



**HLR3830 SERIES RETURN TRANSMITTER
INSTRUCTION MANUAL
RPT-323x-SA/xxx**

INSTRUCTION MANUAL

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Specifications (Return Path Optical Transmitters: F-P, DFB & CWDM)

RF INPUT & PERFORMANCE PARAMETERS:

Frequency Range (+/- 1.0 dB)	5 MHz to 220 MHz
Return Path NPR (DFB/CWDM) *	> 15dB over 41dB NPR*
Return Path Threshold (DFB/CWDM) *	-57 dBmV/Hz (@41dB NPR Threshold)
Return Path NPR (F-P) *	> 15dB over 37dB NPR*
Return Path Threshold (F-P) *	-57 dBmV/Hz (@37dB NPR Threshold)
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 (F-P)	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

R.F. Input Test Point	-20 dB (+/- 1.0 dB)
Optical Output Test Point	1V/mW
Laser Current	1V/50mA.
Optical Power Alarm	Green/Red LED
Interstage R.F. Plug-In SXP Type Pad	7dB to connector R.F Signal Path to Laser

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	+24VDC
Power Dissipation	< 3 W
Mounting	Inside Harmonic PWRBlazer HLR 3830 HFC optical node

Model Number

Description (Optical Output Power; Wavelength; Laser Type; Optical Connector)

RPT-3234-SA/302	R-TX Module; Harmonic HLR3830; 5-220MHz; 2mW unisolated 1310nm F-P; SC/APC
RPT-3234-SA/303	R-TX Module; Harmonic HLR3830; 5-220MHz; 2mW isolated 1310nm F-P; SC/APC
RPT-3235-SA/304	R-TX Module; Harmonic HLR3830; 5-220MHz; 3mW 1310nm DFB; SC/APC
RPT-3235-SA/304/1MW	R-TX Module; Harmonic HLR3830; 5-220MHz; 1mW 1310nm DFB; SC/APC
RPT-3235-SA/304/2MW	R-TX Module; Harmonic HLR3830; 5-220MHz; 2mW 1310nm DFB; SC/APC
RPT-3235-SA/505	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1550nm DFB; SC/APC
RPT-3235-SA/547	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1470nm CWDM DFB; SC/APC
RPT-3235-SA/549	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1490nm CWDM DFB; SC/APC
RPT-3235-SA/551	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1510nm CWDM DFB; SC/APC
RPT-3235-SA/553	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1530nm CWDM DFB; SC/APC
RPT-3235-SA/555	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1550nm CWDM DFB; SC/APC
RPT-3235-SA/557	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1570nm CWDM DFB; SC/APC
RPT-3235-SA/559	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 1590nm CWDM DFB; SC/APC
RPT-3235-SA/561	R-TX Module; Harmonic HLR3830; 5-220MHz; 2.5mW 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/APC optical connector is required

SAFETY WARNINGS

LASER RADIATION



The **RPT-323x** laser transmitter emits invisible laser 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. The power to the HLR3830 should be turned off whenever the optical connector is opened or exposed (as when the fiber connection 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 OR OTHER DEVICES AT ANY DISTANCE FROM THE LASER TRANSMITTER.

SHOCK HAZARD

Care should be used when installing the RPT-323x to prevent shock and injury as there are voltages within the Node which exceed 48 VAC.

INTRODUCTION

The **Olson Technology Inc. RPT-323x** is a high quality, cost effective, Return Transmitter module designed around the latest optical transmitter technology. The RPT-323x is a series of replacement broadband return transmitters for the HLR3830 series of optical nodes. The performance is equivalent to or better than that of the original transmitters. It can be used in the same applications as the original transmitter. Please consult Olson Technology for our latest product list. **ALL standard units have SC/APC connectors.** **Note:** Olson Technology does not recommend or support the use of FP lasers for VOIP or analog video.

The RPT-323x receives preconditioned +24 VDC from the Node and plugs directly into the preexisting locations within the Node. The primary RF connection is made through the coax cable which connects to the top of the unit. The transmitter can be ordered with an optical connection that will match the factory setup. Heat transfer for the RPT-323x is provided via the bottom surface of the module to the Node housing for full outdoor temperature operation.

INSTALLATION / ENVIRONMENTAL CONSIDERATIONS

The RPT-323x operates with an exterior temperature on the Node of -40 to + 70°C. However, like any other electronic device, it will probably have a longer life span if it is not operated at the upper limit of its temperature range continuously. Installation of the RPT-323x should be done such that water, dirt and other contaminants do not enter either the Node or the module. Do not install equipment in locations that are accessible by either children or other unqualified personnel. This unit is meant to be field-installed into the HLR3830 Optical Node by qualified field service technicians.

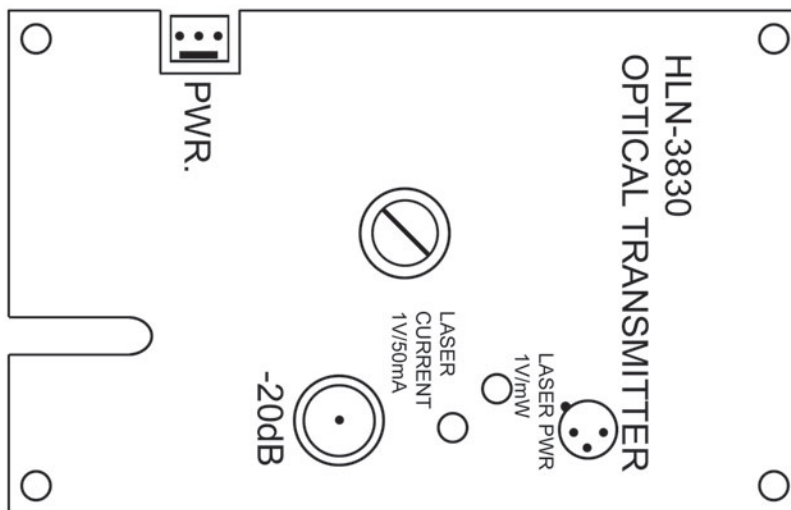
The RPT-323x installs into the optics section of the node between the receiver and the power supply. The transmitter can be hot swapped without damage to the module or node, but should be fully screwed into place before plugging in the power connector. The retaining screws should be simultaneously worked down. Do not fully tighten one screw before partially engaging and tightening the others. Remove the dust cover from the optical connector and the bulkhead adapter and plug the together. Note which connector the fiber from the transmitter is plugged into. Care should be exercised to avoid breaking or kinking the fiber, and that there is enough slack for the node to be opened and closed without pulling on the fiber.

CAUTION: The “standard” units all use **angle physical contact** optical connectors (**APC**) with **green** bodies or boots. Some configurations may use **flat/ultra physical contact** connectors (**UPC**) with **blue** bodies or boots. You **can not** mate the two different types and achieve satisfactory performance. Be sure to clean all fiber using proper fiber cleaner. A lint free cloth such as a chem-wipe or similar wipe may be used.

Route the coaxial cable from the transmitter along the power cable and through the plastic clip on the interface board. Plug the cable into the connector labeled “LSR” on the board. Be sure to close and tighten the cover of optics section before closing the node.

EXTERNAL ADJUSTMENTS AND TEST POINTS

There are no external adjustments. There are three test points that monitor optical output power, laser current, and a -20dB RF input test point. The 'LASER PWR' test point is calibrated to match the output of the laser at a 1VDC per milliwatt scale. This means if the laser has an optical output of 1.1mW, the test point will read 1.1VDC. The 'LASER CURRENT' test point is used to measure the current that the laser is drawing. This test point does not work like that of the Harmonic transmitters. The ground lead for the multimeter probe should be grounded to a ground in the node for both the "LASER PWR" and the 'LASER CURRENT' test points. The 'LASER CURRENT' test point is for historical records, as the laser ages the current will go up. The -20dB RF input test point is to aid in setting up the transmitter for proper loading. This will be covered in a later section.



INTERNAL ADJUSTMENTS AND TEST POINTS

The only internal user adjustment for the RPT-323x is the RF input PAD. This PAD is changed according to the number of channels that will be loaded.

REVERSE INPUT RF LEVEL SETTING

The return RF level should be set using the reverse pad on the HLR3830 main board. The internal pad in the return transmitter is for laser OMI matching, not for level setting. Monitor the -20db test point on the transmitter and adjust the reverse pad on the HLR3830 main board for the correct level from the RF drive table (see page 7) for the transmitter type being used.

RECOMMENDED RF DRIVE LEVEL

Laser Transmitter Option	RF Input	RF Input -20db Test Point
RPT-3234-SA/30x (FP)	+31.0dBmV / Chan	+11.0dBmV / Chan
RPT-3235-SA/30x (DFB)	+31.0dBmV / Chan	+11.0dBmV / Chan

CHANNEL LOADING

The optimum RF input level for the RPT-323x is 31.0dBmV per channel if equipped with a standard loading of six analog video channels. The chart below shows the change in RF input level according to the amount and type of channel loading. The chart shows on the right what the RF input level is according to the -20dB test point. On the left, the RF input in dBmV is shown. If loading with data channels only (QPSK, QAM) refer to the amount of total bandwidth the data channels are consuming. 31.0dBmV per analog video channel is equivalent to -44.68dBmV/Hz. The RPT-323x is setup in a way that allows for the same input level regardless of the laser type (DFB, FP, CWDM).

When setting up the levels for the RPT-323x, use the RF input PAD in the node to adjust the -20dB input test point on the transmitter for 31.0dBmV when loading with six analog video channels of 36MHz of digital loading. If loading with a fewer number of channels, adjust the test point to the loading chart below. As an example, if loading with two analog video channels (12MHz digital) then the test point would be set 16.33dBmV. If the node cannot provide enough gain to do this, the RF input PAD on the transmitter can be changed out for a lower value. However, the RF input test point will not reflect this change as it is after the test point. So if the node has a 0dB PAD in it, and the transmitter RF input test point is showing 15dBmV, than the RF input PAD on the transmitter can be lowered by 1.5dB to reach the 16.33dBmV needed for two channel loading. It should be noted that this PAD has been changed for future reference.

