Optiva OTS-1LC 3 GHz CWDM Wideband Fiber Optic Link

ORTEL®
A Photonics Foundries Enterprise

DATASHEET | JANUARY 2024 SATCOM

Applications

- Satellite Antenna Signal Transport
- DBS Antenna Signal Distribution
- Interfacility Signal Transport

Features

- 50 MHz to 3 GHz Optimized for IF, L- and S-Band Satellite Signals
- Supports 50 km Links
- Supports 8-Channel CWDM
- 30 dB Tx and Rx Adjustable Gain Range
- Peak Optimizer for Quick and Easy Setup
- SmartGain for Enhanced AGC Performance
- 50 Ohm SMA, BNC, and 75 Ohm BNC
- Tx & Rx RF Power Monitors via LED, SMA & SNMP
- SNMP Monitoring and Control
- Optically-Isolated Uncooled DFB Lasers
- Fits in Optiva Enclosures – 16, 6, 2, & 1 Slot Enclosures Available
- CE & CSA Certified, RoHS Compliant

The Optiva OTS-1LC CWDM Wideband Fiber Optic Link is optimized to provide transparent IF, L- and S-Band signal transport and to perform in the 50 MHz to 3 GHz frequency range for satellite antenna and interfacility applications.

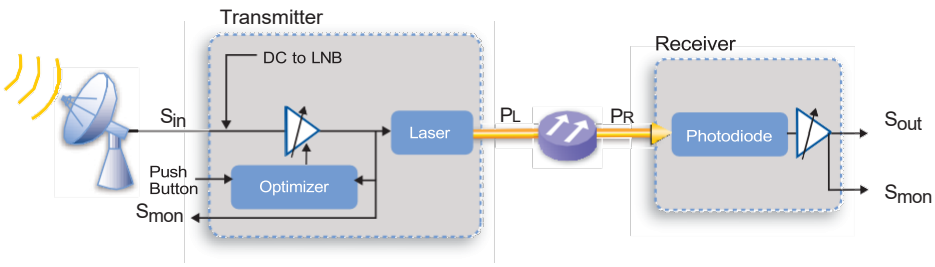
Optiva satellite and microwave transmitters and receivers are SNMP compliant. They can be housed in the same chassis and monitored by the same Network Management System (NMS) to provide multiple frequency transport in a single flexible platform.

System Design

The Optiva platform includes a wide range fiber optic transport products for satellite and microwave communications from 1 MHz to 40 GHz. These units can be used to construct transparent inter- and intra-facility links from 1 meter to >100 km for RF and microwave signal transport, antenna remoting, video transport, electronic warfare systems and other high-dynamic-range applications.

Optiva is a completely modular, hot-swappable platform. Both 19” rack-mount and compact tabletop, or wall-mountable enclosures are available. The 3 RU 19” rack- mount, fan-cooled enclosures (Model OT-CC-16 and OT-CC-16F) can support up to 16 insert cards and utilize two dual-redundant, hot-swappable, 200 watt power supplies. The 1 RU 19” rack-mount, fan-cooled enclosure (Model: OT-CC-6-1U) can accommodate 6 insert cards and utilizes two hot-swappable 60 watt power supplies. Compact one-slot (OT-DTCR-1), or two-slot (OT-DTCR-2) enclosures are also available that use an external wall-mount power supply.

Block Diagram



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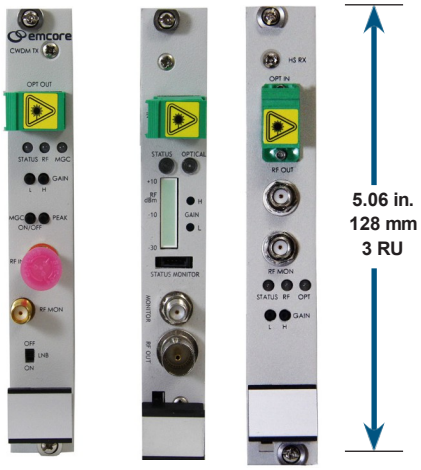
Performance Highlights

	Parameter	Min	Typical	Max	Units
Link[1]	Frequency Range 50 Ohm 75 Ohm	 50 50	 - -	 3000 2500	 MHz MHz
	Frequency Response Any 36 MHz 50-3000 MHz (50 Ohm), 50-2500 MHz (75 Ohm)	 - -	 +/- 0.2 +/- 2.0	 - -	 dB dB
	Noise Figure (TG max, RG max, 1.5 GHz)	-	20	-	dB
	Input IP3 (TG max, 1.5 GHz)	-	-5	-	dBm
	Spur Free Dynamic Range[6]	-	100	-	dB/Hz$^{2/3}$
	RF Link Gain (TG max, RG max)[3] Standard Rx (OTS-1LR) Hi-Sensitivity Rx (OTS-1LSR)	 - -	 25 32	 - -	 dB
Tx	RF Input within Smart Gain Control (SGC) range[2] RF Input without SGC	- < -50[7] (T Gmax)	0 to -35 -	- 10 (TG min)	dBm dBm
	Tx Gain (TG) max, 1.5 GHz	-2	5	-	dB (W/A)
	TG Adjustment Range (from max)	-	-	30	dB
	Optical Output	3	6	-	dBmo
	Wavelength	1270	-	1610	nm
	Input Return Loss 50-3000 MHz (50 Ohm), 50-2500 MHz (75 Ohm)	 10	 14	 -	 dB
	DC Power LNB Off	 -	 12 380	 - 430	 V mA
Rx	Optical Input Standard Rx (OTS-1LR) Hi-Sensitivity Rx (OTS-1LSR)	 -20[4] -25[4]	 - -	 9 5	 dBmo dBmo
	Rx Gain (RG) max, 1.5 GHz Standard Rx (OTS-1LR) Hi-Sensitivity Rx (OTS-1LSR)	 20 25	 22 29	 - -	 dB (A/W) dB (A/W)
	RG Adjustment Range (from max)	-	-	30	dB
	Output IP3 (5 dBmo to Rx, 0 dBm 2150 MHz)	23	25	-	dBm
	RF Output (-35 dBm input, TG max, 1 dBmo to Rx) Standard Rx High Sensitivity Rx	 - -	 -16 -9	 - -	 dBm dBm
	Output Return Loss 50-3000 MHz (50 Ohm), 50-2500 MHz (75 Ohm)	 10	 14	 -	 dB
	DC Power	 - -	 12 260	 300	 V mA

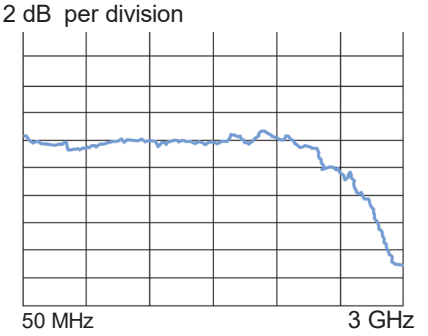
1. For link over 1 m fiber
2. Wider RF inputs are acceptable, but will set the RF amp gain to its limit
3. Link RF Gain$_{dB}$ = TG + RG – 2 * Fiber Loss$_{dBo}$ (assumes Rin = Rout)
4. Minimum optical input to maintain 35 dB C/N on 36 MHz RF carrier over 1 m fiber
5. Performance at ambient temperature (unless specified otherwise)
6. SFDR = 2/3 * (IIP3 + 174 - NF)
7. Some speicifications in the table may degrade when operating at low input

OTS-1L (Tx & Rx)

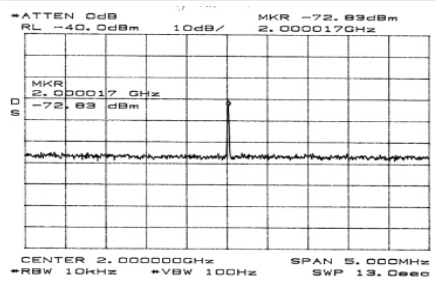


Tx OTS-1LCT | **Rx** Standard (OTS-1LR) | **Rx** High Sensitivity (OTS-1LSR)

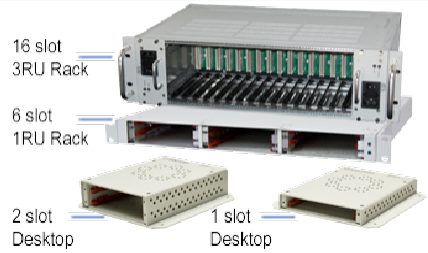
Typical S21



Typical Output @ -100 dBm Input



Enclosure Options



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Absolute Maximum Rating*

Parameter	Min	Max	Unit
Operating Temperature	-20	60	°C
Max Tx RF Input (TG min)	-	+15	dBm
Max Rx Optical Input	-	+10	dBmo

*Damage may occur beyond these limits

CWDM Channel Assignment

Channel	nm
47	1470
49	1490
51	1510
53	1530 *
55	1550 *
57	1570
59	1590
61	1610

* Wavelength can be passed through an EDFA.
Channels 35 (1350) & 37 (1370) omitted due to water peaking effect.

Ordering Information

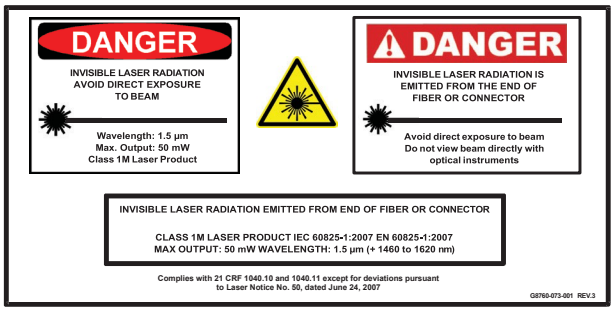
Product Code	Specifications
OTS-1LCT/S5-XX06-SA-IC	Transmitter, 50-3000 MHz, SMA 50 ohm, CWDM Channel XX, 6 dBm, SC/APC
OTS-1LCT/B5-XX06-SA-IC	Transmitter, 50-3000 MHz, BNC 50 ohm, CWDM Channel XX, 6 dBm, SC/APC
OTS-1LCT/B7-XX06-SA-IC	Transmitter, 50-2500 MHz, BNC 75 ohm, CWDM Channel XX, 6 dBm, SC/APC
OTS-1LT1/S5-1306-SA-IC	Transmitter, 50-3000 MHz, SMA 50 ohm, 1310 nm, 6 dBm, SC/APC
OTS-1LT1/B5-1306-SA-IC	Transmitter, 50-3000 MHz, BNC 50 ohm, 1310 nm, 6 dBm, SC/APC
OTS-1LT1/B7-1306-SA-IC	Transmitter, 50-2500 MHz, BNC 75 ohm, 1310 nm, 6 dBm, SC/APC
OTS-1LR/S5-SA-IC	Receiver, 50-3000 MHz, SMA 50 ohm, SC/APC
OTS-1LR/B5-SA-IC	Receiver, 50-3000 MHz, BNC 50 ohm, SC/APC
OTS-1LR/B7-SA-IC	Receiver, 50-2500 MHz, BNC 75 ohm, SC/APC
OTS-1LSR/S5-SA-IC	Receiver, Hi-Sensitivity, 50-3000 MHz, SMA 50 ohm, SC/APC
OTS-1LSR/B5-SA-IC	Receiver, Hi-Sensitivity, 50-3000 MHz, BNC 50 ohm, SC/APC
OTS-1LSR/B7-SA-IC	Receiver, Hi-Sensitivity, 50-2500 MHz, BNC 75 ohm, SC/APC
OPV-CTLR-IC	NMS SNMP Controller Card, MIB, EmcoreView GUI for Optiva Family
OTP-1ETR-A2/A2	Optical Transceiver 1CH, Ethernet, SM, Dual LC -- See OTP-1E datasheet
OT-CC-16F-XXX	Chassis, Rack-Mount, 16-Slot, 3 RU -- See OT-CC-16F datasheet
PS-200F-XX	Power Supply, 12 VDC, 100 to 240 VAC, 50/60 Hz. - See PS-200F datasheet
OT-CC-6-XX	Chassis, Rack-Mount, 6-Slot, 1RU -- See OT-CC-6 datasheet
OT-DTCR-1 / OT-DTCR-2	Chassis, Flange-Mount, w/Power Supply, 1 slot / 2 slot

Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1M laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All versions of this laser are Class 1M laser product, tested according to IEC 60825-1:2007 / EN 60825-1:2007. An additional warning for Class 1M laser products. For diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example: eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. For collimated beams, this warning shall state that viewing the laser output with certain instruments designed for use at a distance (for example: telescopes and binoculars) may pose an eye hazard.

Wavelength = 1.3/1.5 µm.

Maximum power = 30 mW.



*Caution - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

*IEC is a registered trademark of the International Electrotechnical Commision.

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