Optoelectronics

Laser Link®
Modular 1550 nm Transmitters

Description

The Laser Link® Modular 1550 nm Optical Transmitters are part of an advanced transmission system designed to optimize network architectures and increase reliability, scalability, and cost effectiveness.

The Laser Link 1550 nm Transmitter Family includes the Externally Modulated Transmitter (LEMT), Narrowcast Transmitter (LLNT), and Narrowcast Return Transmitter (LLNTR). These 1550 nm transmitters are designed to operate over a wide range of optical output powers and loss budgets, delivering both analog and digital signals.

The 1550 nm LEMT applications include supertrunking, hub interconnects, broadcast transmission portion of DWDM architecture and 1310/1550 nm overlays. The LLNT converts input RF narrowcast signal in the 50-870 MHz frequency range to an optical output with a discrete ITU grid wavelength. Multiple outputs of LLNT products (20 currently) may then be transmitted over a single fiber through utilization of wave division multiplexing. The LLNTR converts RF signal inputs in the 5-210 MHz frequency range to an optical output with a discrete ITU grid wavelength. LLNTR outputs of differing wavelengths may then be combined for amplification and transport over a DWDM system.

LEMT Transmitter

LLNT Narrowcast Transmitter

Common Features

- Full-width modules; seven transmitters in a 5 RU chassis
- User adjustable RF input drive power and RF input test point
- Multiple primary/redundant powering options
- Simple implementation and operation
- Excellent link performance
- Allows for simple optimization and configuration
- Network management (status monitoring) ready
- Front panel fiber interface

LEMT Features

- Dual +10 dBm outputs
- Outstanding Stimulated Brillouin Scattering (SBS) suppression
- Front panel LCD and status LEDs indicate module condition and simplify troubleshooting
- Low RIN source Laser
- Automatic gain control (AGC) available
- 870 MHz input bandwidth

LLNT/LLNTR Features

- Cost-effective targeted service solution
- Directly modulated DFB laser sources
- Front panel optical test points
- Wavelength on ITU grid
- Front panel LEDs indicate module condition and simplify troubleshooting

LLNTR Narrowcast Return Transmitter

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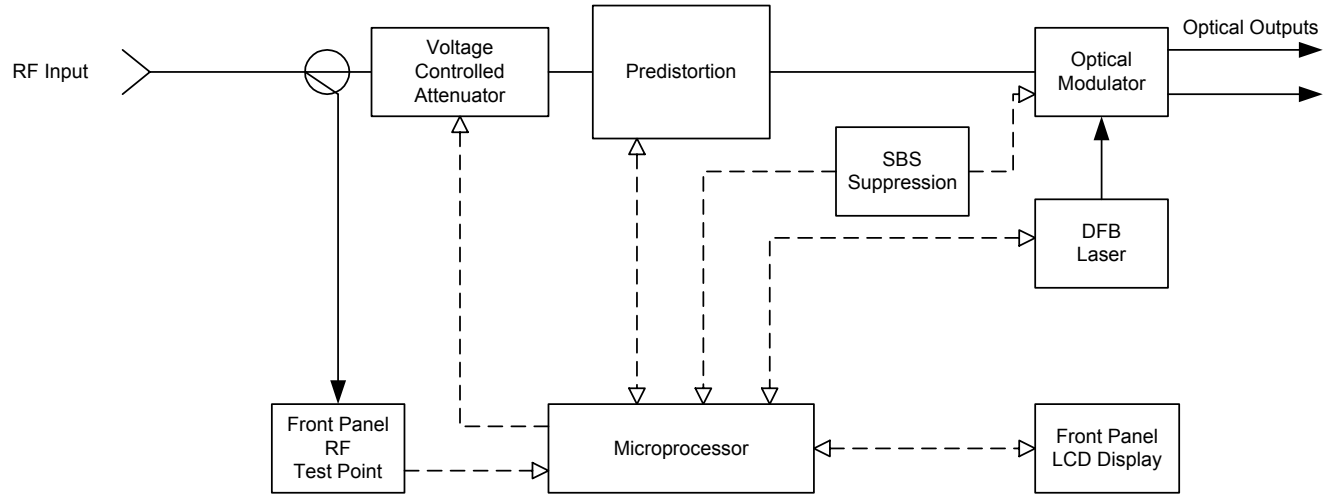
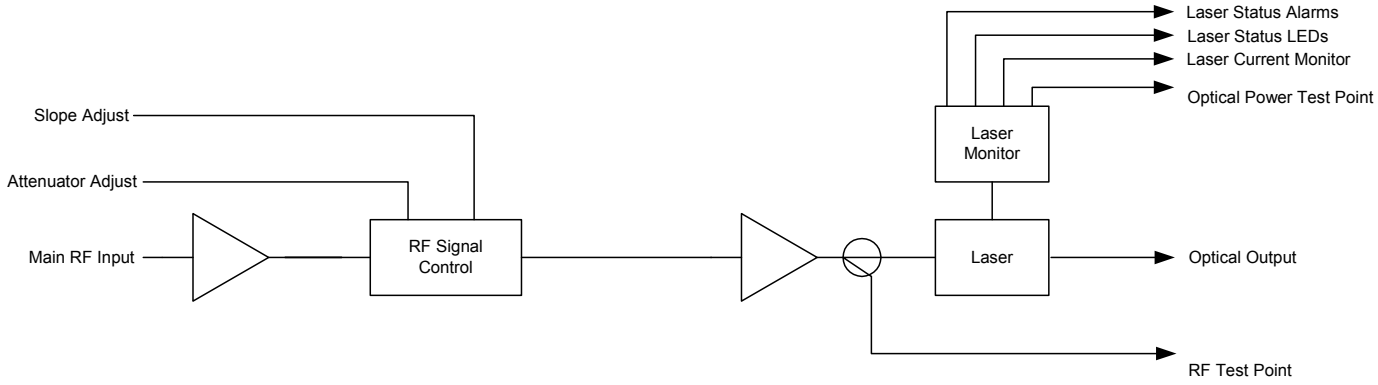
Block Diagrams

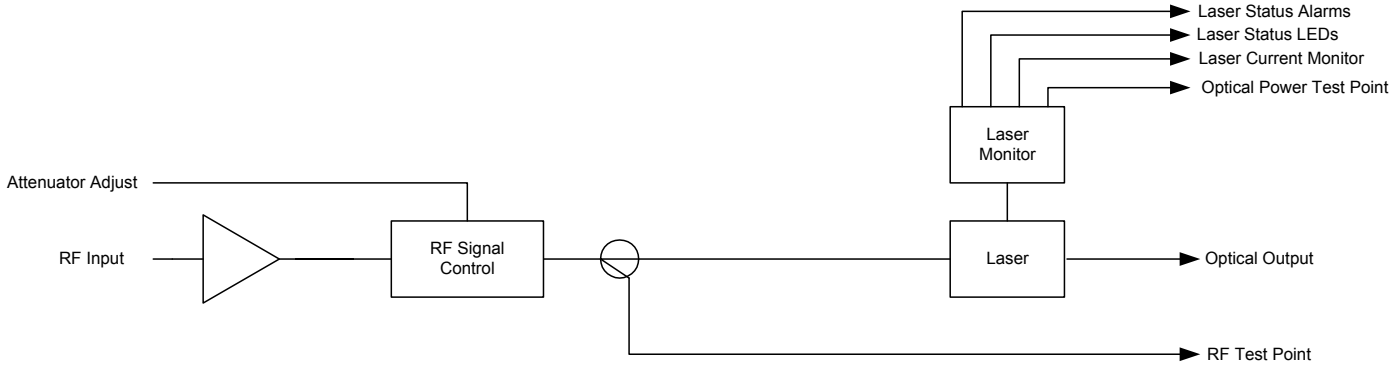
LEMT 870 MHz Forward Transmitter



LLNT 870 MHz Narrowcast Transmitter



LLNTR 210 MHz Narrowcast Return Transmitter



Laser Link Modular 1550 nm Transmitters

Specifications

Optical	Units	LEMT Premium	LEMT Standard	LEMT Industrial	LLNT Narrowcast	LLNTR Reverse	Notes
Wavelength Range Options	nm	1544 - 1546	1544 - 1546 1554.94	1544 - 1546	1530-1561	1530-1561	
Connector Type SC/APC		Std.	Std.	Std.	Std.	Std.	
Output Power Options (minimum)	dBm	>9.5	>9.5	>9.5	10 ± 1	9.5 ± 1	
Modulation Type		External	External	External	Direct	Direct	
SBS Threshold	dBm	18	16	16	≥ rated output	≥ rated output	
Electrical	**Units**	**LEMT Premium**	**LEMT Standard**	**LEMT Industrial**	**LLNT Narrowcast**	**LLNTR Reverse**	**Notes**
Bandwidth	MHz	45 - 870	45 - 870	45 - 870	45 - 870	5 - 210	
RF input Level (dBmV/Channel)					17	32	1
RF Input Level (per Channel)							
Manual Mode							
110 NTSC	dBmV	15 ±1	15 ±1	15 ±1	n/a	n/a	
99 PAL	dBmV	16 ±1	16 ±1	16 ±1	n/a	n/a	
78 NTSC	dBmV	17 ±1	17 ±1	17 ±1	n/a	n/a	
64 PAL B/G	dBmV	18 ±1	18 ±1	18 ±1	n/a	n/a	
59 PAL D/K	dBmV	18.5 ±1	18.5 ±1	18.5 ±1	n/a	n/a	
40 NTSC	dBmV	20 ±1	20 ±1	20 ±1	n/a	n/a	
AGC Mode							
110 NTSC	dBmV	20 ±5	20 ±5	20 ±5	n/a	n/a	
99 PAL	dBmV	21 ±5	21 ±5	21 ±5	n/a	n/a	
78 NTSC	dBmV	22 ±5	22 ±5	22 ±5	n/a	n/a	
64 PAL B/G	dBmV	23 ±5	23 ±5	23 ±5	n/a	n/a	
59 PAL D/K	dBmV	23.5 ±5	23.5 ±5	23.5 ±5	n/a	n/a	
40 NTSC	dBmV	25 ±5	25 ±5	25 ±5	n/a	n/a	
Level Adjustment	dB	-7 to 2.5	-7 to 2.5	-7 to 2.5	0 to -4	-8 to 2	2
Slope Adjustment	dB	n/a	n/a	n/a	0 to -4	n/a	
RF Input Return Loss							
5 MHz-210 MHz	dB	n/a	n/a	n/a	n/a	≥ 18	
50 - 550 MHz	dB	≥ 16	≥ 16	≥ 16	≥ 16		
550 - 870 MHz	dB	≥ 16	≥ 16	≥ 16	≥ 14		
Frequency Response							
5 MHz-210 MHz	dB	n/a	n/a	n/a	n/a	± 0.75	
45 MHz - 870 MHz	dB	± 0.75	± 0.75	± 0.75	± 0.75	n/a	
Power Consumption (maximum)	W DC	40	40	40	20.4	20.4	
Environmental	**Units**	**LEMT Premium**	**LEMT Standard**	**LEMT Industrial**	**LLNT Narrowcast**	**LLNTR Reverse**	**Notes**
Temperature Range (operational)	°C °F	0 - 50 32 - 122	0 - 50 32 - 122	0 - 50 32 - 122	0 - 50 32 - 122	0 - 50 32 - 122	
Humidity	%	95	95	95	95	95	
Mechanical							
Physical Dimensions							
Depth	in. cm	13.5 34.3	13.5 34.3	13.5 34.3	13.5 34.3	13.5 34.3	
Width	in. cm	2.17 5.5	2.17 5.5	2.17 5.5	2.17 5.5	2.17 5.5	
Height	in. cm	5.25 13.3	5.25 13.3	5.25 13.3	5.25 13.3	5.25 13.3	
Weight	lb kg	5.0 2.27	5.0 2.27	5.0 2.27	2.9 1.3	2.9 1.3	

Notes:

1. Optical modulation depth = 10% per channel
2. EMT level adjustment through LCD display or element management

Laser Link Modular 1550 nm Transmitters

Specifications, continued

Externally Modulated Broadcast Transmitters (LEMT)

		Premium	Standard	Standard	Industrial	Notes
Link Performance (min)	Units	78 NTSC 64 PAL B/G 59 PAL D/K	78 NTSC 64 PAL B/G 59 PAL D/K	40 NTSC	64 PAL B/G 59 PAL D/K	
CSO	dBc	-67	-65	-70	-65	
CTB	dBc	-67	-65	-70	-65	
XMOD	dB	-67	-65	-70	-65	
CNR	dB	54.5	53.5	56.5	51.5	1,2
CNR (60Km)	dB	53	52	55	50	1,3,4
CNR (100Km)	dB	51	50	53	48	1,3,5

Notes:

1. Optical receiver equivalent input noise density is 8 pA/Hz
2. Transmitter followed by an optical attenuator followed by an optical receiver; attenuator is adjusted for 0 dBm received optical power
3. Erbium Doped Fiber Amplifier (EDFA) noise figure 5.0 dB Maximum
4. Transmitter followed by EDFA, a single-mode fiber, an optical attenuator and optical receiver
5. Transmitter followed by an EDFA, a single-mode fiber, an EDFA, a single-mode fiber, an optical attenuator and optical receiver

Narrowcast transmitter (Forward and Return)

Distortion Performance		CNR (dB)	CSO (dBc)	CTB(dBc)	Notes
Forward (NT)	dBc	50	-59	-49	1,2,3
Return (NTR)	dBc	50	-49	-60	1,4,5

Notes:

1. Optical modulation depth = 10% per channel
2. Link budget of 18 dB: 4 passive 14 dB (60 km) standard fiber; Receiver: LLFR forward receiver
3. 8 channel CW measurement: channels 79-86
4. Optical path: 8 dB fiber, 6 dB passive, Receiver: ELLRR-S reverse receiver
5. 6 CW carriers: 7, 13, 19, 25, 31 and 37 MHz

Laser Link Modular 1550 nm Transmitters

Ordering Information

1550 EMT Transmitters (LEMT)

Description	Model Number	Part Number
Transmitter, Modular, 870 MHz, 1550 nm, Premium Performance, NTSC Channel Loading, Dual Output Units, SC/APC	LEMT-P-10	253877
Transmitter, Modular, 870 MHz, 1550 nm, Standard Performance, NTSC Channel Loading, Dual Output Units, SC/APC	LEMT-S-10	253878
Transmitter, Modular, 870 MHz, 1550 nm, Premium Performance, PAL Channel Loading, Dual Output Units, SC/APC	LEMT-P-10	254178
Transmitter, Modular, 870 MHz, 1550 nm, Standard Performance, PAL Channel Loading, Dual Output Units, SC/APC	LEMT-S-10	254179
Transmitter, Modular, 870 MHz, 1550 nm, Industrial Performance, PAL Channel Loading, Dual Output Units, SC/APC	LEMT-I-10	254180
Transmitter, Modular, 870 MHz, 1550 nm, Premium Performance, 40 High NTSC Channel Loading, Dual Output Units, SC/APC	LEMT-S-10	254347
Transmitter, Modular, 870 MHz, 1550 nm, Standard Performance, 40 Low NTSC Channel Loading, Dual Output Units, SC/APC	LEMT-S-10	254348
Transmitter, Modular, 870 MHz, 1550 nm, Standard Performance, NTSC Channel Loading, Dual Output Units, SC/APC, ITU 28 (1554.94 nm)	LEMT-S-10	4002982

Note: Additional connector options are available; please contact a sales representative for more information

1550 Narrowcast Transmitters (LLNT)

Description	Wavelength	Part Number
Transmitter, Directly Modulated 1550 nm, 870 MHz	1560.61 nm	253263
Transmitter, Directly Modulated 1550 nm, 870 MHz	1558.98 nm	253262
Transmitter, Directly Modulated 1550 nm, 870 MHz	1557.36 nm	253261
Transmitter, Directly Modulated 1550 nm, 870 MHz	1555.75 nm	253260
Transmitter, Directly Modulated 1550 nm, 870 MHz	1554.13 nm	253259
Transmitter, Directly Modulated 1550 nm, 870 MHz	1552.52 nm	253258
Transmitter, Directly Modulated 1550 nm, 870 MHz	1550.92 nm	253257
Transmitter, Directly Modulated 1550 nm, 870 MHz	1549.32 nm	R253256
Transmitter, Directly Modulated 1550 nm, 870 MHz	1547.72 nm	R254699
Transmitter, Directly Modulated 1550 nm, 870 MHz	1546.12 nm	R254698
Transmitter, Directly Modulated 1550 nm, 870 MHz	1544.53 nm	254697
Transmitter, Directly Modulated 1550 nm, 870 MHz	1542.94 nm	254696
Transmitter, Directly Modulated 1550 nm, 870 MHz	1539.77 nm	R253797
Transmitter, Directly Modulated 1550 nm, 870 MHz	1538.19 nm	253801
Transmitter, Directly Modulated 1550 nm, 870 MHz	1536.61 nm	R253805
Transmitter, Directly Modulated 1550 nm, 870 MHz	1535.04 nm	253809
Transmitter, Directly Modulated 1550 nm, 870 MHz	1533.47 nm	R253813
Transmitter, Directly Modulated 1550 nm, 870 MHz	1531.90 nm	253817
Transmitter, Directly Modulated 1550 nm, 870 MHz	1530.33 nm	253821

Ordering Information, continued

1550 Narrowcast Return Transmitters (LLNTR)

Description	Wavelength	Part Number
Reverse Transmitter, Directly Modulated, 5-210 MHz	1560.61 nm	253296
Reverse Transmitter, Directly Modulated, 5-210 MHz	1558.98 nm	253297
Reverse Transmitter, Directly Modulated, 5-210 MHz	1557.36 nm	253298
Reverse Transmitter, Directly Modulated, 5-210 MHz	1555.75 nm	253299
Reverse Transmitter, Directly Modulated, 5-210 MHz	1554.13 nm	253300
Reverse Transmitter, Directly Modulated, 5-210 MHz	1552.52 nm	253301
Reverse Transmitter, Directly Modulated, 5-210 MHz	1550.92 nm	253302
Reverse Transmitter, Directly Modulated, 5-210 MHz	1549.32 nm	253303
Reverse Transmitter, Directly Modulated, 5-210 MHz	1547.72 nm	253745
Reverse Transmitter, Directly Modulated, 5-210 MHz	1546.12 nm	253749
Reverse Transmitter, Directly Modulated, 5-210 MHz	1544.53 nm	253753
Reverse Transmitter, Directly Modulated, 5-210 MHz	1542.94 nm	253757
Reverse Transmitter, Directly Modulated, 5-210 MHz	1541.35 nm	R253761
Reverse Transmitter, Directly Modulated, 5-210 MHz	1539.77 nm	253765
Reverse Transmitter, Directly Modulated, 5-210 MHz	1538.19 nm	R253769
Reverse Transmitter, Directly Modulated, 5-210 MHz	1536.61 nm	253773
Reverse Transmitter, Directly Modulated, 5-210 MHz	1535.04 nm	253777
Reverse Transmitter, Directly Modulated, 5-210 MHz	1533.47 nm	253781
Reverse Transmitter, Directly Modulated, 5-210 MHz	1531.90 nm	253785
Reverse Transmitter, Directly Modulated, 5-210 MHz	1530.33 nm	253789

Laser Link products include some of the industry's most complete range of high performance optical components:

	For more information please refer to:
1310 nm Transmitters	Laser Link Data Sheet Part Number 7001673
1550 nm Transmitters	Laser Link Data Sheet Part Number 7001674
1550 nm Optical Amplifiers	Laser Link Data Sheet Part Number 7001675
Receivers	Laser Link Data Sheet Part Number 7001676
Ancillary Modules	Laser Link Data Sheet Part Number 7001677
Main Frame	Laser Link Data Sheet Part Number 7001678

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