.

[4] Excluding in-band harmonics. SFDR (calculated) $\approx 2/3 \times [(IP1dB+10)+174-NF]$ dB/Hz^{2/3}.

[5] Measured for link without amplifiers. Spur levels increase with post amplifier gain.

Each amplifier adds about ±1dB to the flatness and up to 3.5 Watts to power consumption of the module.

[6] See table on page 3 for RFoF enclosure options.

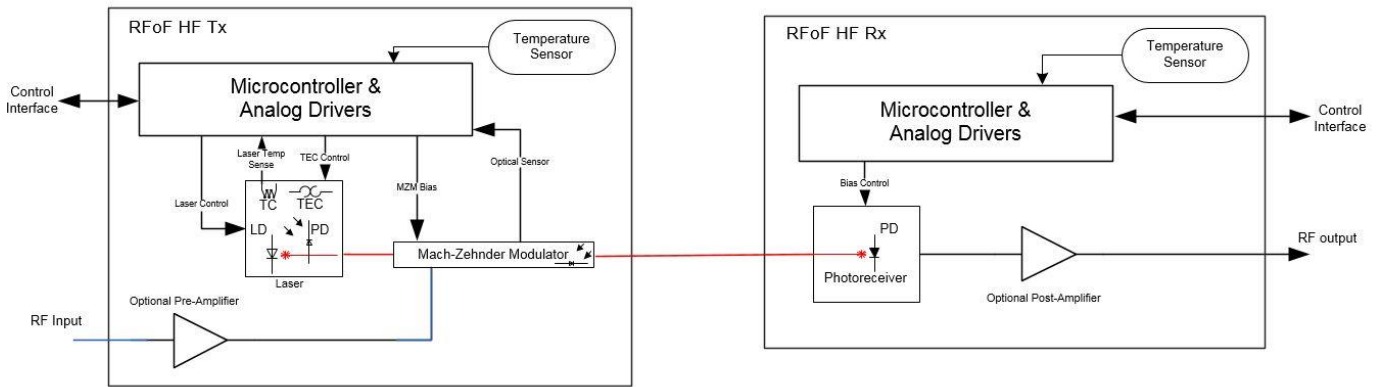
[7] Recommended Power Supplies: Meanwell P/N GSM25U05-P1J (USA); GSM25E05-P1J (Europe); GE40I05-P1J (all purpose).

[8] For USB monitor download software here: <https://rfoptic.com/software-download-rfof/> (ask your local representative for password).

RFoF 12GHz Module Options

Parameter	Unit	12GHz Transceiver	12GHz Transceiver with Pre-Amp	12GHz Transceiver with Post-Amp	12GHz Transceiver with Pre- and Post-Amp
P/N	-	RFoF-12GHz-S0-Mini	RFoF-12GHz-S1-Mini	RFoF-12GHz-S0-Mini-P	RFoF-12GHz-S2-Mini
Gain	dB	-32	-16	0	0
InP1dB	dB	17	0	17	0
Noise Figure	dB	44	28	44	28
SFDR	dBc/Hz	104	104	104	104

RFoF 12GHz – Simplified Block Diagram



RFoF Enclosure Options

Parameter	19" 1U Enclosure for RFoF	Outdoor Enclosure for RFoF
Dimensions (mm)	19" 1U Generic: 445(W)* 476(L)*44(H) 19" 1U Removable: 442(W)* 402(L)*44(H)	Small Outdoor: 270(W)*230(L)*85(H) Large Outdoor: 330(W)*350(L)*85(H)
RF Input / Output Connector	SMA female	N Type female
Optical Connector	FC/APC or SC/APC	MPO/APC 4/8 male ^[1]
Data Connector	USB2/RJ-45	RJ45 female ^[2]
Power Connector	HP Socket	DC female/ AC male ^[2,3]
Power	110/220 VAC	9-36DC / 110/220VAC ^[2,3]

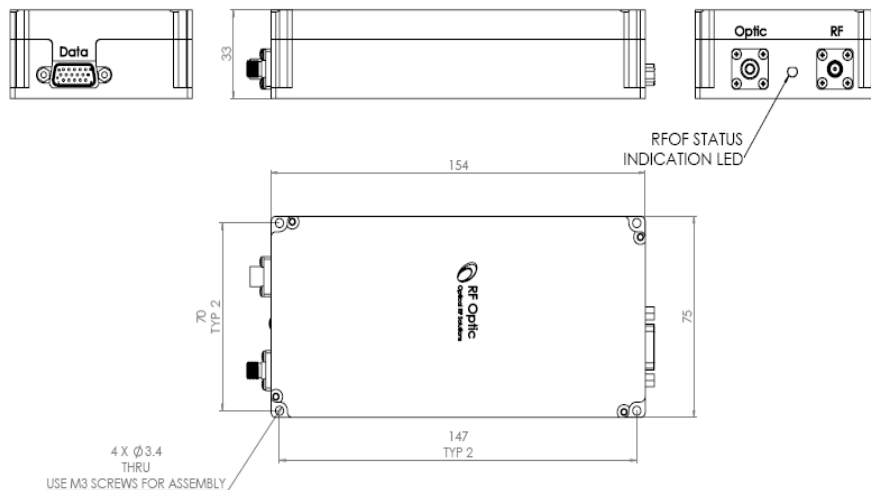
[1] MPO 4/8 optical cable (female) should be ordered by the customer according to the required length and conditions.

Example: GoFoton: P/N BPF3P1SM015FLR020 (4 fibers) / BPF3P1FM015FLR021 (8 fibers). XXX = 015m fiber length.

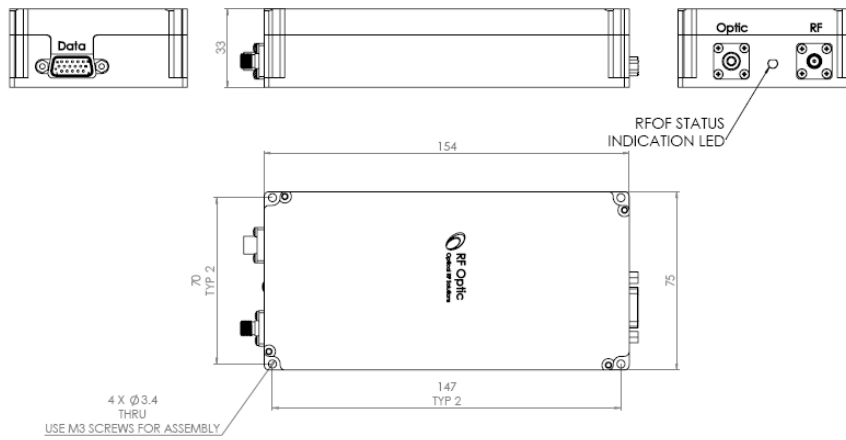
[2] IP67 Data, AC and DC opposite connectors are provided as accessories with the module (cables are not included). (3) DC and AC versions of the outdoor enclosures are available.

Mechanical Outline Drawing - 12GHz RFoF Tx and Rx modules

Tx module



Rx module



Ordering Information

P/N	Description	Tx	Rx
RFoF-12G-S0-Mini	Transceiver 12GHz	RFoF12TFS-N0-11	RFoF12RFS-N0-11
RFoF-12G-S1-Mini	Transceiver 12GHz, with Pre-Amp	RFoF12TFS-A0-11	RFoF12RFS-N0-11
RFoF-12G-S0-Mini-P	Transceiver 12GHz, with Post-Amp	RFoF12TFS-N0-11	RFoF12RFS-A1-11
RFoF-12G-S2-Mini	Transceiver 12GHz, with Pre and Post-Amp	RFoF12TFS-A0-11	RFoF12RFS-A0-11
Cable-Data-DC ^[1]	2 X D15 to USB 150cm & D15 to DC 25cm special cable	For stand-alone link	
Outdoor Data & AC set ^[2]	Data and 110/220 AC opposite connectors – accessories	For outdoor enclosure with AC supply	
Outdoor Data & DC set ^[2]	Data and 5VDC opposite connectors – accessories	For outdoor enclosure with DC supply	

[1] Accessory for HSDFR stand-alone link - supplied with the RFoF-12G-S0-Mini.

[2] Accessories / connectors for Outdoor enclosure - supplied with the RFoF-12G-S0-Mini.