

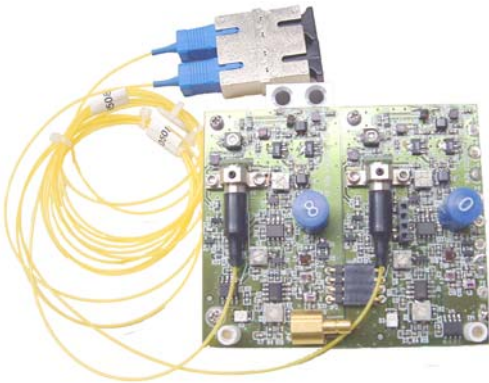
## LegacyPlus LLRX400 Return Path Transmitter

Replacement/Upgrade Modules for Arris/Antec Gemini LLRX400 HFC Nodes

### Features / Benefits

- FP, DFB (1310 or 1550nm) or CWDM (ITU-grid 1470-1610nm) laser return path optical transmitters
- For installed base of Arris Model # LLRX400 Gemini HFC optical nodes
- Performs significantly better than or equal to the original Model RDL/RVD modules
- To minimize clipping in VoIP deployments, DFB or CWDM module replacement of FP lasers
- Ideal for systems undergoing “node splitting” for return path segmentation purposes
- Low cost alternative to DWDM transmitters, digital reverse & other node segmentation methods
- Field proven since 1999: Olson TX & RX modules successfully deployed in 1000’s of nodes worldwide
- Low power consumption & good heat dissipation for increased service life and reliability
- Low Cost; Stable operation over Time, Temperature and Signal Loading; Convenient test points

The **OLSON TECHNOLOGY, INC. (OTI) LegacyPlus series of Replacement & Upgrade Modules for Installed HFC Optical Nodes** is a high performance, low cost, field proven group of custom engineered products specifically designed to upgrade the functionality of installed optical nodes from many major manufacturers by dramatically increasing upstream or downstream bandwidth without having to replace optical nodes or deploy extra fiber, 1550nm ITU grid DWDM lasers, baseband digital reverse modules, or other expensive return path segmentation technologies.



**OLSON TECHNOLOGY, INC. LegacyPlus LLRX400 Return Path Transmitter Modules** have been specifically designed so that node modules can be replaced, if needed, with any module or unit of the same type and the same optical and electrical specifications from Arris/Antec, the original vendor/supplier of the LLRX400 Gemini node. Hence, the replacement of a node based Return Path Transmitter Module does not require replacement of the corresponding headend optical receiver or vice versa.

**LegacyPlus** products provide outstanding return path performance, system design flexibility and scalability in almost any network architecture from traditional Hybrid Fiber Coax (HFC) to the newer fiber deep Targeted Service Delivery (TSD) area topologies. There are two general types of reverse transmitters available: (1) Fabry-Perot (FP) type, which are lower priced and designed for low traffic data carrier transmission applications with less stringent performance requirements (i.e. element management, set top box communications, etc.), and; (2) DFB/CWDM-type, which support analog video channels and/or high capacity data traffic (i.e. Internet access, telephony, etc.).

The introduction of VoIP services adds even tougher constraints to return path performance. Originally deployed FP return path transmitter modules tend to exhibit laser clipping. One of the end effects of clipping is packet loss, which is very detrimental to VoIP. **LegacyPlus** DFB & CWDM TX modules, with their inherently higher dynamic range, provide cost effective and robust migration alternatives to FP laser return transmitters during pre-VoIP plant upgrades.

In addition to the many “standard” **LegacyPlus** modules currently available to system operators, **OLSON TECHNOLOGY, INC.** continues to work with MSOs to define, refine, develop and manufacture new solutions custom tailored to their individual system requirements. For the latest information or to discuss possible module availability or design for unlisted nodes, please contact **OLSON TECHNOLOGY, INC.** directly.

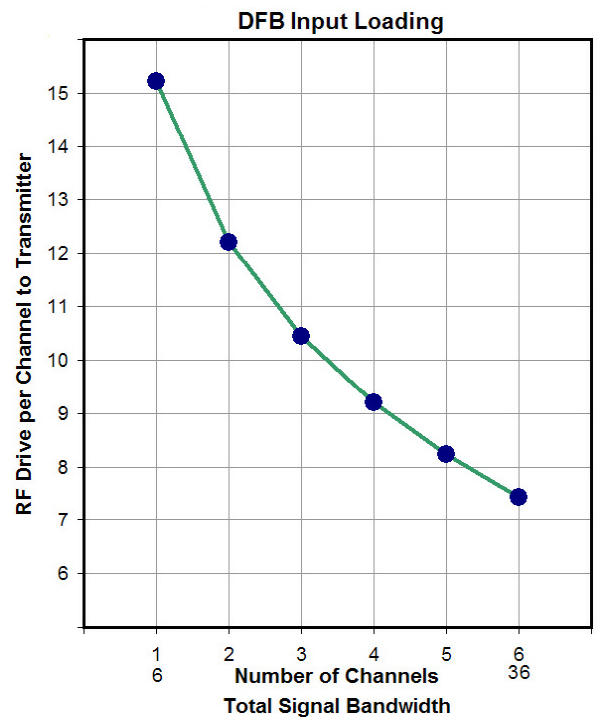
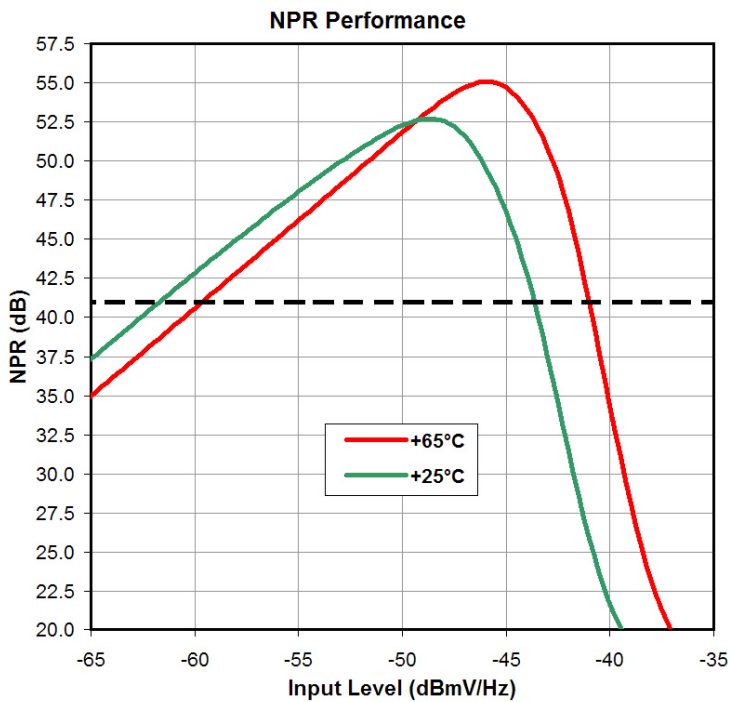
# LegacyPlus LLRX400 Return Path Transmitter

## Specifications (Return Path Optical Transmitters: FP, DFB & CWDM)

### RF INPUT & PERFORMANCE PARAMETERS:

Frequency Range ( $\pm 1.0$ dB)	5 MHz to 220 MHz	
Return Path NPR (DFB/CWDM) *	> 15dB over 41dB NPR*	@41dB NPR Threshold
Return Path Threshold (DFB/CWDM) *	-57 dBmV/Hz	
Return Path NPR (FP) *	> 15dB over 37dB NPR*	@37dB NPR Threshold
Return Path Threshold (FP) *	-57 dBmV/Hz	
Input Return Loss	> 16dB	
Input Level	(see graph)	
Input Level Laser Drive Test Point	-20 dB	

\* NOTE: As measured with 10dB of fiber and Olson Model # OTOR-300 Return Path Receiver



### OPTICAL OUTPUT PARAMETERS:

Optical Output (FP)	2.0 mW (unisolated and isolated versions) @ 1310nm
Optical Output (DFB)	1.0 or 2.0mW @ 1310nm/2.5 @ 1550nm
Optical Output (CWDM)	2.5mW @ 1470, 1490, 1510, 1530, 1550, 1570, 1590 or 1610nm
Return Loss	> 60 dB with APC connector
Optical Connector	SC/APC standard; FC/APC optional (8°APC); SC/UPC optional

### USER INTERFACE

Optical Output Level	1V/mW
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### ELECTRICAL, ENVIRONMENTAL & MECHANICAL PARAMETERS

Dimensions (L x H x D)	5.8" x 1.0" x 3.1" (147mm x 25mm x 79mm)
Weight	0.5 lbs (0.22 kg)
Operating Temperature Range	-40 to +70°C (temperature at the mounting plate)
Powering	12V <sub>DC</sub>
Power Dissipation	< 3 W
Mounting	Inside Arris/Antec LLRX400 Gateway II HFC optical node

# LegacyPlus LLRX400 Return Path Transmitter

## Ordering Information

<u>Model Number</u>	<u>Description (Optical Output Power; Wavelength; Laser Type; Optical Connector)</u>
<b>RDL-GE-SA/302</b>	R-TX Module; Arris LLRX400; 5-220MHz; 2mW unisolated 1310nm FP; SC/APC
<b>RDL-GE-SA/303</b>	R-TX Module; Arris LLRX400; 5-220MHz; 2mW isolated 1310nm FP; SC/APC
<b>RVD-GE-SA/304</b>	R-TX Module; Arris LLRX400; 5-220MHz; 3mW 1310nm DFB; SC/APC
<b>RVD-GE-SA/304/1MW</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1mW 1310nm DFB; SC/APC
<b>RVD-GE-SA/304/2MW</b>	R-TX Module; Arris LLRX400; 5-220MHz; 2mW 1310nm DFB; SC/APC
<b>RVD-GE-SA/505</b>	R-TX Module; Arris LLRX400; 5-220MHz; 2.5mW 1550nm DFB; SC/APC
<b>RVD-GE-SA/547</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1470nm CWDM DFB; SC/APC
<b>RVD-GE-SA/549</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1490nm CWDM DFB; SC/APC
<b>RVD-GE-SA/551</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1510nm CWDM DFB; SC/APC
<b>RVD-GE-SA/553</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1530nm CWDM DFB; SC/APC
<b>RVD-GE-SA/555</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1550nm CWDM DFB; SC/APC
<b>RVD-GE-SA/557</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1570nm CWDM DFB; SC/APC
<b>RVD-GE-SA/559</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1590nm CWDM DFB; SC/APC
<b>RVD-GE-SA/561</b>	R-TX Module; Arris LLRX400; 5-220MHz; 1.5mW 1610nm CWDM DFB; SC/APC

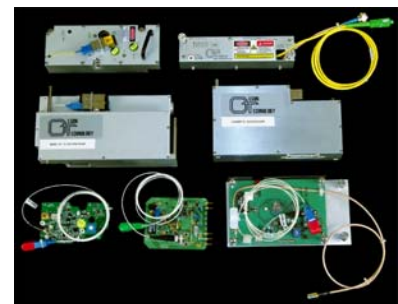
\* *NOTE: Substitute "SU" for "SA" if SC/UPC optical connector is required  
Substitute "FA" for "SA" if FC/APC optical connector is required  
Substitute "FU" for "SA" if FC/UPC optical connector is required*

## Additional HFC Optical Nodes supported by Olson's LegacyPlus

The following is a partial list of HFC optical nodes for which Return Transmitter and/or Forward Receiver Modules are either available or under development.

Please contact **OLSON TECHNOLOGY, INC. (OTI)** regarding availability of units not listed below.

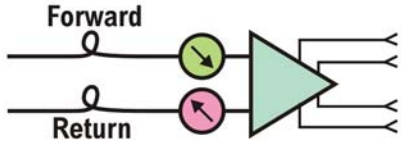
* ADC/C-COR	ISX-3030/3040 & 3021
* Antec/Texscan	Gateway II , GlassPal & FlameThrower
* Arris/Antec	LLRX100, LLRX200, LLRX400 Gemini
* Augat	Megaflex
* Harmonic	HLR3830 & HLN3841/3842/3843/3844 PWRBlazer
* Motorola/GI	BTN-2 , AM-MBR & SG2000/2440
* Philips/Magnavox	7-OR Diamond Point
* Scientific-Atlanta	6910, 6920, 6940/6942/6944 & Gainmaker



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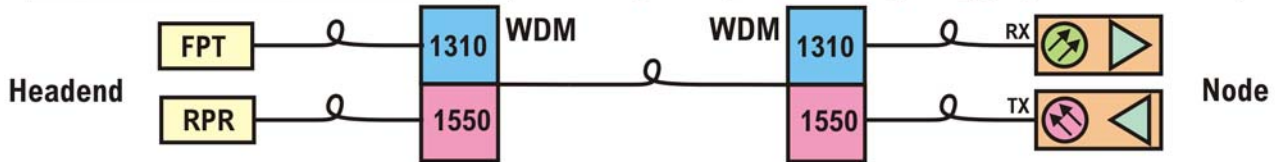
## Typical Applications

### 1. STANDARD 2-WAY CONFIGURATION *(for Node Upgrade, Maintenance and Repair):*

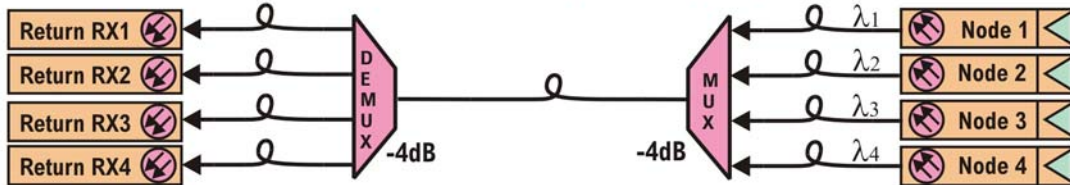


- A. One-way to Two-way Node Upgrade
- B. OEM Module Replacement for Routine Maintenance and Repair
- C. FP to DFB Laser Upgrade for VoIP Telephony System Deployment

### 2. SINGLE FIBER CAPACITY DOUBLING *(WDM in forward/return node splitting for fiber conservation):*



### 3. MULTIPLE NODE RETURN PATH MULTIPLEXING *(CWDM for return path fiber conservation)*



### 4. RETURN PATH SEGMENTATION & REDUNDANCY *(WDM or CWDM for return fiber conservation):*

