# Program Announcement

## ARRIS Refurbishment Program

*FP to DFB Laser Upgrades for Legacy Optiworx ISX 3030 and ISX 3040 Return Transmitters*

- FP to 1310nm DFB/1471nm CWDM laser upgrades for Optiworx ISX 3030 and ISX 3040 return transmitters provide DOCSIS™ 3.0 capability on the return path for new subscriber features and expanded network capacity
- Leverages the installed base of C-COR Optiworx ISX Optical Distribution nodes without major CAPEX
- Improved subscriber experience with performance that exceeds the original transmitter specifications
- Seed stock quantities may be available depending on current customer commitments – accelerated service upgrade
- Minimum project quantities of **20** or more required for refurbishment program
- 4-6 Week Lead Time
- 2 year upgraded components and labor warranty from date of shipment and unparalleled 24/7 support

In today's business climate, cable operators are challenged to support prior investments without major CAPEX in order to expand capacity and support DOCSIS 3.0 initiatives.

To support these prior investments, the thoughtful designs from ARRIS help maximize backwards compatibility while taking advantage of the latest technologies. ARRIS FP to DFB/CWDM laser upgrades for Optiworx ISX return transmitters allow operators to deploy the latest services through a success based investment. This limits the possibility of significant future redesigns.

The ARRIS transmitter bench upgrade for FP to DFB/CWDM lasers will upgrade legacy Optiworx ISX3030 and ISX 3040 Optical Distribution nodes, providing DOCSIS 3.0 capability on the return path.

- Laser upgrade provides increased transmitter service life and reliability
- Bench upgrade performed by ARRIS provides assurance of performance

# FP to DFB Laser Upgrades for Legacy Optiworx ISX 3030 and ISX 3040 Return Transmitters

## Features

- DFB transmitter in 1310nm with 2.0 mW optical output
- CWDM transmitter in 1471nm with 1.0 mW or 2.0 mW optical output
- Low power consumption and good heat dissipation
- Upgrade and testing performed by ARRIS personnel in an ARRIS ISO certified manufacturing facility

## Ordering Information

| Part Number | Description |
|---|---|
| **ISX 3030 DFB & CWDM 1 mW** | |
| ISXRPTXR-1310-1-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX 1mW 1310NM FC-UPC |
| ISXRPTXR-1310-3-1 | REFURBISHED ISXRPTX13 ISX 3030 RET TX 1mW 1310 nm SC-UPC |
| ISXRPTXR-1310-4-1 | REURBISHED ISXRPTX11 ISX 3030 RET TX 1mW 1310 nm FC-UPC |
| ISXRPTXR-1310-6-1 | REFURBISHED ISXRPTX16 ISX 3030 RET TX 1mW 1310 nm SC-APC |
| ISXRPTXR-1471-1-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX CWDM 1mW 1471 nm FC-UPC |
| ISXRPTXR-1471-3-1 | REFURBISHED ISXRPTX13 ISX 3030 RET TX CWDM 1mW 1471 nm SC-UPC |
| ISXRPTXR-1471-4-1 | REFURBISHED ISXRPTX14 ISX 3030 RET TX CWDM 1mW 1471 nm FC-AP |
| ISXRPTXR-1471-6-1 | REFURBISHED ISXRPTX16 ISX 3030 RET TX CWDM 1mW 1471 nm SC-APC |
| **ISX 3030 DFB & CWDM 2 mW** | |
| ISXRPTXR-1310-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX 2mW 1310 nm FC-UPC |
| ISXRPTXR-1310-3 | REFURBISHED ISXRPTX13 ISX 3030 RET TX 2mW 1310 nm SC-UPC |
| ISXRPTXR-1310-4 | REFURBISHED ISXRPTX14 ISX 3030 RET TX 2mW 1310 nm FC-APC |
| ISXRPTXR-1310-6 | REFURBISHED ISXRPTX16 ISX 3030 RET TX 2mW 1310 nm SC-APC |
| ISXRPTXR-1471-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX CWDM 2mW 1471 nm FC-UPC |
| ISXRPTXR-1471-3 | REFURBISHED ISXRPTX13 ISX 3030 RET TX CWDM 2mW 1471 nm SC-UPC |
| ISXRPTXR-1471-4 | REFURBISHED ISXRPTX14 ISX 3030 RET TX CWDM 2mW 1471 nm FC-APC |
| ISXRPTXR-1471-6 | REFURBISHED ISXRPTX16 ISX 3030 RET TX CWDM 2mW 1471 nm SC-APC |
| **ISX 3040 DFB & CWDM 1 mW** | |
| IX40RPTXR-1310-1-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX 1MW 1310NM FC-UPC |
| IX40RPTXR-1310-3-1 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX 1MW 1310NM SC-UPC |
| IX40RPTXR-1310-4-1 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX 1MW 1310NM FC-APC |
| IX40RPTXR-1310-6-1 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX 1MW 1310NM SC-APC |
| IX40RPTXR-1471-1-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX CWDM 1MW 1471NM FC-UPC |
| IX40RPTXR-1471-3-1 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX CWDM 1MW 1471NM SC-UPC |
| IX40RPTXR-1471-4-1 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX CWDM 1MW 1471NM FC-APC |
| IX40RPTXR-1471-6-1 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX CWDM 1MW 1471NM SC-APC |
| **ISX 3040 DFB & CWDM 2 mW** | |
| IX40RPTXR-1310-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX 2mW 1310 nm FC-UPC |
| IX40RPTXR-1310-3 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX 2mW 1310 nm SC-UPC |
| IX40RPTXR-1310-4 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX 2mW 1310 nm FC-APC |
| IX40RPTXR-1310-6 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX 2mW 1310 nm SC-APC |
| IX40RPTXR-1471-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX CWDM 2mW 1471 nm FC-UPC |
| IX40RPTXR-1471-3 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX CWDM 2mW 1471 nm SC-UPC |
| IX40RPTXR-1471-4 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX CWDM 2mW 1471 nm FC-APC |
| IX40RPTXR-1471-6 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX CWDM 2mW 1471 nm SC-APC |

*Minimum project quantities of **20** or more are required.

## ISX3030 1310 nm Refurbished Return Transmitter Technical Specifications

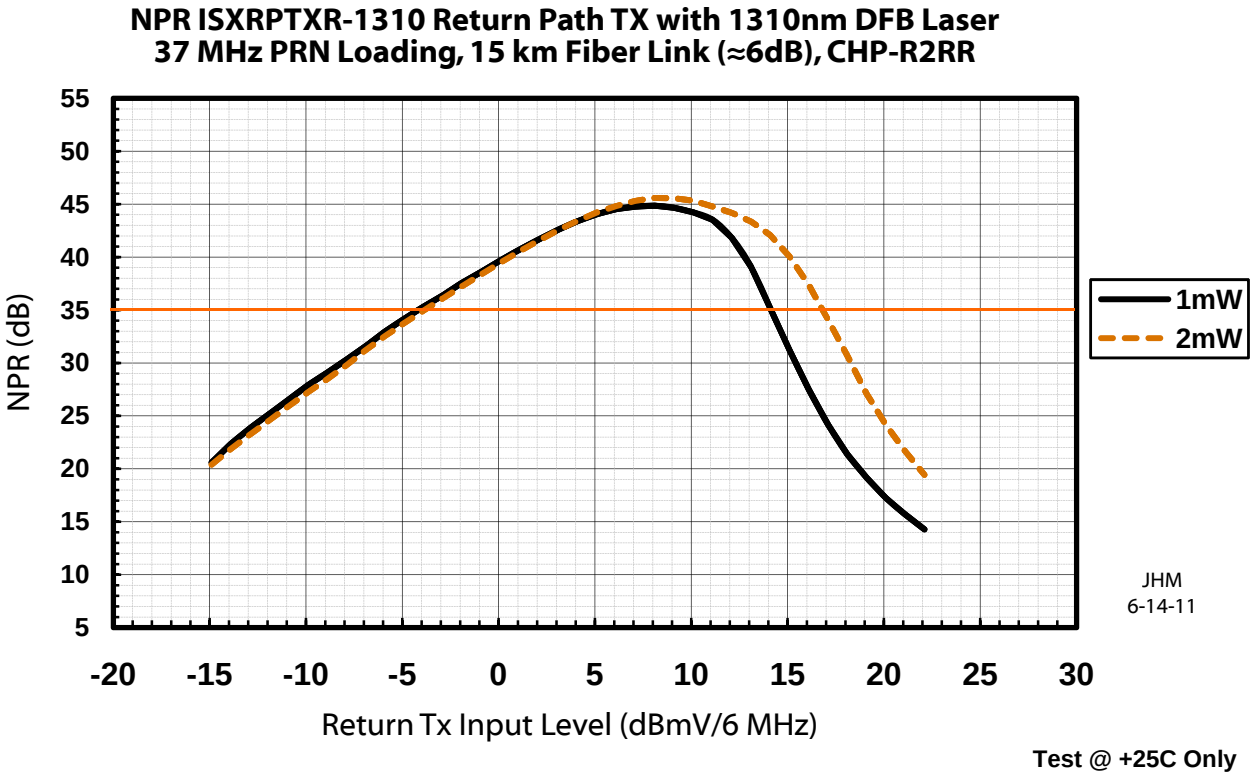
### Optical

| Characteristic | ISXRPTXR-1310-x (2 mW version) | ISXRPTXR-1310-x-1 (1 mW version) |
|---|---|---|
| Output Power, dBm[1] | 3 ± 1 | 0 ± 1 |
| LED Indicators | | |
| Optical Power / DC Power | Green: ≥ 1.6 mW output<br>Red: < 1.5 mW output<br>Off: DC power not available | Green: ≥ 0.8 mW output<br>Red: < 0.7 mW output<br>Off: DC power not available |
| Optical Power Testpoint | 1 mW/V ± 10 % | |
| Transmitted Wavelength, nm | 1310 ± 20 | |
| Return Loss, dB | –55 dB with APC connector | |
| Laser Type | Isolated Uncooled DFB | |
| Optical Connector Type | SC/APC, FC/APC, SC/UPC, FC/UPC | |
| **RF** | | |
| Impedance, Ohms | 75 | |
| RF Passband, MHz | 5 to 200 | |
| Return Loss, dB, min. | –16 | |
| Frequency Flatness, dB maximum | ± 1.0 | |
| **Operating Temperature**[2] | –20 to 80 °C (–4 to 176 °F) | |
| **Powering Specifications** | | |
| Supply Voltage, VDC | 5.0 (Typical) / –5.0 (Typical) | |
| Current Draw, mA, max. | 190 (5 VDC) / 205 (–5 VDC) | |
| **Performance**[3] | | |
| Optimum Transmitter Input | 6 dBmV/ 6 MHz (–62 dBmV/Hz) | |
| Optical Modulation Index (OMI), typ. | See table on next page | |
| NPR/Dynamic Range, dB[4] | 35/15 | |

*Specification Document Number 1507021 Rev A*

1. Measured at output of bulkhead connector.
2. Denotes transmitter temperature. Product must operate in a node from –40 to 60° C (–40 to 140° F).
3. All performance specifications measured over a nominal 6 dB fiber return path link with an optical receiver causing low degradation to performance (≤ 0.5 dB).
4. Measured over 6 dB fiber link using 37 MHz PRN loading. All measurements are typical and taken at room temperature.

## ISX-3030 NPR Curve — 1310 nm




| Return Transmitter | Optimum Tx RF Input | | Typical OMI/Ch | Optical Output | HE Rx Output Δ Relative to FP |
|---|---|---|---|---|---|
| | dBmV/ Hz | dBmV/ 6 MHz | %/ch | dBm | dB |
| FP Tx: ISXRPTX1 | –62 | 6 | 10 | –3 | NA |
| Refurb DFB Tx: ISXRPTXR-1310-X-1 | –62 | 6 | 5.9 | 0 | 1.4 |
| Refurb DFB Tx: ISXRPTXR-1310-X | –62 | 6 | 4.1 | 3 | 4.2 |

## ISX3030 1471 nm Refurbished Return Transmitter Technical Specifications

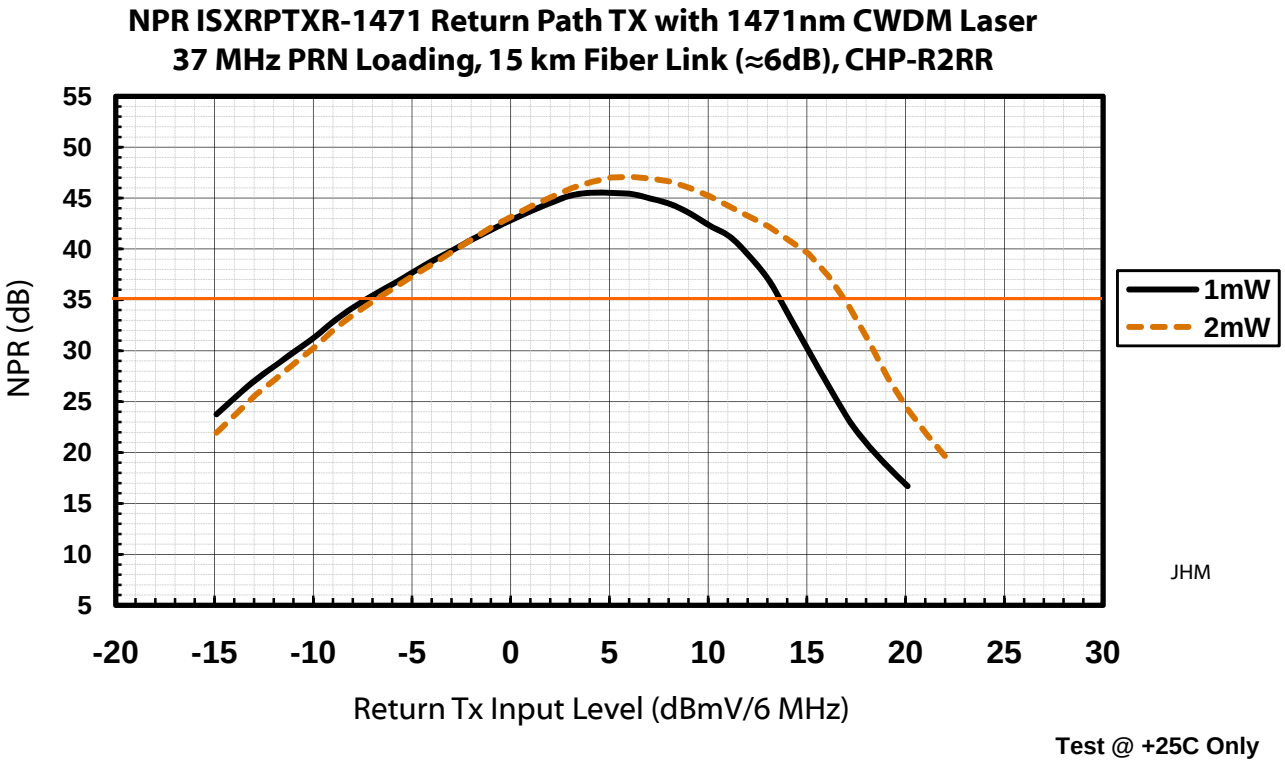
### Optical

| Characteristic | ISXRPTXR-1471-x (2 mW version) | ISXRPTXR-1471-x-1 (1 mW version) |
|---|---|---|
| Output Power, dBm[1] | 3 ± 1 | 0 ± 1 |
| LED Indicators | | |
| Optical Power / DC Power | Green: ≥ 1.6 mW output<br>Red: < 1.5 mW output<br>Off: DC power not available | Green: ≥ 0.8 mW output<br>Red: < 0.7 mW output<br>Off: DC power not available |
| Optical Power Testpoint | 1 mW/V ± 10 % | |
| Transmitted Wavelength, nm | 1471 ± 7.5 | |
| Return Loss, dB | –55 dB with APC connector | |
| Laser Type | Isolated Uncooled DFB | |
| Optical Connector Type | SC/APC, FC/APC, SC/UPC, FC/UPC | |
| **RF** | | |
| Impedance, Ohms | 75 | |
| RF Passband, MHz | 5 to 200 | |
| Return Loss, dB, min. | –16 | |
| Frequency Flatness, dB maximum | ± 1.0 | |
| **Operating Temperature,** [2] | –20 to 80 °C (–4 to 176 °F) | |
| **Powering Specifications** | | |
| Supply Voltage, VDC | 5.0 (Typical) / –5.0 (Typical) | |
| Current Draw, mA, max. | 190 (5 VDC) / 205 (–5 VDC) | |
| **Performance**[3] | | |
| Optimum Transmitter Input | 6 dBmV/ 6 MHz (–62 dBmV/Hz) | |
| Optical Modulation Index (OMI), typ. | See table on next page | |
| NPR/Dynamic Range, dB[4] | 35/15 | |

*Specification Document Number 1507020 Rev A*

1. Measured at output of bulkhead connector.
2. Denotes transmitter temperature. Product must operate in a node from –40 to 60° C (–40 to 140° F).
3. All performance specifications measured over a nominal 6 dB fiber return path link with an optical receiver causing low degradation to performance (≤ 0.5 dB).
4. Measured over 6 dB fiber link using 37 MHz PRN loading. All measurements are typical and taken at room temperature.

## ISX-3030 NPR Curve — 1471 nm




| Return Transmitter | Optimum Tx RF Input | | Typical OMI/Ch | Optical Output | HE Rx Output Δ Relative to FP |
|---|---|---|---|---|---|
| | dBmV/ Hz | dBmV/ 6 MHz | %/ch | dBm | dB |
| FP Tx: ISXRPTX1 | –62 | 6 | 10 | –3 | NA |
| Refurb DFB Tx: ISXRPTXR-1471-X-1 | –62 | 6 | 6.1 | 0 | 1.7 |
| Refurb DFB Tx: ISXRPTXR-1471-X | –62 | 6 | 4.3 | 3 | 4.7 |

## ISX3040 1310 nm Refurbished Return Transmitter Technical Specifications

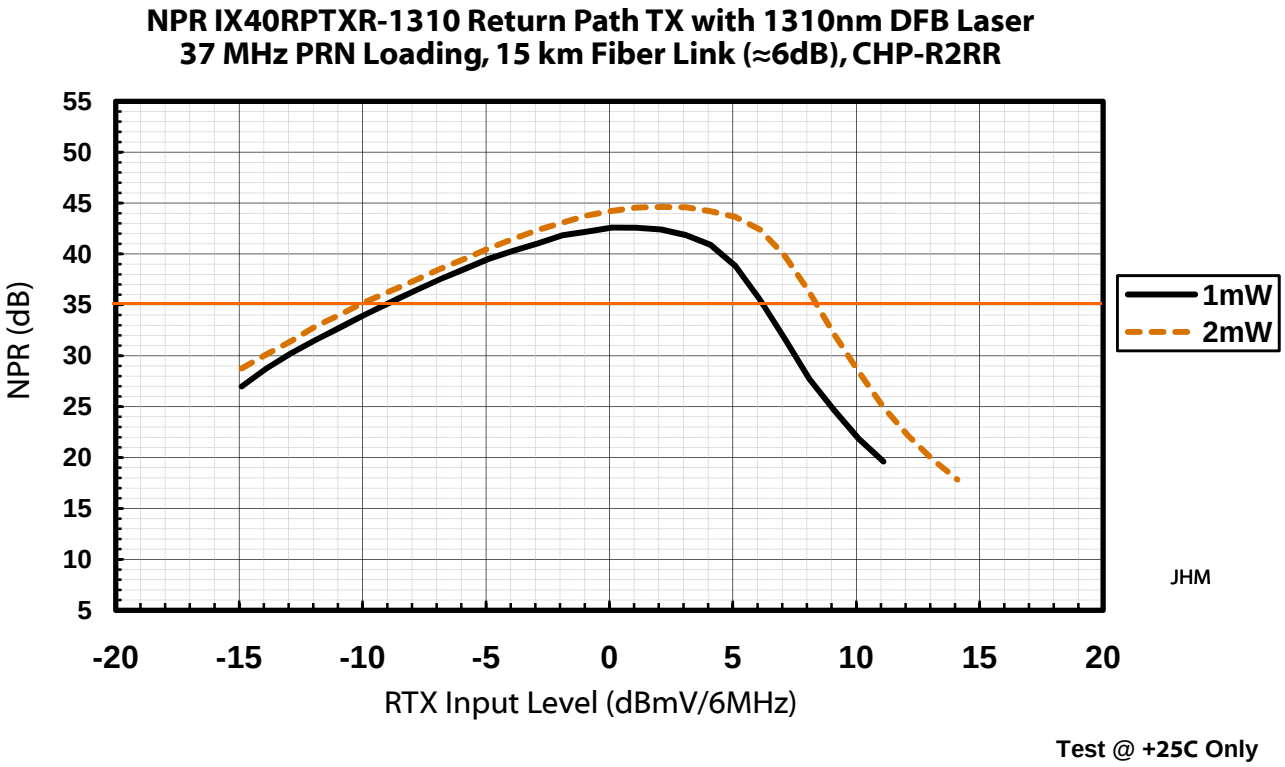
### Optical

| Characteristic | IX40RPTXR-1310-x (2 mW version) | IX40RPTXR-1310-x-1 (1 mW version) |
|---|---|---|
| Output Power, dBm[1] | 3 ± 1 | 0 ± 1 |
| LED Indicators | | |
| Optical Power / DC Power | Green: ≥ 1.6 mW output<br>Red: < 1.5 mW output<br>Off: DC power not available | Green: ≥ 0.8 mW output<br>Red: < 0.7 mW output<br>Off: DC power not available |
| Optical Power Testpoint | 1 mW/V ± 10 % | |
| Transmitted Wavelength, nm | 1310 ± 20 | |
| Return Loss, dB | –55 dB with APC connector | |
| Laser Type | Isolated Uncooled DFB | |
| Optical Connector Type | SC/APC, FC/APC, SC/UPC, FC/UPC | |
| **RF** | | |
| Impedance, Ohms | 75 | |
| RF Passband, MHz | 5 to 55 | |
| Return Loss, dB, min. | –16 | |
| Frequency Flatness, dB maximum | ± 1.0 | |
| RF Test Point Insertion Loss, dB | -20 ± 1.0 | |
| **Operating Temperature,** [2] | –20 to 80 °C (–4 to 176 °F) | |
| **Powering Specifications** | | |
| Supply Voltage, VDC | 5.0 (Typical) / –5.0 (Typical) | |
| Current Draw, mA, max. | 190 (5 VDC) / 205 (–5 VDC) | |
| **Performance**[3] | | |
| Optimum Transmitter Input | -1 dBmV/ 6 MHz (–69 dBmV/Hz) | |
| Optical Modulation Index (OMI), typ. | See table on next page | |
| NPR/Dynamic Range, dB[4] | 35/15 | |

*Specification Document Number 1507023 Rev A*

1. Measured at output of bulkhead connector.
2. Denotes transmitter temperature. Product must operate in a node from –40 to 60° C (–40 to 140° F).
3. All performance specifications measured over a nominal 6 dB fiber return path link with an optical receiver causing low degradation to performance (≤ 0.5 dB).
4. Measured over 6 dB fiber link using 37 MHz PRN loading. All measurements are typical and taken at room temperature.

## ISX-3040 NPR Curve — 1310 nm




**Test @ +25C Only**

| Return Transmitter | Optimum Tx RF Input | | Typical OMI/Ch | Optical Output | HE Rx Output Δ Relative to FP |
|---|---|---|---|---|---|
| | dBmV/ Hz | dBmV/ 6 MHz | %/ch | dBm | dB |
| FP Tx: IX40RPTX1 | –69 | -1 | 10 | –3 | NA |
| Refurb DFB Tx: IX40RPTXR-1310-X-1 | –69 | -1 | 7 | 0 | 2.9 |
| Refurb DFB Tx: IX40RPTXR-1310-X | –69 | -1 | 5.1 | 3 | 6.1 |

## ISX3040 1471 nm Refurbished Return Transmitter Technical Specifications

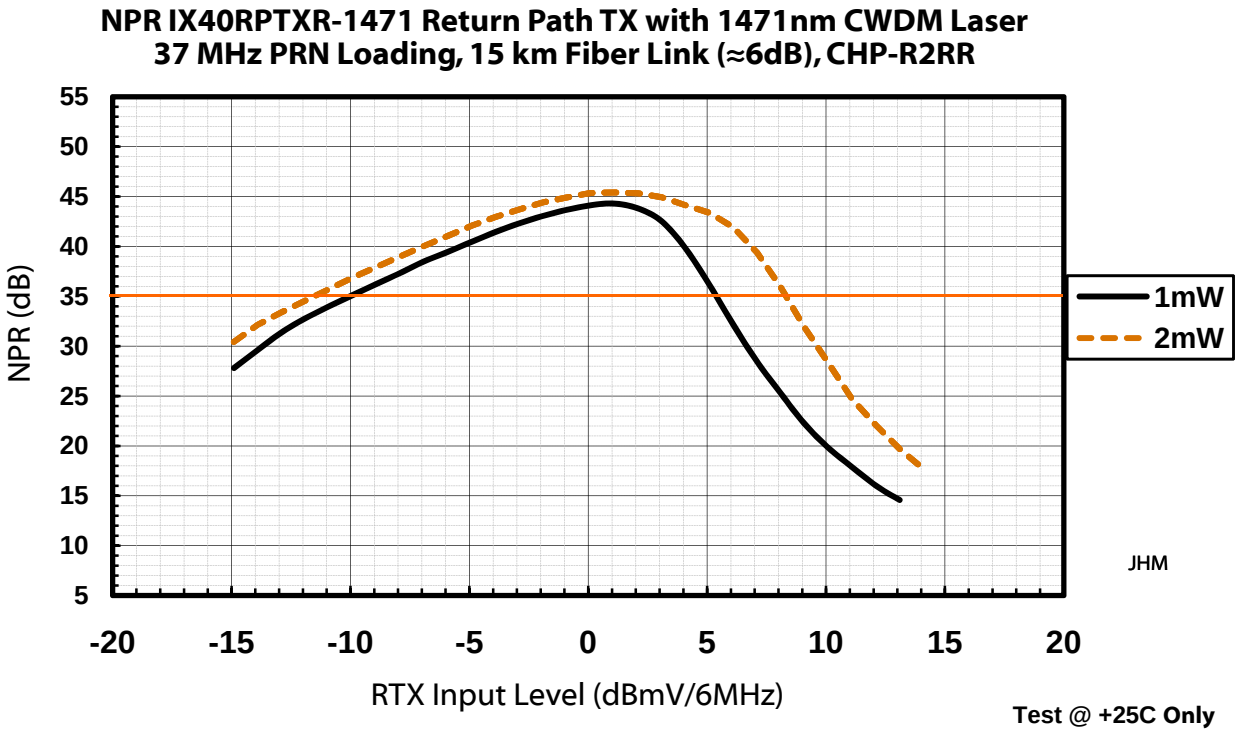
### Optical

| Characteristic | IX40RPTXR-1471-x (2 mW version) | IX40RPTXR-1471-x-1 (1 mW version) |
|---|---|---|
| Output Power, dBm[1] | 3 ± 1 | 0 ± 1 |
| LED Indicators | | |
| Optical Power / DC Power | Green: ≥ 1.6 mW output<br>Red: < 1.5 mW output<br>Off: DC power not available | Green: ≥ 0.8 mW output<br>Red: < 0.7 mW output<br>Off: DC power not available |
| Optical Power Testpoint | 1 mW/V ± 10 % | |
| Transmitted Wavelength, nm | 1471 ± 7.5 | |
| Return Loss, dB | –55 dB with APC connector | |
| Laser Type | Isolated Uncooled DFB | |
| Optical Connector Type | SC/APC, FC/APC, SC/UPC, FC/UPC | |
| **RF** | | |
| Impedance, Ohms | 75 | |
| RF Passband, MHz | 5 to 55 | |
| Return Loss, dB, min. | –16 | |
| Frequency Flatness, dB maximum | ± 1.0 | |
| RF Test Point Insertion Loss, dB | -20 ± 1.0 | |
| **Operating Temperature,** [2] | –20 to 80 °C (–4 to 176 °F) | |
| **Powering Specifications** | | |
| Supply Voltage, VDC | 5.0 (Typical) / –5.0 (Typical) | |
| Current Draw, mA, max. | 190 (5 VDC) / 205 (–5 VDC) | |
| **Performance**[3] | | |
| Optimum Transmitter Input | -1 dBmV/ 6 MHz (–69 dBmV/Hz) | |
| Optical Modulation Index (OMI), typ. | See table on next page | |
| NPR/Dynamic Range, dB[4] | 35/15 | |

*Specification Document Number 1507022 Rev A*

1. Measured at output of bulkhead connector.
2. Denotes transmitter temperature. Product must operate in a node from –40 to 60° C (–40 to 140° F).
3. All performance specifications measured over a nominal 6 dB fiber return path link with an optical receiver causing low degradation to performance (≤ 0.5 dB).
4. Measured over 6 dB fiber link using 37 MHz PRN loading. All measurements are typical and taken at room temperature.

## ISX-3040 NPR Curve — 1471 nm




| Return Transmitter | Optimum Tx RF Input | | Typical OMI/Ch | Optical Output | HE Rx Output Δ Relative to FP |
|---|---|---|---|---|---|
| | dBmV/ Hz | dBmV/ 6 MHz | %/ch | dBm | dB |
| FP Tx: IX40RPTX1 | –69 | -1 | 10 | –3 | NA |
| Refurb DFB Tx: IX40RPTXR-1471-X-1 | –69 | -1 | 7.8 | 0 | 3.8 |
| Refurb DFB Tx: IX40RPTXR-1471-X | –69 | -1 | 5.6 | 3 | 7.0 |

## Getting Started

Transmitter units to be upgraded from FP to DFB/CWDM lasers for legacy C-COR ISX return transmitters are to be returned to ARRIS via the ARRIS Global Repair RMA process.

Known defective transmitters or nodes should be repaired prior to submitting to ARRIS for laser upgrade via a separate RMA. Additionally, requested upgrade part numbers need to match up with the original part numbers to be submitted for upgrade (see ordering information listed above). Additional charges will apply to unmatched requested part numbers to original product part numbers.

Customers will use the internet to gather the necessary forms to itemize the transmitter returns and submit the request to ARRIS.

Visit :http://www.arrisi.com/support/repair_return/_docs/rma_form_qms0086.xls to obtain the form required to itemize all FP lasers being returned.

Submit the form via e-mail to repair@arrisi.com

In the subject line of the e-mail write "RMA Request/TX refurbish"

Once we receive your e-mail request, an ARRIS Customer Account Specialist will contact you to obtain a purchase order and to provide shipping instructions. This purchase order will cover the basic laser upgrade from FB to DFB and does not include additional services such as repairs beyond the scope of this project.

The purchase order must reflect a minimum of 20 upgrades per the minimum project requirements noted on pages 1 and 2.

Purchase orders will need to reflect the proper part numbers listed on page 2 of this document based on the connector type (s) intended for return.

Known defective transmitters or nodes should be repaired prior to submitting to ARRIS for laser upgrade.

Please feel free to contact your ARRIS Customer Account Specialist for additional details regarding this program or ARRIS Global Repair at 1-888-221-9797 (in U.S) or +1-678-473-5656 (outside U.S.).



# ISX-3030/ISX-3040 Optic Node

## Refurbished DFB/CWDM Return TX Installation Instructions

**1507061 Revision A**

# *ISX-3030/3040 Node Refurbished DFB/CWDM Return TX Installation Instructions*

Document Number: 1507061 Revision A



**Trademarks**



**Revision History**

| Revision | Date | Reason for Change |
|---|---|---|
| A | 6/24/11 | Initial release. |

## Introduction

This document consists of the following sections:



## Overview

These instructions describe how to remove the existing return transmitter and install the refurbished DFB return transmitter in the ISX-3030 or ISX-3040 node. The refurbished DFB return transmitters are listed in Table 1.

**Table 1 New DFB/CWDM Return Transmitters**

| Part Number | Description |
|---|---|
| **ISX 3030 DFB & CWDM 1 mW** | |
| ISXRPTXR-1310-1-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX 1mW 1310nm FC-UPC |
| ISXRPTXR-1310-3-1 | REFURBISHED ISXRPTX13 ISX 3030 RET TX 1mW 1310nm SC-UPC |
| ISXRPTXR-1310-4-1 | REURBISHED ISXRPTX11 ISX 3030 RET TX 1mW 1310nm FC-UPC |
| ISXRPTXR-1310-6-1 | REFURBISHED ISXRPTX16 ISX 3030 RET TX 1mW 1310nm SC-APC |
| ISXRPTXR-1471-1-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX CWDM 1mW 1471nm FC-UPC |
| ISXRPTXR-1471-3-1 | REFURBISHED ISXRPTX13 ISX 3030 RET TX CWDM 1mW 1471nm SC-UPC |
| ISXRPTXR-1471-4-1 | REFURBISHED ISXRPTX14 ISX 3030 RET TX CWDM 1mW 1471nm FC-AP |
| ISXRPTXR-1471-6-1 | REFURBISHED ISXRPTX16 ISX 3030 RET TX CWDM 1mW 1471nm SC-APC |

**Table 1 New DFB/CWDM Return Transmitters (cont'd)**

| Part Number | Description |
|---|---|
| **ISX 3030 DFB & CWDM 2 mW** | |
| ISXRPTXR-1310-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX 2 mW 1310 nm FC-UPC |
| ISXRPTXR-1310-3 | REFURBISHED ISXRPTX13 ISX 3030 RET TX 2 mW 1310 nm SC-UPC |
| ISXRPTXR-1310-4 | REURBISHED ISXRPTX11 ISX 3030 RET TX 2 mW 1310 nm FC-UPC |
| ISXRPTXR-1310-6 | REFURBISHED ISXRPTX16 ISX 3030 RET TX 2 mW 1310 nm SC-APC |
| ISXRPTXR-1471-1 | REFURBISHED ISXRPTX11 ISX 3030 RET TX CWDM 2 mW 1471 nm FC-UPC |
| ISXRPTXR-1471-3 | REFURBISHED ISXRPTX13 ISX 3030 RET TX CWDM 2 mW 1471 nm SC-UPC |
| ISXRPTXR-1471-4 | REFURBISHED ISXRPTX14 ISX 3030 RET TX CWDM 2 mW 1471 nm FC-AP |
| ISXRPTXR-1471-6 | REFURBISHED ISXRPTX16 ISX 3030 RET TX CWDM 2 mW 1471 nm SC-APC |
| **ISX 3040 DFB & CWDM 1 mW** | |
| IX40RPTXR-1310-1-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX 1 mW 1310 nm FC-UPC |
| IX40RPTXR-1310-3-1 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX 1 mW 1310 nm SC-UPC |
| IX40RPTXR-1310-4-1 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX 1 mW 1310 nm FC-APC |
| IX40RPTXR-1310-6-1 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX 1 mW 1310 nm SC-APC |
| IX40RPTXR-1471-1-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX CWDM 1 mW 1471 nm FC-UPC |
| IX40RPTXR-1471-3-1 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX CWDM 1 mW 1471 nm SC-UPC |
| IX40RPTXR-1471-4-1 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX CWDM 1 mW 1471 nm FC-APC |
| IX40RPTXR-1471-6-1 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX CWDM 1 mW 1471 nm SC-APC |
| **ISX 3040 DFB & CWDM 2 mW** | |
| IX40RPTXR-1310-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX 2 mW 1310 nm FC-UPC |
| IX40RPTXR-1310-3 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX 2 mW 1310 nm SC-UPC |
| IX40RPTXR-1310-4 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX 2 mW 1310 nm FC-APC |
| IX40RPTXR-1310-6 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX 2 mW 1310 nm SC-APC |
| IX40RPTXR-1471-1 | REFURBISHED IX40RPTXA1 ISX 3040 RET TX CWDM 2 mW 1471 nm FC-UPC |
| IX40RPTXR-1471-3 | REFURBISHED IX40RPTXA3 ISX 3040 RET TX CWDM 2 mW 1471 nm SC-UPC |
| IX40RPTXR-1471-4 | REFURBISHED IX40RPTXA4 ISX 3040 RET TX CWDM 2 mW 1471 nm FC-APC |
| IX40RPTXR-1471-6 | REFURBISHED IX40RPTXA6 ISX 3040 RET TX CWDM 2 mW 1471 nm SC-APC |

## Conventions

The following symbols are used throughout this document:

***WARNING*** *Personal injury might result if instructions are not followed.*

***CAUTION*** *Equipment damage might result if instructions are not followed.*

***Note*** *Read for added information and reminders, including when a service interruption could occur.*

## Related Publications

| Title | Document Number |
|---|---|
| OptiWorx™ ISX3040 (ISX.. Series) 870MHz Optical Distribution Node Procedures Manual | 1129230 |
| ISX-3030 Refurbished 1471nm Analog Return Transmitter Specifications | 1507020 |
| ISX-3030 Refurbished 1310nm Analog Return Transmitter Specifications | 1507021 |
| ISX-3040 Refurbished 1471nm Analog Return Transmitter Specifications | 1507022 |
| ISX-3040 Refurbished 1310nm Analog Return Transmitter Specifications | 1507023 |

## Tools and Materials

Table 2 describes the tools and materials required to remove the existing return transmitter and install the new DFB return transmitter in the ISX node. Anyone performing the procedures in this manual is expected to be familiar with the appropriate, safe use of these tools. Tools or equipment with superior specifications may be substituted for those listed.

**Table 2 Tools and Materials Required**

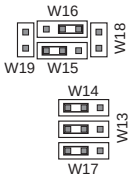
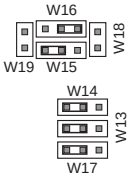
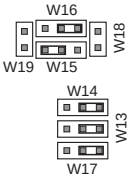
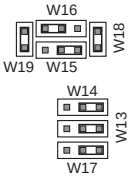
| Tools/Materials | Required Characteristics | Uses |
|---|---|---|
| **Tools** | | |
| Torque wrench/driver | Up to 66 in-lbs (4.0 to 7.5 N·m), with interchangeable 1/2 inch hex socket, Phillips, flat-blade, and TORX® | Housing closing, tightening various fasteners; ARRIS recommends torquing all bolts and screws to the appropriate values whenever specified |
| Nutdriver | 1/2 inch | Housing opening and closing, removing and installing the fiber tray |
| Flat-blade screwdriver | 1/4 inch, 5/16 inch | Return transmitter removal/installation |
| SMB jack to jack adapter | Emerson P/N 131-8901-801 or equivalent | One end connects to SMB connector in the center of the D-subminiature connector that will accept the return transmitter. The other end connects to the SMB plug of the test probe |
| SMB plug to type F plug cable assembly | ARRIS P/N 1504945 | Connects to SMB jack to jack adapter to measure the injected signal level at the return transmitter input. |
| Testpoint probe (–20 dB) | ARRIS P/N TPA-2 | Connect probe to J7 of the ISX-3030 to measure the injected RF carrier during setup |
| **Materials** | | |
| Compressed air | non-residue, inert gas, ultra-filtered to <0.2 microns; recommended for optical systems | Fiber optic connector cleaning |
| Lint-free cloth and 99.9% reagent grade or medicinal quality isopropyl alcohol | — | Fiber optic connector cleaning |
| Anti-seize compound | — | RF and fiber optic cable attachment |

## Available Configurations

Table 3 lists the four available return transmitter configurations for the ISX3 node. For each case, the table specifies which transmitter configuration module is needed and shows the required jumper configuration headers. Where the RF tray header diagrams show no jumpers on headers W18 and W19, the jumpers may be stored for possible future use by plugging one end of the jumper onto a single pin of the header. If a jumper is lost, a replacement jumper (P/N JP0019) may be ordered.

Note that in configurations 1 and 2, added reverse path PAD socket A21 and coaxial test connector J10 are disconnected. They are used only in configurations 3 and 4. There they serve the same purpose for the RF feed to the secondary return transmitter as do PAD socket A6 and test connector J7 for the primary return RF feed.

**Table 3 ISX3 Return Transmitter Configurations**

| Configuration | | | Jumper Positions | |
|---|---|---|---|---|
| No. | Description | Transmitter Configuration Module | Headers on Board in Lid | Header on Board in RF Tray |
| 1 | Return path signals from all ports routed to single return transmitter in primary location | 093778-001 |  |  |
| 2 | Return path signals from all ports routed to dual redundant transmitters | 093777-001 |  |  |
| 3 | Return path signals from ports 1 and 3 routed to return transmitter in primary location; signals from ports 4 and 6 routed to return transmitter is secondary location | 093778-001 |  |  |
| 4 | Return path signals from ports 1 and 4 routed to return transmitter in primary location; signals from ports 3 and 6 routed to return transmitter is secondary location | 093778-001 |  |  |

## Housing Opening

The electronic components of the ISX-3030/ISX-3040 are enclosed in a diecast aluminum housing. Proper installation and other housing related operations are important to ensure the integrity of the contained electronics.

***WARNING*** *Hazardous voltages are present. Use approved safety equipment and procedures.*

***CAUTION*** *Housing damage may result if the lid bolts are not loosened or tightened in the pattern shown in Figure 1.*

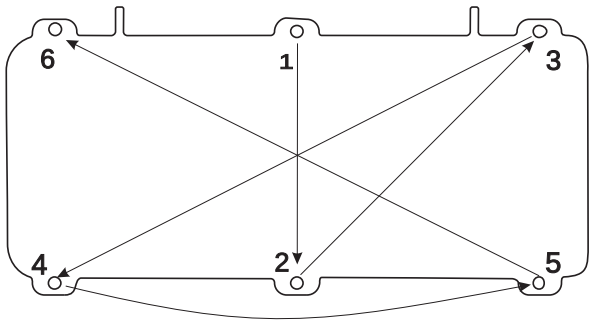
***CAUTION*** *Node electronic components can be damaged by the environment. Close the housing whenever it is left unattended to keep moisture out of the station and to protect the network from RF interference.*

➤ ***To open the housing***

1. Loosen the six captive lid bolts with a 1/2 inch nutdriver according to the pattern in Figure 1.
2. Hand loosen and release the three captive cover bolts on the side with the hinges and then loosen and release the two captive cover bolts at the ends of the unit.
3. While holding the cover closed with one hand, release the last captive cover bolt, and lower or open the lid.

**Figure 1**

***Housing Lid Bolt Loosening Sequence***



## Remove the Existing Return Transmitter from the ISX-3030 or ISX-3040 Node

➤ ***To remove the existing return transmitter***

***Note*** *Refer to Figure 2 to remove the return transmitter.*

1. Open the housing as described in *To open the housing* on page 8.
2. Power off the ISX-3030 node. Leave the ISX-3040 node powered on.
3. Disconnect the return transmitter fiber(s) from the optical connector(s). Place protective cap(s) on the connector(s) to keep dirt or dust off of the fiber surface.
4. Using a flat-blade screwdriver, loosen the two return transmitter module hold-down screws. Pull the return transmitter module out of the optical lid.

## Installing the Refurbished DFB/CWDM Transmitter in the ISX-3030 or ISX-3040 Node

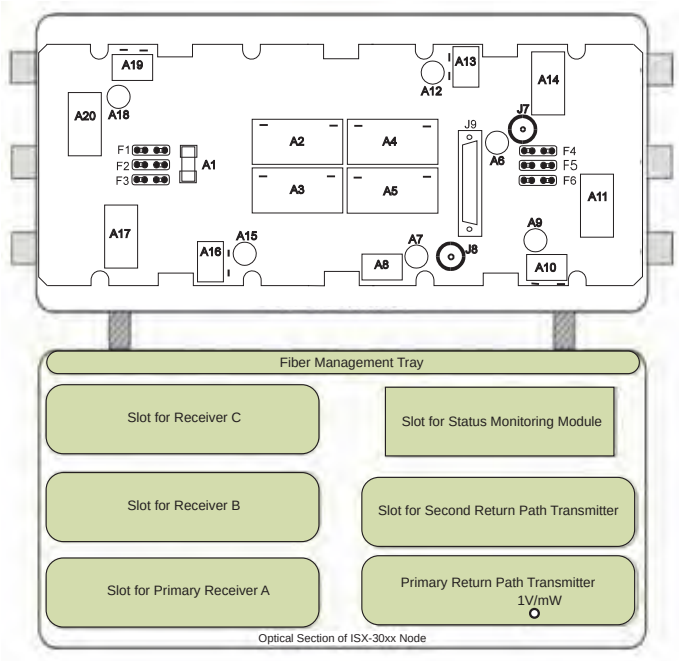
***Note*** *Do not install the refurbished DFB/CWDM transmitter in the ISX-3030 or ISX-3040 node until the optimum RF input level has been set.*

➤ ***To install the refurbished return transmitter***

1. Install the refurbished DFB/CWDM return transmitter in the module slots identified as the Primary or Secondary return transmitter in the optical lid of the ISX node. For the location of the return transmitters and testpoints, refer to Figure 2 on page 10 for the ISX-3030.
2. Firmly push the new DFB/CWDM return transmitter into the D-subminiature connector on the interface board in the optical lid.
3. Using a flat-blade screwdriver, secure the new DFB/CWDM return transmitter by tightening the two captive screws.
4. Remove the protective cap from the optical connector on the return transmitter. Clean and reconnect the connector on the optical fiber connector to the return transmitter.

**Figure 2**

***ISX-3030 Return Transmitter and Testpoint Locations***




## Return Transmitter Setup

The refurbished ARRIS return path DFB/CWDM transmitters for the ISX-3030 and ISX-3040 nodes have been optimized for 37 MHz of loading. The optimum drive level, using 6 carriers, at the input to the transmitter is 6 dBmV per channel.

The following procedure provides the basic steps necessary to balance the return path through an ISX-3030 node. The optimal transmitter input level depends on system CNR specifications and link specifications. Use these input levels as a basis for reverse balancing, but consult the system manager for the desired performance specifications; then refer to the ARRIS specification sheet for CCNR data for the return transmitter in use.

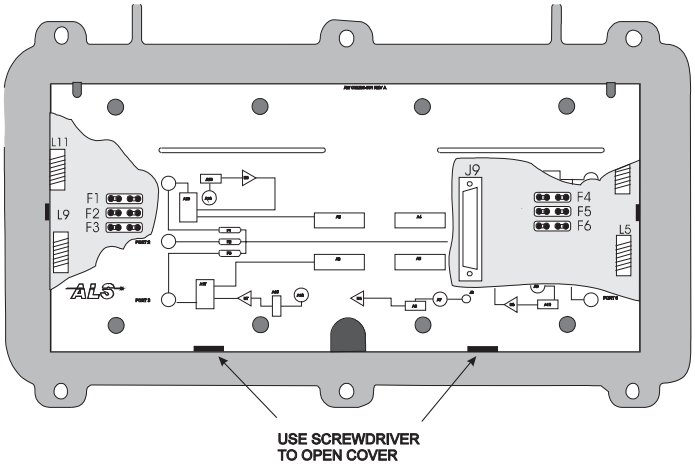
***Note*** *The return path input level should be flat across the entire return bandwidth. Any channel may be used within this bandwidth to setup the return path. In the following procedure, this channel is referred to as the return balancing channel.*

➤ ***To setup the new DFB/CWDM return path transmitter in the ISX-3030 node***

1. When the ISX-3030 is powered-on, the green **LASER PWR** LED on the return transmitter is lit when the laser output level is within ± 1.5 dB of the specified output level.
2. Optical output power can be measured at the **1V/mW** testpoint on the transmitter. The transmitter optical output power is silkscreened on the front of the module.
3. Remove the RF cover from the ISX-3030 base by inserting a flat-blade screwdriver at the snap closures and pry open the cover of the RF base of the ISX-3030. Refer to Figure 3.

**Figure 3**

***Removing RF Cover from ISX-3030 Base***




4. Press the testpoint probe (P/N TPA-2) into the **J7** testpoint to measure the return signal level before it reaches the return transmitter. This testpoint probe attenuates the signal by 20 dB.

5. Set the optimum RF drive level input to the return transmitter by performing the following substeps. Refer to Figure 2 on page 10 to locate the return testpoint (J7) and return PAD (A6).

***Note*** *If a tap is not available, screw the threaded RF port probe (P/N TPA-1) that has 20 dB attenuation into an unused port opening and tighten it firmly. Each output port has two openings at right angles to each other. Inject a carrier into the RF port probe connected to the specific node port to be configured at a level equal to the "Expected Return Carrier Level[1] + 20 dB (RF port probe loss)". Using an RF port probe may result in an error of up to 3 dB and ARRIS recommends using a tap to inject a return carrier.*

   a. Inject a carrier into the tap connected to the specific node port to be configured at a level equal to the "**Expected Return Carrier Level**[1] + Tap Loss" for the preferred method or inject a carrier into the RF Port Probe at a level equal to the "**Expected Return Carrier Level** + 20 dB" for the alternative method. Refer to Figure 4 on page 12 for the return configuration setup diagram.

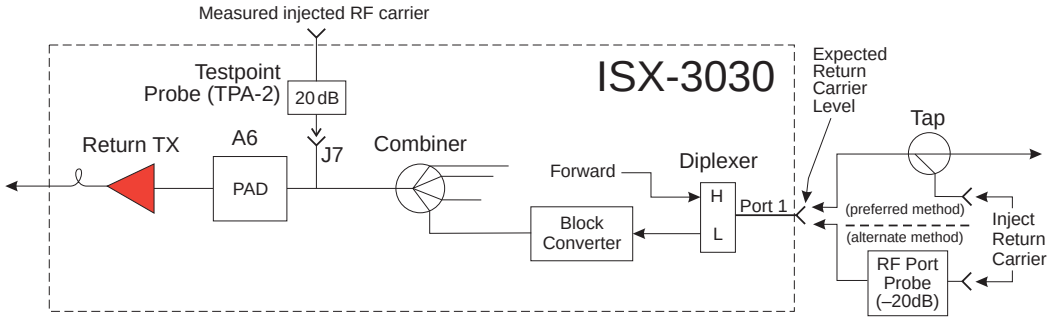
   b. Measure and record the injected RF level at the Testpoint Probe (TPA-2) connected to **J7** return testpoint located on the RF tray as shown in Figure 2 on page 10.

   c. Install a plug-in PAD in the **A6** location that equals the value of "Measured injected RF carrier" level +20 dB (compensate for testpoint probe loss) – 6 dB.[2,3]

1. The "Expected Return Carrier Level(s)" is a system specification and should be obtained by appropriate engineering staff.
2. The optimum operating point for the transmitter is 6 dBmV/channel based on 6 channel loading.
3. This calculation assumes that this is single return transmitter application only. In the event that two return path transmitters are being used (i.e. Primary and Secondary slots are populated) in a redundant fashion, the PAD level calculated should be reduced by 4 dB.

**Figure 4**

***ISX-3030 Return Configuration Setup***




➤ ***To setup the new DFB/CWDM return path transmitter in the ISX-3040 node***

***Note*** *The IX40RTX transmitters have a –20 dB testpoint. This testpoint can be used to verify the transmitter input level or be used instead of performing Steps 1b through 1d.*

***Note*** *The ISXRTX transmitters do not have a –20 dB testpoint.*

1. Set the optimum RF drive level input to the return transmitter by performing the following substeps. Refer to Figure 5 on page 13 to locate the –20 dB return testpoints, –20 dB forward testpoints, and return PAD locations for each individual port.

   a. Inject a carrier into the tap connected to the specific node port to be configured at a level equal to the "**Expected Return Carrier Level**[1] + Tap Loss" for the preferred method or inject a carrier into the RF Port Probe at a level equal to the "**Expected Return Carrier Level** + 20 dB" for the alternative method. Refer to Figure 6 on page 13 for the return configuration setup diagram.

   b. Connect the SMB jack to jack adapter (Emerson P/N 131-8901-801) to the SMB connector in the center of the D-subminiature connector that will accept the new DFB return transmitter. This connector is located in the optical lid of the ISX-3040 node and is labeled **SLOT D** (Primary Transmitter) or **SLOT E** (Secondary Transmitter). In a single return path configuration, only the Primary Transmitter slot (**SLOT D**) is used.

   c. Connect the SMB to type F plug cable assembly (P/N 1504945) to the SMB jack to jack adapter.

   d. Measure and record the injected RF level at the F-connector of cable (P/N 1504945).

1. The "Expected Return Carrier Level(s)" is a system specification and should be obtained by appropriate engineering staff.

**Figure 5**

***ISX-3040 Return Transmitter and Testpoint Locations***

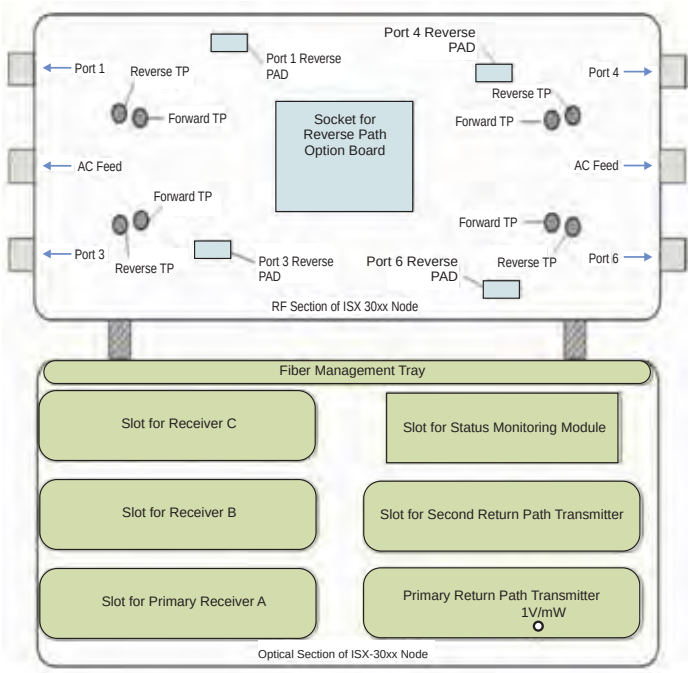
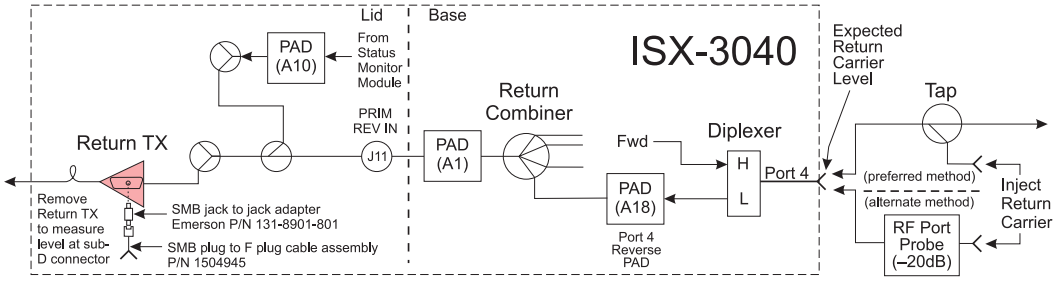



**Figure 6**

***ISX-3040 Return Configuration Setup***



e. Install a plug-in PAD in the corresponding node port's location to achieve an input at the return transmitter of 6 dBmV.[1,2] Use the following equation to calculate the return PAD value.

| | | | | | | |
|---|---|---|---|---|---|---|
| _____ | + | _____ | – | 6 | = | _____ |
| Measured Injected RF Carrier Value at SMB to F plug | | Installed Return PAD | | Optimum Return TX input | | Final PAD Value |

2. Install the refurbished DFB return transmitter in the module slots identified as **SLOT D** (Primary) or **SLOT E** (Secondary) return transmitter in the optical lid of the ISX-3040 node. For the location of the return transmitters and testpoints, refer to Figure 5 for the ISX-3040.
3. Firmly push the new DFB return transmitter into the D-subminiature connector on the interface board in the optical lid.
4. Using a flat-blade screwdriver, secure the new DFB return transmitter by tightening the two captive screws.
5. Remove the protective cap from the optical connector on the return transmitter. Clean and reconnect the connector on the optical fiber connector to the return transmitter.

1. The optimum operating point for the transmitter is 6 dBmV/channel based on 6 channel loading.
2. This calculation assumes that this is single return transmitter application only. In the event that two return path transmitters are being used (i.e. Primary and Secondary slots are populated) in a redundant fashion, the pad level calculated should be reduced by 4 dB.

## Housing Closing and Tightening

***CAUTION*** *Close the housing whenever it is left unattended to keep moisture out of the unit and protect the network from RF interference.*

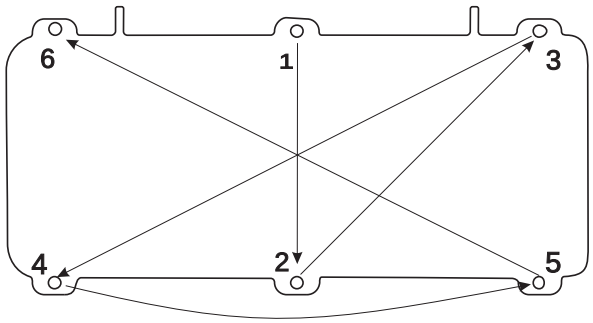
1. Examine the rubber gasket and aluminum mesh seal. Remove all foreign matter that could interfere with proper sealing. Use a rag to dry any accumulation of moisture within the housing.
2. Close the housing cover until it is flush with the rubber gasket.
3. Finger tighten all the cover bolts until they seat. Any binding during finger tightening is an indication of improper cover alignment. Further tightening when binding occurs can cause cover warping. If binding occurs:
   - Loosen the tightened bolts.
   - Grasp the cover and shift it into a slightly different position so that all bolts seat evenly with normal finger torque.

***CAUTION*** *Do not torque the cover bolts more than 40 in-lbs (4.5 N·m). Overtightening and incorrect seating may warp the housing, allowing moisture to enter and damage the components.*

4. Torque the cover bolts between 35 and 40 in-lbs (4.0 and 4.5 N·m) with a torque wrench following the pattern shown in Figure 7. Inspect the rubber seal to be certain that the cover is evenly seated and the gasket is compressed to form a weatherproof seal.
5. Install testpoint caps on all testpoints and tighten until finger tight. Then tighten testpoint caps an additional 1/4 to 1/2 turn.

**Figure 7**

***Housing Lid Bolt Tightening Sequence***



## To contact Technical Support


North America: 888-221-9797; +1-203-303-6400 (worldwide)
RFOptics-support@arrisi.com

Europe: +31 20 311 2525
techsupport.europe@arrisi.com


For additional technical support contact information, visit http://www.arrisi.com/about_us/contact_us/tech_support/index.asp.

## About this document


ISX-3030/3040 Node Refurbished DFB/CWDM Return TX Installation Instructions

Document Number: 1507061 Revision A