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LaserPlus: HFC 1310nm DFB Transmitter (LP-OT-H)

1 GHz HIGH DENSITY COMPACT CATV OPTICAL TRANSMISSION SYSTEM

Features / Benefits

- **High Power** design facilitates traditional **"Blast-and-Split"** topologies using 1:x ratio (transmitter-to-multiple node) **Hybrid Fiber Coax (HFC)** broadcast architectures
- **8dBm to 15dBm** high optical outputs for loss budgets from 6dB to 19dB (< 55 km)
- Simple Plug-and-Play initial set-up: adjust transmitter for RF input level and GO!
- Front Panel RF Input test point: 75 Ohm F-type
- Front Panel Optical Power & Laser Current test points: via high-impedance voltmeter
- Front Panel status LEDs: Optical Power, Laser Current and Cooler summary alarms
- Advanced predistortion circuitry yields excellent CSO/CTB performance
- Energy-efficient internal circuit design for low power consumption & long-term reliability
- Single-slot width, plug-in, front-access module with hot-swap capability, slides into one of the fifteen (15) available applications slots in the LaserPlus LP-CH-16 Chassis
- Chassis-based plenum with four large fans creates more airflow & better reliability than module-based fans; if fan-failure occurs, transmitters remain in operation

The **Olson Technology Inc.** ***Model LP-OT-H*** **Hybrid Fiber Coax (HFC) 1310nm DFB Optical Transmitter family** is a single-slot module for the ***LaserPlus*** optical transmission platform. It was engineered to meet the requirements for a high power one-transmitter-per-multiple-node (1:2, 1:3, 1:4, … 1:32 ratio) traditional "blast-and-split" system topology. However, this series of transmitters will also deliver superior performance in a long distance, point-to-point, 1:1 transmitter-to-node scenario, with associated optical loss budgets from 6dB to 19db, allowing for unrepeatered spans of up to 55km (depending on node/receiver sensitivity)..

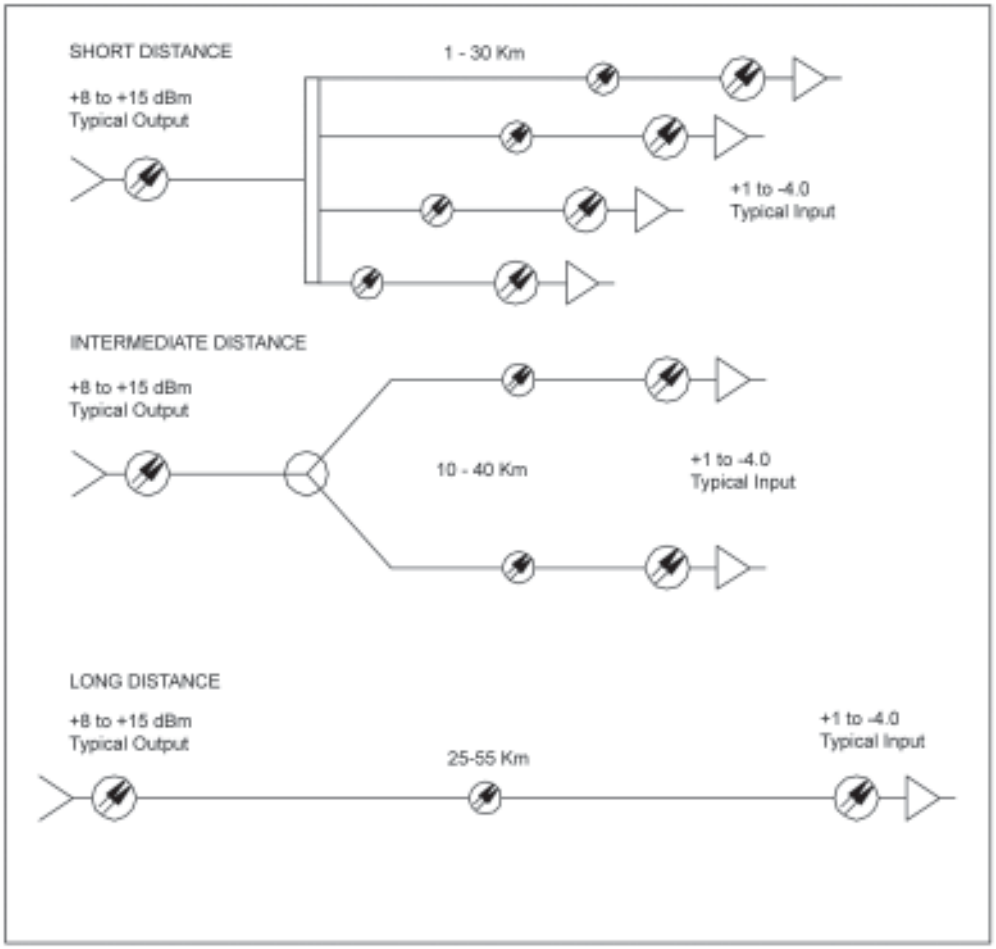
The rugged, low-profile, amplitude-modulated ***Model LP-OT-H*** transmitter family utilizes high-quality, optically isolated, cooled 1310 nm lasers with optical output powers from 6mW to 31mW. They are packaged as convenient, hot-swappable plug-in modules, and feature an RF driver, integrated laser cooler circuitry, advanced predistortion electronics, front panel RF and optical test points, and front panel LEDs which provide immediate visual status of the unit. Enhanced local and remote monitoring of the transmitters is also provided via summary alarms to LEDs on the ***Model LP-PS-x*** power supplies, via contact closures on the ***Model LP-CH-16*** chassis, and additionally via the optional ***Model LP-CH-SNMP-1*** element manager agent which is compatible with third-party solutions.

The design of these transmitters facilitates initial setup by requiring only a simple RF input gain adjustment via easily accessable front panel variable attenuator to bring the units online. The ***Model LP-OT-H*** accepts a 79 channel flat RF input from +19dBmV to +23dBmV per channel from 50-550MHz. The transmitters have a full 50–1000 MHz bandwidth and meet stringent industry requirements for the carriage of standard analog CATV signals (50-550MHz) plus 64/256 QAM digital tiers, high speed data traffic, cable telephony, video-on-demand (VOD), and other advanced services deployments (550 MHz to 1,000 MHz @-6dB below analog).

The ***LaserPlus Model LP-OT-H*** **family** is the perfect companion to optical receiver/node products in the Olson Technology Inc. ***MetroNode Model OTMN-II*** and ***PremiseNode Model OTPN-x*** product families, but is also designed to operate seamlessly with optical transmitters, receivers and nodes from most leading manufacturers.

Many traditional HFC applications in professional MSO, campus, institutional, military or other metropolitan area applications typically utilize a common, commercially-available, balanced or unbalanced 1x2, 1x3, 1x4… 1xX optical splitter/coupler to feed two (2) or more remote node locations from a single source transmitter. The ***Olson Technology Inc.*** **LaserPlus Model LP-OT-H** *was designed to deliver excellent performance in these traditional "blast-and-split" topologies. When used with low-loss, high-performance optical couplers, like the* **LaserLite Model OTCP-x** *family, it is possible to deploy shared optical fiber feeds to several independent, remote node/receivers located 1km to 10km from the central headend or hub source location.*

The transmitter also facilitates system design criteria which provide a 1:1 single transmitter-to-node connection over distances up to 55km utilizing Olson Technology Inc. **MetroNode** *or* **PremiseNode** *high-sensitivity node/ receivers, or up to 45km utilizing nodes from most other leading manufacturers. By splitting the transmitter output with the appropriate 1x2 optical splitter/coupler, one can also provide a 1:1 dual redundant feed to a single node, using diverse optical path routing.*



Specifications

RF INPUT & PERFORMANCE PARAMETERS:

Frequency Range	*50 MHz to 1,000 MHz*
Frequency Response	*±1.0 dB*
Input Impedance	*75 Ohms*
Input Return Loss	*>16 dB*
Input Level for Optimum Performance	*Analog Channels: +19 dBmV/carrier minimum* *Digital QAM Channels: +9dBmV/carrier minimum* (79 NTSC channels to 550MHz & 320MHz digital at -6dBc) (RF Input spec based on unmodulated CW carriers. Typical modulated carrier input will be 2dB higher)
Input Slope	*0 dB*
Distortion Performance	see next page

OPTICAL PARAMETERS:

Wavelength	*1310 nm ±20nm*
Output Powers (8)	*8dBm/6.3mW; 9dBm/8mW; 10dBm/10mW; 11dBm/12.6mW; 12dBm/15.7mW; 13dBm/20mW; 14dBm/25mW; 15dBm/31.6mW*

ELECTRICAL, ENVIRONMENTAL & MECHANICAL PARAMETERS:

Dimensions	*4.5" H x 1.125" W x 8.75" D (11.4 cm x 2.9 cm x 22.2 cm)*
Weight	*1 lb (0.454 kg)*
Operating Temperature Range	*0°C to +50°C (+32°F to +122°F)* (Air temperature measured at air inlet of **Model LP-CH** Chassis)
Humidity Range	*to 95% non-condensing* (Recommended for use only in non-condensing environments)
Mounting	*In applications slot in* **Model LP-CH-16 LaserPlus** Chassis
Module Slots	*One slot width: Slot# 1-15 (inclusive)*
Powering	*5.25V_{DC} per module*
Protection	*3A SB fuse* [Littelfuse PN# **0454033**; Opticomm PN# **286-000009**]

TRANSMITTER INTERFACES:

RF Input Connector	*F-Type* (rear of module)
RF Input Test Point (F-Type Connector)	*+10dBmV/carrier @550MHz for optimal OMI & performance*
Input Level Adjust	*+4dB (to+23dBmV/carrier) via variable attenuator* (front of module)
Optical Output Connector	*SC/APC standard; FC/APC optional* (front of module)
LED Indicators (Green/Red)	*Optical Power Alarm; Laser Current Alarm; Cooler Alarm*
Laser Enable/Disable	*Recessed push-button switch* (front of module

Distortion Performance - LP-OT-H

Composite Triple Beat	(All Powers)	-62 dBc
Composite Second Order	(All Powers)	-60 dBc
Cross Mod (XMOD)	(All Powers)	-65 dBc

Carrier-to-Noise

Olson Model Number	Output Power (dBm)	Link Loss (dB)	Low Channel Load (79 NTSC)			High Channel Load (110 NTSC)		
			All Fiber Loss CNR (dB)	Fiber+3.5dB Passive Loss CNR (dB)	Fiber+7dB Passive Loss CNR (dB)	All Fiber Loss CNR (dB)	Fiber+3.5dB Passive Loss CNR (dB)	Fiber+7dB Passive Loss CNR (dB)
		6	55	56	57	53	54	55
		7	54	55	56	52	53	54
LP-OT-8	+8dBm	**8**	**53**	**54**	**55**	**51**	**52**	**53**
		9	52	53	54	50	51	52
		10	51	52	53	49	50	51
		11	50	51	52	48	49	50
		12	49	50	51	47	48	49
		7	55	56	57	53	54	55
		8	54	55	56	52	53	54
LP-OT-9	+9dBm	**9**	**53**	**54**	**55**	**51**	**52**	**53**
		10	52	53	54	50	51	52
		11	51	52	53	49	50	51
		12	50	51	52	48	49	50
		13	49	50	51	47	48	49
		8	55	56	57	53	54	55
		9	54	55	56	52	53	54
LP-OT-10	+10dBm	**10**	**53**	**54**	**55**	**51**	**52**	**53**
		11	52	53	54	50	51	52
		12	51	52	53	49	50	51
		13	50	51	52	48	49	50
		14	49	50	51	47	48	49
		9	55	56	57	53	54	55
		10	54	55	56	52	53	54
LP-OT-11	+11dBm	**11**	**53**	**54**	**55**	**51**	**52**	**53**
		12	52	53	54	50	51	52
		13	51	52	53	49	50	51
		14	50	51	52	48	49	50
		15	49	50	51	47	48	49
		10	55	56	57	53	54	55
		11	54	55	56	52	53	54
LP-OT-12	+12dBm	**12**	**53**	**54**	**55**	**51**	**52**	**53**
		13	52	53	54	50	51	52
		14	51	52	53	49	50	51
		15	50	51	52	48	49	50
		16	49	50	51	47	48	49

Olson Model Number	Output Power (dBm)	Link Loss (dB)	All Fiber Loss CNR (dB)	Fiber+4.5dB Passive Loss CNR (dB)	Fiber+9dB Passive Loss CNR (dB)	All Fiber Loss CNR (dB)	Fiber+4.5dB Passive Loss CNR (dB)	Fiber+9dB Passive Loss CNR (dB)
		11	54	55	56	52	53	54
		12	53	54	55	51	52	53
LP-OT-13	+13dBm	**13**	**52**	**53**	**54**	**50**	**51**	**52**
		14	51	52	53	49	50	51
		15	50	51	52	48	49	50
		16	49	50	51	47	48	49
		17	48	49	50	46	47	48
		12	54	55	56	52	53	54
		13	53	54	55	51	52	53
LP-OT-14	+14dBm	**14**	**52**	**53**	**54**	**50**	**51**	**52**
		15	51	52	53	49	50	51
		16	50	51	52	48	49	50
		17	49	50	51	47	48	49
		18	48	49	50	46	47	48
		13	54	55	56	52	53	54
		14	53	54	55	51	52	53
LP-OT-15	+15dBm	**15**	**52**	**53**	**54**	**50**	**51**	**52**
		16	51	52	53	49	50	51
		17	50	51	52	48	49	50
		18	49	50	51	47	48	49
		19	48	49	50	46	47	48

Notes:

1. *"Load" refers to the total analog modulated channel loading. Power levels are per channel peak envelope power.*
2. *Specifications are for unmodulated (CW) carriers (Matrix test set) per SCTE standards.*
3. *Measured at the specified RF input level of +18 dBmV per channel.*
4. *Activation of digital loading @ -6dB reduced level may negatively impact analog performance.Testing of QAM with (79) 6 MHz analog video channels(i.e. 550 MHz) and (33) 64 QAM channels to 750 MHz indicates a typical CNR degradation of less than 0.5*
5. *Specifications measured using Olson Technology, Inc. OTMN-II node/receiver @ 0 dBm optical input to the receiver.*

All specifications are subject to change without notice