3 GHz and 6 GHz Fiber Optic Links

Wireless Applications

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DATASHEET | JANUARY 2016 WIRELESS



Applications

- 4G LTE
- Distributed Antenna System (Indoor/Outdoor)
- Cellular Backhaul
- WiMAX

Features

- 30 MHz-3 GHz and 30 MHz-6 GHz RF Fiber Optic Links for Wireless Signals
- 3 µm or 1.5 µm Low Noise Isolated DFB Laser
- Optional CWDM Wavelengths
- Internal Tx RF pre-Amplifier
- Automatic Optical Power Control
- 50 Ohm SMA RF Connector
- SC/APC or FC/APC Optical Connector
- LD/PD Monitoring and Alarm
- Optional Wide DC Input: +12 VDC to +24 VDC
- Rugged Dust-Tight Housing
- Laser: Class 1 per CDRH and IEC-825

The 3 GHz and 6 GHz Fiber Optic Links for wireless signals are cost-effective, high-performance broadband transmitter, receiver, and transceiver modules designed for wireless interfacility link applications.

GENUINE ORTEL TECHNOLOGY

Each module comes with optimal optical power stability with assured performance over full temperature range. Transmit and receive alarm/indicator LEDs simplify installation and provide operational status. Each module is packaged in a rugged cast metal housing.

EMCORE Advantage

EMCORE's vertically integrated, ISO-9001, RoHS compliant facility and its world-class GaAs InP wafer fab (Ortel heritage) has been successfully designing and manufacturing highly linear, wide-dynamic-range laser/photodiode die, modules, PCBAs, cards, and integrated systems for the CATV, satcom, and telecommunications RF fiber signal transport applications.

This module series is developed with selected laser and photodiode die and modules, then designed and integrated into a PCB module assembly specifically for the wireless and other wideband RF signal transport applications.

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Performance Highlights - 3 GHz Link

	Parameter	Min	Typical	Max	Units
Link	Frequency Range	30	-	3000	MHz
	Frequency Response	-	+/- 2	-	dB
	Noise Figure (with RF pre-Amplifer)	-	41 (21)	-	dB
	Input Third-Order Intercept (with RF pre-Amplifier)[4]	-	30 (12)	-	dBm
	Spurs Free Dynamic Range (with RF pre-Amplifier)[2]	-	104 (107)	-	$dB/Hz^{2/3}$
	RF Link Gain (with RF pre-Amplifier)[3]	-	0 (19)	2 (21)	dB
Tx	Output Optical Power	-	3	6	dBmo
	Wavelength	1310	-	1610	nm
	Input Impedance	-	50 or 75	-	Ohm
	Input Return Loss	-	12	9	dB
	Input Power Supply Current (with RF pre-Amplifier)[1] @ 12 VDC	-	60 (140)	80 (160)	mA
Rx	Optical Input[6]	-15	-	-	dBmo
	Output Impedance	-	50 or 75	-	Ohm
	Output Return Loss	-	13	11	dB
	Input Power Supply Current[1] @ 12 VDC	-	155	175	mA
TR	Input Power Supply Current (with RF pre-Amplifier) @ 12 VDC	-	250 (320)	400 (460)	mA

1. Does not include custom gain, NF and IIIP3 configurations
2. SFDR = 2/3 * (IIP3 + 174 - NF)
3. Measured with 1 m of fiber. Link RF Gain dB = TG + RG - 2* Fiber Loss dBo (assumes Rin = Rout)
4. Equivalent to IMD 60 dB @ 0 dBm total output power (2-tone measurement)
5. dBmo and dBo indicate optical power and loss
6. Minimum optical input is dependent on RF signal type and modulation bandwidth

Performance Highlights - 6 GHz Link

	Parameter	Min	Typical	Max	Units
Link	Frequency Range	30	-	6000	MHz
	Frequency Response	-	+/- 3	-	dB
	Noise Figure (with RF pre-Amp)	-	41 (21)	-	dB
	Input Third-Order Intercept (with RF pre-Amplifier)[4]	-	18.5 (2)	-	dBm
	Spurs Free Dynamic Range (with RF pre-Amp)[2]	-	101 (103)	-	$dB/Hz^{2/3}$
	RF Link Gain (with RF pre-Amp)[3]	-	0 (16)	1 (18)	dB
Tx	Output Optical Power	-	3	6	dBmo
	Wavelength	1310	-	1610	nm
	Input Impedance	-	50 or 75	-	Ohm
	Input Return Loss	-	11	8	dB
	Input Power Supply Current (with RF pre-Amplifier)[1] @ 12 VDC	-	80 (160)	95 (175)	mA
Rx	Optical Input[6]	-15	-	-	dBmo
	Output Impedance	-	50 or 75	-	Ohm
	Output Return Loss	-	11	8	dB
	Input Power Supply Current[1] @ 12 VDC	-	160	180	mA
TR	Input Power Supply Current (with RF pre-Amplifier) @ 12 VDC	-	250 (330)	400 (480)	mA

1. Does not include custom gain, NF and IIIP3 configurations
2. SFDR = 2/3 * (IIP3 + 174 - NF)
3. Measured with 1 m of fiber. Link RF Gain dB = TG + RG - 2* Fiber Loss dBo (assumes Rin = Rout)
4. Equivalent to IMD 60 dB @ 0 dBm total output power (2-tone measurement)
5. dBmo and dBo indicate optical power and loss
6. Minimum optical input is dependent on RF signal type and modulation bandwidth

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Absolute Maximum Rating

Parameter	Min	Max	Unit
Storage Temperature	-40	85	° C
Operating Temperature	-20	70	° C
DC Supply Voltage	+11.5	+12.5	V
Maximum TX RF Input (No RF pre-Amplifier)	-	+15	dBm
Maximum RX Optical Input	-	4	mW

Unit Status LED Indicator

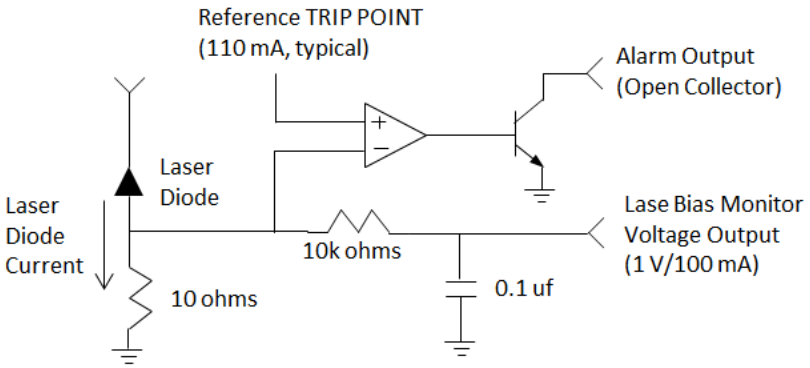
LED Indicator	Green	Red
Transmitter	Laser Bias Current Normal < 110 mA	Laser Bias Current Fault
Receiver	Input Optical Power Normal > -10 dBm	Input Optical Power Fault

Monitor Configuration (RS-232, DB-9 Connector)

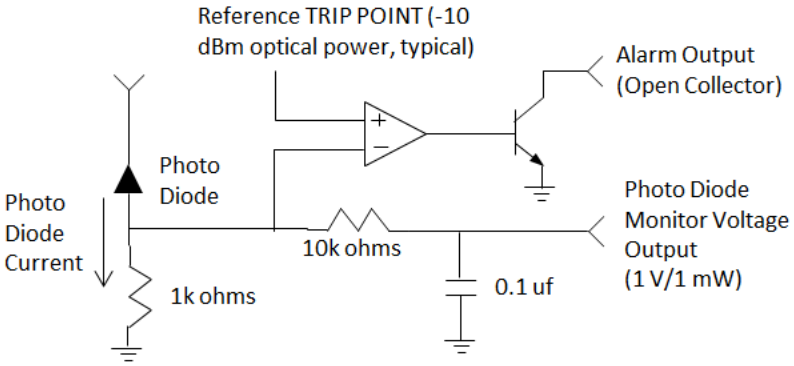
Pin #	Function
1	Laser Enable (+12VDC = laser ON)
2	NC
3	NC
4	12 V (400 mA max)
5	Ground
6	Laser Bias Monitor (0.1 V = 10 mA)
7	Laser Bias Alarm (open collector, 25 mA)
8	Received Power Monitor (1 V = 1 mW)
9	Received Power Alarm (open collector, 25 mA)

Alarm and Monitoring Circuit Diagram

Transmitter (Tx)



Receiver (Rx)

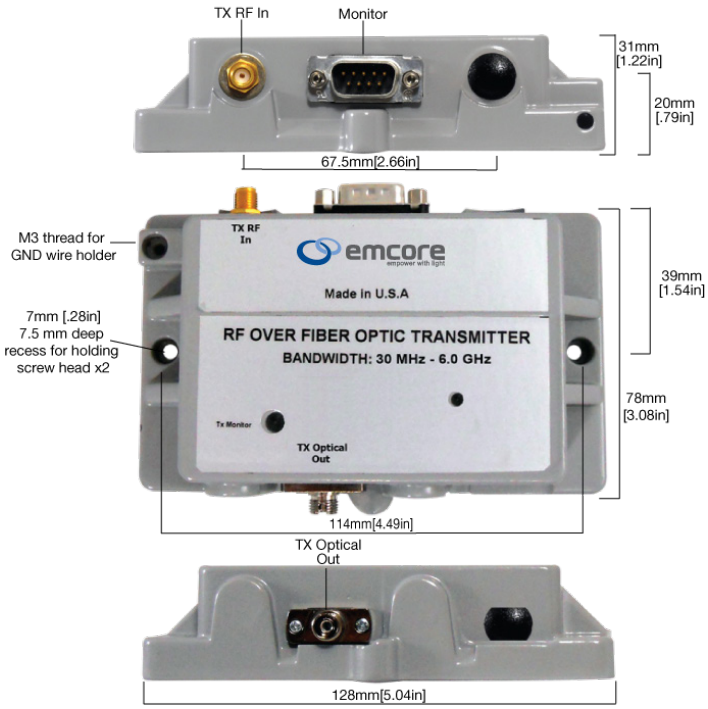


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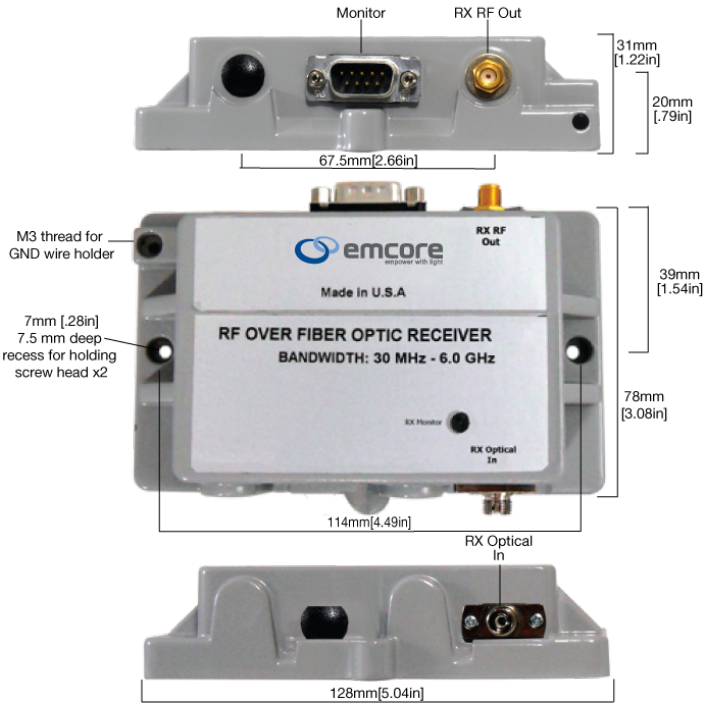
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Tx/Rx/TR Diagram

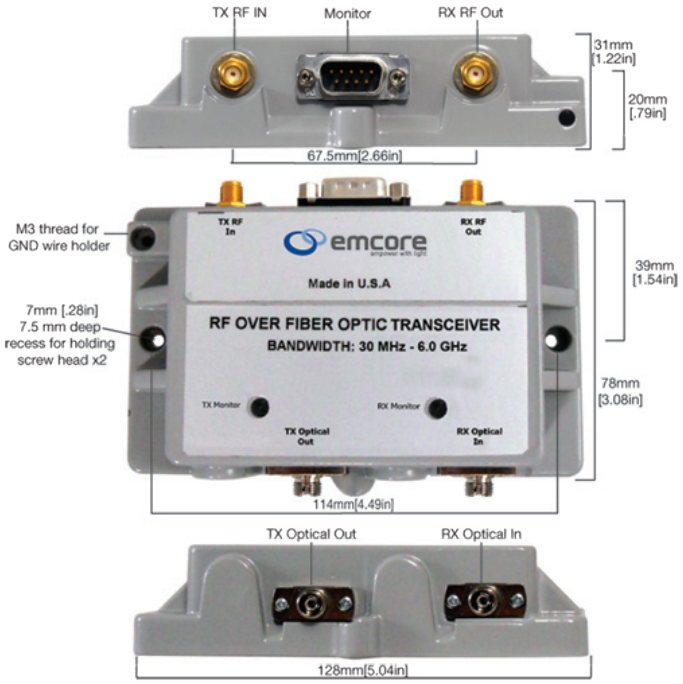
TRANSMITTER (TX)



RECEIVER (RX)



TRANSCEIVER (TR)



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Ordering Information

Transmitter (T)
FOL-WWTX / YY-ZZ-AA

- When ordering replace "WW" with one of the Frequency Band Option
- When ordering replace "X" with one of the Tx RF pre-Amplifier Options
- When ordering replace "YY" with one of the RF Connector Type Options
- When ordering replace "ZZ" with one of the Optical Wavelength Options
- When ordering replace "AA" with one of the Optical Connector Options

Model Series	Frequency Band (GHz) "WW"	TX Pre-Amplifier Options "X"	RF Connector Type Options " YY"	Optical Wavelength Options "ZZ"	Optical Connector Options "AA"
FOL - Fiber Optic Link	33 = 30 MHz - 3 GHz 36 = 30 MHz - 6 GHz	1 = no pre-Amp 2 = with pre-Amp	S5 = SMA (50 Ohm)	13= 1310 nm 47= 1470 nm 49 = 1490 nm 51= 1510 nm 53 = 1530 nm 55= 1550 nm 57 = 1570 nm 59= 1590 nm 61 = 1610 nm	SA = SC/APC FA = FC/APC

Receiver (R)
FOL-WWR/XX-YY

- When ordering replace "WW" with one of the Frequency Band Options
- When ordering replace "XX" with one of the RF Connector Type Options
- When ordering replace "YY" with one of the Optical Connector Options

Model Series	Frequency Band (GHz) "WW"	RF Connector Type Option "XX"	Optical Connector Options "YY"
FOL - Fiber Optic Link	33 = 30 MHz - 3 GHz 36 = 30 MHz - 6 GHz	S5 = SMA (50 Ohm)	SA = SC/APC FA = FC/APC

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Transceiver (TR)
FOL-WWTRX/YY-ZZ-AA

- When ordering replace "WW" with one of the Frequency Band Options
- When ordering replace "X" with one of the Tx RF pre-Amplifier Options
- When ordering replace "YY" with one of the RF Connector Type Options
- When ordering replace "ZZ" with one of the Optical Wavelength Options
- When ordering replace "AA" with one of the Optical Connector Options

Model Series	Frequency Band (GHz) "WW"	Tx pre-Amplifier Option "X"	RF Connector Type Option " YY"	Optical Wavelength Option "ZZ"	Optical Connector Options "AA"
FOL - Fiber Optic Link	33 = 30 MHz - 3 GHz 36 = 30 MHz - 6 GHz	1 = no pre-Amp 2 = with pre-Amp	S5 = SMA (50 Ohm)	13= 1310 nm 47= 1470 nm 49 = 1490 nm 51= 1510 nm 53 = 1530 nm 55= 1550 nm 57 = 1570 nm 59= 1590 nm 61 = 1610 nm	SA = SC/APC FA = FC/APC

MADE IN USA

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