



OLRT / OLRR-3000

Rugged L-Band Fiber Optic Link
500 - 3,000MHz
10 - 3,600MHz

INSTRUCTION MANUAL



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SAFETY WARNINGS



LASER RADIATION



The OLRT laser transmitter emits invisible radiation that can cause permanent eye damage. ***AVOID DIRECT EXPOSURE TO BEAM.*** Operate the transmitter only with the proper optical fiber installed in the transmitter optical connector. Power to the OLRT transmitter should be turned-off or preferably, disconnected whenever the optical connector cover is opened and there is no installed fiber (as when the fiber connector is being installed or removed from the transmitter connector).

NEVER USE ANY OPTICAL INSTRUMENT TO VIEW THE OUTPUT OF THE LASER TRANSMITTER. "OPTICAL INSTRUMENT" INCLUDES MAGNIFYING GLASSES, ETC.

NEVER LOOK INTO THE OUTPUT OF THE LASER TRANSMITTER

NEVER LOOK INTO THE OUTPUT OF A FIBER CONNECTED TO A LASER TRANSMITTER.

NEVER LOOK INTO OR USE ANY OPTICAL INSTRUMENT TO VIEW THE DISTANT END OF A FIBER THAT MAY BE CONNECTED DIRECTLY OR VIA AN OPTICAL SPLIT, TO A TRANSMITTER THAT MAY BE OPERATING. THIS SPECIFICALLY APPLIES TO FIBERS THAT ARE TO BE CONNECTED TO RECEIVERS (SUCH AS THE OLRR RECEIVER) OR OTHER DEVICES AT ANY DISTANCE FROM THE LASER TRANSMITTER.

SHOCK HAZARD

The OLRT/OLRR is designed for indoor use only. Direct exposure to moisture must be avoided.

GENERAL FEATURES

The OLRT L-Band fiber optic transmitter and the OLRR L-Band fiber optic receiver form the basic L-Band Fiber Distribution System. The wide bandwidth 500MHz to 3,000MHz or 10MHz to 3,600MHz allows for a wide variety of communications applications including L-Band satellite antenna remoting, trunking radio, telemetry tracking and time and frequency reference distribution. The extended frequency range to 3.6GHz allows this to accommodate additional transponders including European satellite communications applications. The enhanced bandwidth also facilitates stacked LNB applications to accommodate additional transponders containing enhanced DBS services (HDTV, local channels, etc.) over single-mode fiber for DBS distribution.

These stand-alone versions are designed for mounting in outdoor enclosures or in other small spaces. For powering, the stand-alone units both the transmitter and receiver can be powered via the wire leads or on the center of the coax connector.

RF PERFORMANCE

The specifications below are with 10dB link optical loss and >55dB optical return loss.

RF Frequency Range	500-3,000MHz or 10-3,600MHz
Amplitude Flatness (>50MHz)	± 1.5 dB for any 500MHz ± 0.35 dB for any 40 MHz
Return Loss	10dB
I/O Connector	F-Type Female (75 Ohm) Standard SMA, BNC (50 Ohm) Optional
Link Gain (High-Gain Receiver) @ 2GHz	-4 ± 5 dB
Noise Figure	See Table 1
Input 1 dB Compression	>-17dBm, see Figure 2
Input IP3	-9.5dBm Typical
Max. Total RF Power in	-14dBm

Typical NF vs. Rx Power	
Rx Optical In	Typical NF
(dBm)	(dB)
3	13
0	16
-3	20
-6	25
-9	30
-12	35
-15	40
-18	45

Table 1 - NF vs. Rx Power

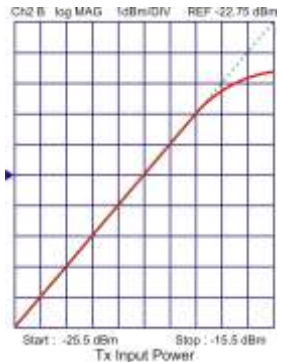


Figure 1 - P1dB Performance

OPTICAL PERFORMANCE

Optical Fiber	SM 9/125 μ m (Corning SMF-28 or Equivalent)
Tx/Rx Optical Return Loss	>55dB
Tx/Rx Optical Connector	FC/APC or SC/APC
Rx Wavelength	1270-1610nm
Rx Optical Input Power (PIN)	-15 to +3dBm
Rx Optical Input Power (APD)	-22 to -3dBm
Rx Alarm Standalone	Optical Input Power Low (Open Collector Output) Less than -15dBm (PIN), -22dBm (APD)

Tx Model #	-D5	-D4	-C4
Tx Laser Type	DFB	DFB	DFB/CWDM
Tx Output Power	5dBm	4dBm	4dBm
Tx Wavelength	1310	1550	1XX0
PIN Rx Link Optical Budget	2 to 20dB	1 to 19dB	1 to 19dB
APD Rx Link Optical Budget	9 to 27dB	8 to 26dB	8 to 26dB

XX= 47, 49, 51, 53, 55, 57, 59, 61 ITU-grid CWDM wavelengths.

DC POWERING AND ALARMS

The current requirements for the Tx and Rx units are as follows:

Input Voltage	8VDC	12VDC	15VDC	18VDC	24VDC
Tx	250mA	170mA	135mA	115mA	85mA
Rx	200mA	150mA	120mA	100mA	70mA

CAUTION!

The Tx & Rx have flying leads which carry DC inputs and alarms. Any unused wires should be wrapped with electrical tape to avoid shorting that could damage the unit.

The Tx & Rx have built in bias-T for remote powering of an LNB for the Tx or could be used to power the Tx & Rx though the RF connector. This feature can be enabled or disabled (Factory Preset) by moving the internal jumper JP1, see Figures 2 & 3. The Tx & Rx is powered by the Red Wire; +8V_{DC} to +24 V_{DC} and the Black Wire; ground or "-". The flying cable also has a shield wire that can be grounded to shield any external signals.

The Rx also has a Brown or White Wire that is an Open Collector Low Optical Level Alarm. It pulls low when the optical level falls below an acceptable level.

Flying Lead Signal Description:

COLOR	Tx/Rx	SIGNAL DESCRIPTION
Red	Tx	DC Input, 8-24 V _{DC}
Black	Tx	Ground, DC Return
Silver	Tx	Shield, Shield wire, connect to Ground
Red	Rx	DC Input, 8-24 V _{DC}
Black	Rx	Ground, DC Return
Silver	Rx	Shield, Shield wire, connect to Ground
Brown or White	Rx	Open Collector Output/Low Rcvd Optical Power

INSTALLATION

Optical Connectors

Only APC type connectors in the product. Most installation problems are caused by the use of the wrong type of mating optical connector. Be sure that all mating optical connectors are APC type. They are usually green. Mating to a PC or UPC type will result in poor to no performance. PC or UPC connectors sometimes have a blue marking.

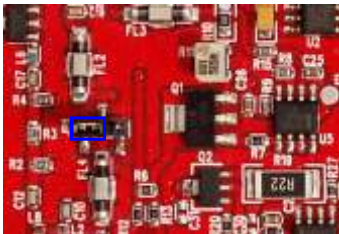


Figure 2 - Tx JP1 Location Shunt Shown in the LNB Power *Disabled* Position (Factory Default)

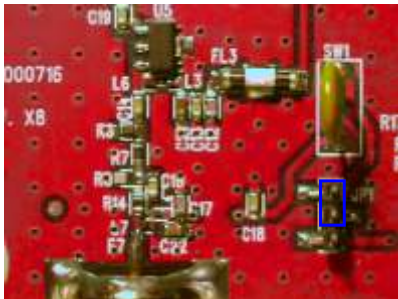


Figure 3 - Rx JP1 Location Shunt Shown in the LNB Power *Disabled* Position (Factory Default)

Cleaning Optical Connectors

Fiber optic connectors on the cable come pre-terminated should be clean and capped, so one can usually remove the cap and make the connection without cleaning the connector, but, if there is any doubt it is good practice to clean the optical connectors before making the connection. Once the connection is made, there should be no need clean the connector as long as the connector remains connected.

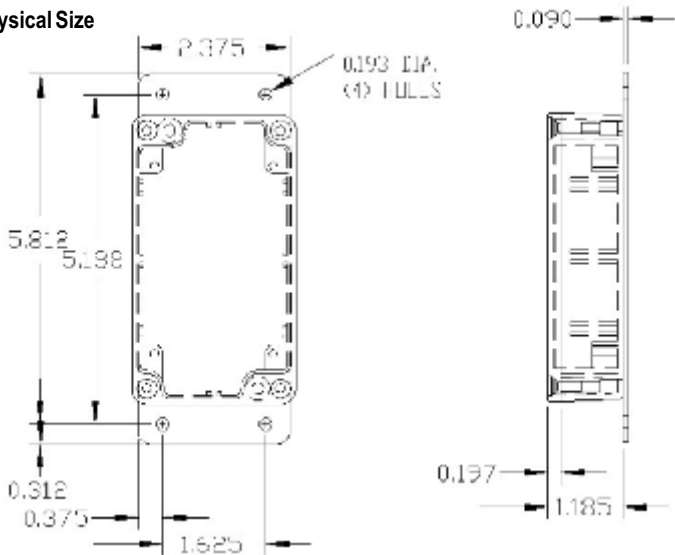
The fiber ends can be damaged by the insertion of contaminated connectors. Some types of customer damage to connectors are not covered under warranty. Fiber connectors should never be left uncovered. Pre-packaged alcohol wipes are a convenient means of cleaning optical connectors. Clean alcohol and lint free wipes, such as Kim-Wipe type 34155, or swabs may also be used.

More sophisticated fiber optic connector cleaners, such as the Senko SmartCleaner (SCK-SC-250) are very effective for cleaning external and internal fiber optic connectors.



Senko SmartCleaner

Physical Size



Mount modules to enclosure using #8 screws and split lock washers. Mount the modules with the RF and Optical connectors mounted down to prevent moisture from entering. For a watertight seal, pot the optical connectors with RTV. If the enclosure provides enough water protection you can skip this step. There are no user adjustments on modules. To optimize Tx RF input, external amplifiers or attenuators may be required.

- * Connect the optical fiber to both the transmitter and receiver. Insure the optical input to the receiver is within the specified range.
- * Verify the proper RF level out of the LNB and connect the LNB output to the RF input of the transmitter
- * Connect the RF out of the receiver to the distribution amplifier or TV set top receiver
- * Apply power to both modules, the system should now be operational as there are no user adjustments required on the modules (*NOTE: Applying power before RF connections are made, may damage the unit.*)

ORDERING INFORMATION

Tx Model Number

OLRT-D3013-D5-FA	500MHz-3GHz Tx, 1310nm, +5dBm/3mW DFB, 75Ω, FC/APC
OLRT-D3013-D5-50-FA	500MHz-3GHz Tx, 1310nm, +5dBm/3mW DFB, 50Ω, FC/APC
OLRT-D3013-D5-SA	500MHz-3GHz Tx, 1310nm, +5dBm/3mW DFB, 75Ω, SC/APC
OLRT-D3013-D5-50-SA	500MHz-3GHz Tx, 1310nm, +5dBm/3mW DFB, 50Ω, SC/APC
OLRT-D3015-D4-FA	500MHz-3GHz Tx, 1550nm, +4dBm/2.5mW DFB, 75Ω, FC/APC
OLRT-D3015-D4-50-FA	500MHz-3GHz Tx, 1550nm, +4dBm/2.5mW DFB, 50Ω, FC/APC
OLRT-D3015-D4-SA	500MHz-3GHz Tx, 1550nm, +4dBm/2.5mW DFB, 75Ω, SC/APC
OLRT-D3015-D4-50-SA	500MHz-3GHz Tx, 1550nm, +4dBm/2.5mW DFB, 50Ω, SC/APC
OLRT-D30xx-C4-FA	500MHz-3GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 75Ω, FC/APC
OLRT-D30xx-C4-50-FA	500MHz-3GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 50Ω, FC/APC
OLRT-D30xx-C4-SA	500MHz-3GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 75Ω, SC/APC
OLRT-D30xx-C4-50-SA	500MHz-3GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 50Ω, SC/APC
OLRT-X3613-D5-FA	10MHz-3.6GHz Tx, 1310nm, +5dBm/3mW DFB, 75Ω, FC/APC
OLRT-X3613-D5-50-FA	10MHz-3.6GHz Tx, 1310nm, +5dBm/3mW DFB, 50Ω, FC/APC
OLRT-X3613-D5-SA	10MHz-3.6GHz Tx, 1310nm, +5dBm/3mW DFB, 75Ω, SC/APC
OLRT-X3613-D5-50-SA	10MHz-3.6GHz Tx, 1310nm, +5dBm/3mW DFB, 50Ω, SC/APC
OLRT-X3615-D4-FA	10MHz-3.6GHz Tx, 1550nm, +4dBm/2.5mW DFB, 75Ω, FC/APC
OLRT-X3615-D4-50-FA	10MHz-3.6GHz Tx, 1550nm, +4dBm/2.5mW DFB, 50Ω, FC/APC
OLRT-X3615-D4-SA	10MHz-3.6GHz Tx, 1550nm, +4dBm/2.5mW DFB, 75Ω, SC/APC
OLRT-X3615-D4-50SA	10MHz-3.6GHz Tx, 1550nm, +4dBm/2.5mW DFB, 50Ω, SC/APC
OLRT-X36xx-C4-FA	10MHz-3.6GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 75Ω, FC/APC
OLRT-X36xx-C4-50-FA	10MHz-3.6GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 50Ω, FC/APC
OLRT-X36xx-C4-SA	10MHz-3.6GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 75Ω, SC/APC
OLRT-X36xx-C4-50-SA	10MHz-3.6GHz Tx, 1xx0nm, 4dBm/2.5mW CWDM DFB, 50Ω, SC/APC

where xx = 47, 49, 51, 53, 55, 57, 59 or 61

Rx Model Number

OLRR-X3600-HG-FA	10MHz-3.6GHz Rx, PIN Detector, -15 to +3dBm Input, 75Ω, FC/APC
OLRR-D3000-HG-SA	500MHz-3GHz Rx, PIN Detector, -15 to +3dBm Input, 75Ω, SC/APC
OLRR-X3600S-HG-FA	10MHz-3.6GHz Rx, APD Option, -22 to -3dBm Input, 75Ω, FC/APC
OLRR-D3000S-HG-SA	500MHz-3GHz Rx, APD Option, -22 to -3dBm Input, 75Ω, SC/APC

PS Model Number

Model OTPS-12A	Power Supply, Universal AC Input, +12 V _{DC} , 1.5A Output
Model OTPS-18A	Power Supply, Universal AC Input, +18 V _{DC} , 1.0A Output