

# 3405FR Series Fiber Optic SFP Frame Installation and Operating Manual

© Copyright 2010 - 2011

## **EVERTZ MICROSYSTEMS LTD.**

5288 John Lucas Drive,  
Burlington, Ontario, Canada  
L7L 5Z9

Phone: +1 905-335-3700

Sales Fax: +1 905-335-3573

Tech Support Phone: +1 905-335-7570

Tech Support Fax: +1 905-335-7571

Sales: [sales@evertz.com](mailto:sales@evertz.com)

Tech Support: [service@evertz.com](mailto:service@evertz.com)



Web Page: <http://www.evertz.com>

Version 2.3, May 2013

The material contained in this manual consists of information that is the property of Evertz Microsystems and is intended solely for the use of purchasers of the 3405FR Series. Evertz Microsystems expressly prohibits the use of this manual for any purpose other than the operation of the device.

All rights reserved. No part of this publication may be reproduced without the express written permission of Evertz Microsystems Ltd. Copies of this guide can be ordered from your Evertz products dealer or from Evertz Microsystems.

## IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

### **WARNING**

TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

### **WARNING**

DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

### **WARNING**

TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

### **WARNING**

THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

## FIBER OPTIC DEVICES

Some modules in this product may have fiber optic outputs. The following safety information applies to the optical outputs of these modules. Consult individual chapters for specific safety information for handling fiber optics.

### WARNING



**CAUTION – CLASS 1 VISIBLE & INVISIBLE LASER RADIATION WHEN OPEN  
DO NOT VIEW DIRECTLY OR WITH OPTICAL INSTRUMENTS.**

### ELECTROSTATIC SENSITIVE DEVICES



**The hand symbol within an equilateral triangle is intended to alert the user to instructions related to precautions for handling electrostatic-sensitive devices. See “Electro Static Discharge (ESD) Precautions” section for further details.**

# INFORMATION FOR NEBS COMPLIANT VERSIONS



The intra-building port(s) of this equipment is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment **MUST NOT** be metalically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.



The intra-building port(s) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends.



This equipment is to be connected to a Common Bonding Network. See Installation section for further information.



This equipment is to be installed in the network telecommunication facilities.



To ensure that radiated emissions do not exceed NEBS requirements, all Ethernet (Cat-5 or better) connections must use shielded cable.

The use of unshielded Ethernet cable may cause excessive electromagnetic radiation in excess of NEBS specifications.

## INFORMATION TO USERS IN EUROPE

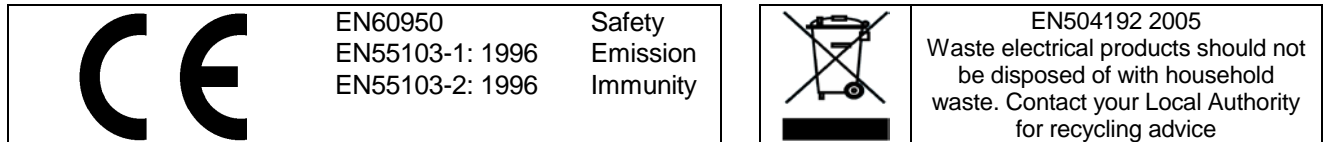
### NOTE

This equipment with the CE marking complies with both the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

- EN60950 Product Safety
- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



## INFORMATION TO USERS IN THE U.S.A.


### NOTE

#### FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### WARNING

Changes or modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment. Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connect

<p>Evertz Microsystems Ltd</p>  <p>For Commercial Use</p> <p>Tested to comply with FCC Standards</p>	<p>This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:</p> <p>This device may cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.</p>
---	---

## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First Release	Mar 2009
1.1	Added Status LED and VistaLINK Monitoring description	Mar 2009
1.2	Added power supply cabling information	Jun 2009
1.3	Added SFP variants and VLPRO screenshots & parameter chart	Nov 2009
1.4	Removed Status LED note in section 6.2.1	Dec 2009
1.5	Revised front and rear panel screens and added Ethernet configuration	Apr 2010
1.6	Added information regarding the 3405FAN-Q module	Jun 2010
1.7	Revised serial port command and VistaLINK parameters	Sept 2010
1.8	Added 3405 Series CWDM Passive Optical Modules section	Oct 2010
2.0	3405 Series Manual – merged all 3405FR frame information	Nov 2010
2.1	Added 48V versions, updated specifications	Dec 2010
2.2	Modified 3405PST LED functionality	Feb 2011
2.3	Added requirements for NEBS documentation	May 2013

Information contained in this manual is believed to be accurate and reliable. However, Evertz assumes no responsibility for the use thereof or for the rights of third parties, which may be effected in any way by the use thereof. Any representations in this document concerning performance of Evertz products are for informational use only and are not warranties of future performance, either expressed or implied. The only warranty offered by Evertz in relation to this product is the Evertz standard limited warranty, stated in the sales contract or order confirmation form.

Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

---

---

## TABLE OF CONTENTS

<b>1.</b>	<b>OVERVIEW .....</b>	<b>1</b>
1.1.	3405FR-BNC FRAME .....	2
1.2.	3405FR-DIN FRAME.....	3
1.3.	3405FR-XLINK FRAME .....	4
<b>2.</b>	<b>INSTALLATION.....</b>	<b>5</b>
2.1.	12V DC POWER (12V VERSIONS ONLY).....	6
2.1.1.	Connecting a Redundant Power Supply.....	7
2.1.2.	Connecting the 1RU Power Supply Tray (3405PS-6/+PS-6 option) .....	7
2.1.3.	Connecting the Standalone Power Supply (3405PSX).....	9
2.2.	48V DC POWER (48VDC VERSIONS ONLY).....	10
2.2.1.	Power Supply Status Indicators .....	10
2.3.	FAN INSTALLATION AND REMOVAL (3405FAN).....	11
2.3.1.	Cooling .....	12
2.4.	CARE AND HANDLING OF OPTICAL FIBER .....	13
2.4.1.	Safety .....	13
2.4.2.	Assembly .....	13
2.4.3.	Labeling .....	14
2.4.4.	Handling and Connecting Fibers.....	14
2.5.	FIBER INPUT AND OUTPUT CONNECTIONS .....	15
2.5.1.	Electro Static Discharge (ESD) Precautions .....	16
2.5.2.	3405FR-BNC SFP Module Variants.....	16
2.5.3.	3405FR-DIN SFP Module Variants .....	17
2.5.4.	3405FR-XLINK SFP Module Variants .....	18
2.5.5.	Installing an SFP Module .....	18
2.5.6.	Removing an SFP Module .....	19
2.6.	ELECTRICAL INPUT AND OUTPUT CONNECTIONS .....	19
2.6.1.	Rear Panel BNC Connections.....	19
2.6.2.	Rear Panel DIN Connections .....	20
2.6.3.	Rear Panel XLINK Connections .....	20
2.6.4.	3405FR-BNC-48V and 3405FR-DIN-48V Rear Panels .....	21
2.7.	SERVICING INSTRUCTIONS .....	22
2.8.	REPLACING THE 3405PS-6 POWER SUPPLY .....	22
2.9.	CHANGING THE FUSES .....	23
<b>3.</b>	<b>TECHNICAL SPECIFICATIONS.....</b>	<b>24</b>

---

3.1.	3405FR-BNC FRAME .....	24
3.2.	3405FR-DIN FRAME.....	24
3.3.	3405FR-XLINK FRAME .....	24
3.4.	COMMUNICATION AND CONTROL .....	24
3.5.	OPTICAL OUTPUT .....	24
3.6.	OPTICAL INPUT .....	25
3.7.	ELECTRICAL INPUTS (3405FR-BNC & 3405FR-DIN ONLY).....	25
3.8.	ELECTRICAL OUTPUTS (3405FR-BNC & 3405FR-DIN ONLY) .....	25
3.9.	PHYSICAL .....	26
3.10.	POWER (12V DC VERSIONS).....	26
3.11.	POWER (48V DC).....	26
3.12.	3405PSX EXTERNAL POWER SUPPLY BRICK.....	26
3.13.	3405PS-6 1RU POWER SUPPLY TRAY .....	26
3.14.	COMPLIANCE .....	27
4.	STATUS AND LEADS.....	28
4.1.1.	STATUS LED.....	28
4.1.2.	SFP Monitoring LEDs .....	28
5.	CONFIGURATION AND CONTROL.....	30
5.1.	3405 FRAME CONTROLLER CONFIGURATION .....	30
5.2.	VISTALINK® CONFIGURATION .....	32
5.2.1.	General Tab.....	32
5.2.2.	TX/RX Configuration Tabs .....	34
5.2.2.1.	Tx Configuration.....	36
5.2.2.2.	Rx Configuration .....	36
5.2.3.	Faults Tab.....	36
5.2.4.	Network Parameters Tab .....	39
5.2.5.	Trap Destination Tab .....	40
5.2.6.	FC Faults Tab .....	40
6.	VISTALINK® MONITORING/CONTROL.....	41
6.1.	WHAT IS VISTALINK®?.....	41
6.2.	VISTALINK® MONITORED PARAMETERS.....	41



6.3.	VISTALINK <sup>®</sup> TRAPS .....	42
6.4.	VISTALINK <sup>®</sup> CONTROLLED PARAMETERS .....	42
7.	3405 SERIES CWDM PASSIVE OPTICAL MODULES .....	44
7.1.	OVERVIEW .....	44
7.1.1.	3405CWDM Coarse Wavelength Division Multiplexor.....	44
7.2.	INSTALLATION .....	48
7.3.	SPECIFICATIONS.....	51
7.3.1.	Optical Input/Output.....	51
7.3.2.	Physical .....	51

**Figures**

Figure 1-1:	3405FR-BNC Frame .....	2
Figure 1-2:	3405FR-BNC Block Diagram .....	2
Figure 1-3:	3405FR-DIN Frame .....	3
Figure 1-4:	3405FR-DIN Block Diagram .....	3
Figure 1-5:	3405FR-XLINK Frame .....	4
Figure 1-6:	3405FR-XLINK Block Diagram .....	4
Figure 2-1:	External Views of 3405FR-BNC .....	5
Figure 2-2:	External Views of 3405FR-DIN .....	5
Figure 2-3:	External Views of 3405FR-XLINK .....	6
Figure 2-4:	DC Power Connector to Frame and 3405PS-6 .....	7
Figure 2-5:	Locating the External 12V DC Power Connector .....	7
Figure 2-6:	3405PS-6 Power Supply Tray .....	8
Figure 2-7:	3405PSX Power Supply.....	9
Figure 2-8:	Locating the External 48V DC Power Connector .....	10
Figure 2-9:	3405PST Status Indicators .....	11
Figure 2-10:	Front View of 3405FAN.....	12
Figure 2-11:	Cooling Fan Installation and Removal.....	13
Figure 2-12:	Reproduction of Laser Certification and Identification Label .....	14
Figure 2-13:	3405FR Front View with Fiber Inputs and Outputs.....	15
Figure 2-14:	3405T, 3405R, 3405T13-R, and 3405OO13-DA4 Evertz <sup>®</sup> SFP Modules .....	15
Figure 2-15:	3405FR-BNC Fixed Electrical Connections.....	19
Figure 2-16:	3405FR-DIN Fixed Electrical Connections .....	20
Figure 2-17:	3405FR-XLINK Fixed Electrical Connections .....	20
Figure 2-18:	3405FR-BNC-48V Rear Panel .....	21
Figure 2-19:	3405FR-DIN-48V Rear Panel .....	21
Figure 2-20:	Power Supply Retaining Screw .....	22
Figure 4-1:	Front of 3405FC .....	28
Figure 4-2:	Front of 3405FC-2 .....	29
Figure 5-1:	3405T13-2 VistaLINK <sup>®</sup> General Tab .....	32
Figure 5-2:	3405T13-R VistaLINK <sup>®</sup> General Tab.....	32
Figure 5-3:	3405OO13-DA4 VistaLINK <sup>®</sup> General Tab.....	33
Figure 5-4:	3405R-2 VistaLINK <sup>®</sup> General Tab.....	33
Figure 5-5:	3405R-2R VistaLINK <sup>®</sup> General Tab .....	33

Figure 5-6: 3405T13-2 VistaLINK® TX Configuration Tab .....	34
Figure 5-7: 3405T13-R VistaLINK® TX Configuration Tab .....	34
Figure 5-8: 3405OO13-DA4 VistaLINK® RX Configuration Tab .....	35
Figure 5-9: 3405R-2 VistaLINK® RX Configuration Tab .....	35
Figure 5-10: 3405R-2R VistaLINK® RX Configuration Tab .....	36
Figure 5-11: 3405T13-2 VistaLINK® Faults Tab .....	37
Figure 5-12: 3405T13-R VistaLINK® Faults Tab .....	37
Figure 5-13: 3405OO13-DA4 VistaLINK® Faults Tab .....	38
Figure 5-14: 3405R-2 VistaLINK® Faults Tab .....	38
Figure 5-15: 3405R-2R VistaLINK® Faults Tab .....	39
Figure 5-16: 3405FC VistaLINK® Network Parameter Tab .....	39
Figure 5-17: 3405FC VistaLINK® Trap Destination Tab .....	40
Figure 5-18: 3405FC VistaLINK® FC Faults Tab .....	40
Figure 7-1: 3405CWDM-M8 Simplified Block Diagram .....	45
Figure 7-2: 3405CWDM-M16 Simplified Block Diagram .....	45
Figure 7-3: 3405CWDM-2-M16 Simplified Block Diagram .....	46
Figure 7-4: 3405CWDM-2-M8 Simplified Block Diagram .....	47
Figure 7-5: 8 Channel Breakout Cable .....	48
Figure 7-6: Wiring Diagram of the 3405CWDM-2-M16 and 3405CWDM-D16 .....	50

**Tables**

Table 1-1: Frame Versions .....	1
Table 4-1: Status LED Chart .....	28
Table 4-2: SFP LED Chart .....	28
Table 6-1: VistaLINK® Monitoring .....	41
Table 6-2: VistaLINK® Traps .....	42
Table 6-3: VistaLINK® Controlled Parameters .....	43
Table 7-1: Passive Optical Modules .....	44
Table 7-2: 3405CWDM Model and The Associated Required Fanout Cable .....	49
Table 7-3: Insertion Loss Specifications .....	51

## 1. OVERVIEW

The Evertz 3405FR Series SFP frame is the ideal solution for today's low cost, high density fiber optic distribution needs. The 3405FR Series provides the flexibility to handle the high-speed requirements of 3G and HDTV as well as SD-SDI, SDTi, and DVB-ASI.

All components are hot swappable through the front of the frame including SFP's, frame controllers, multiplexers, and power converters. This ensures the unit can be fully serviceable in the field without having to be de-cabled or removed from the customers rack.

The unit supports extraction of the SFP modules from the front without compromising performance. The frame can be configured for a variety of modules. The 3405FR frame is available in five versions as shown in Table 1-1.

Model	Description	Connector	Density
<b>3405FR-BNC</b>	Fiber Optic SFP BNC Frame	BNC	Up to 32 EO, OE, or mixture of EO and OE in a 1RU unit
<b>3405FR-DIN</b>	Fiber Optic SFP DIN Frame	miniDIN	Up to 32 EO, OE, or mixture of EO and OE in a 1RU unit
<b>3405FR-XLINK</b>	Fiber Optic SFP X-LINK Frame	X-LINK	Up to 32 EO or 32 OE X-LINK conversions in a 1RU unit
<b>3405FR-BNC-48V</b>	Fiber Optic SFP BNC Frame with Dual 48V DC Inlets	BNC	Up to 32 EO, OE, or mixture of EO and OE in a 1RU unit
<b>3405FR-DIN-48V</b>	Fiber Optic SFP DIN Frame with Dual 48V DC Inlets	miniDIN	Up to 32 EO, OE, or mixture of EO and OE in a 1RU unit

**Table 1-1: Frame Versions**

**Note:** The 3405FR-BNC-48V and 3405FR-DIN-48V are identical in all aspects of functionality when comparing to the 3405FR-BNC and 3405FR-DIN respectively. The only difference is that they are powered from 48VDC instead of 12VDC.

**Features:**

- Dual Power supplies (primary and redundant) and conversion trays (front extractable)
- Houses up to 16 front loading Evertz SFP modules
- Each slot can be used as an input or an output based on SFP type
- Dual primary & secondary 3405FC Frame Controllers for full VistaLINK<sup>®</sup> SNMP control and monitoring
- No electrical re-cabling required when hot swapping modules
- Power options include external 12V power supply bricks or 1RU power supply tray which will power up to 6 x 3405FR units with redundancy
- 48VDC powered versions available for Telco applications

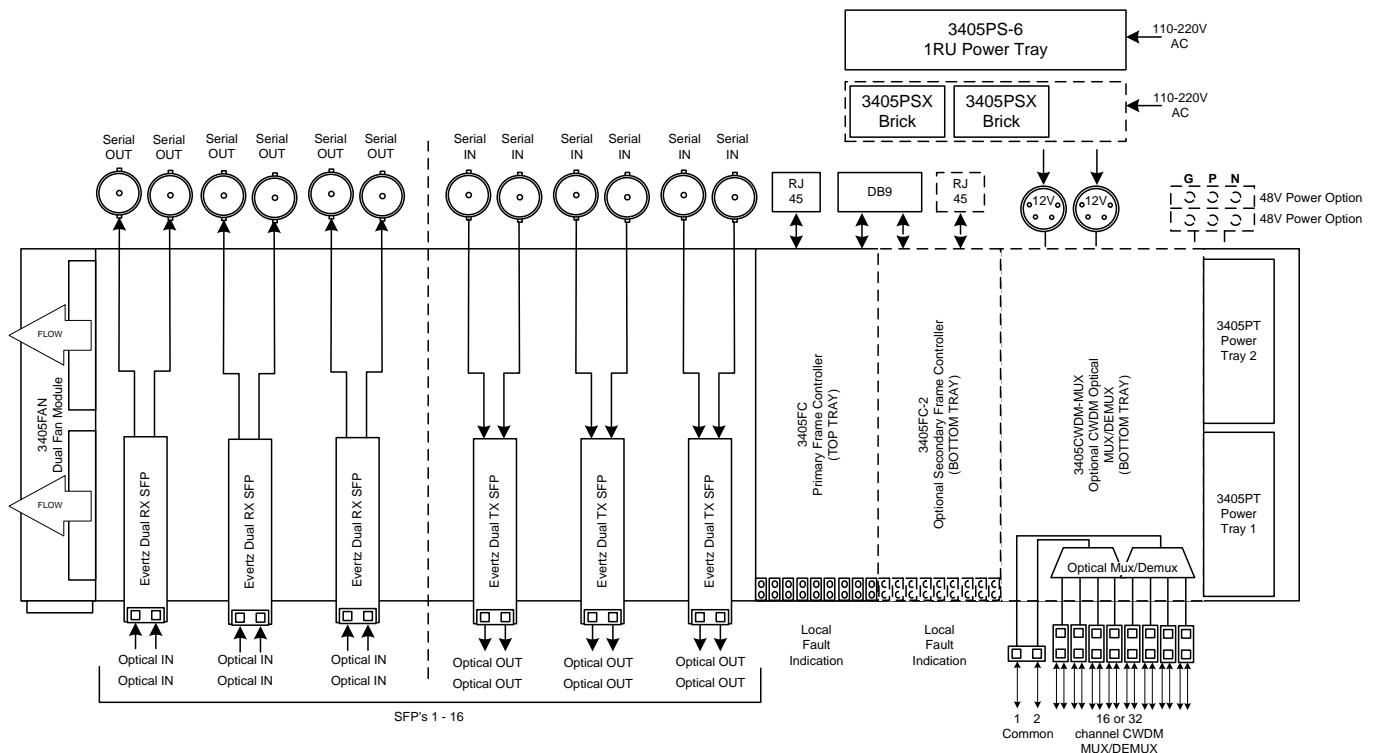
**Additional Features for 3405FR-BNC and 3405FR-DIN:**

- Optional bi-directional single or dual Mux/Demux of up to 16 wavelengths in the 1270nm to 1610nm spectrum (ITU-T G.694.2 compliant)
- Optional 48V DC power inlet version
- MTP to LC/UPC fanout cable for convenient fiber connection from Evertz SFPs to Mux/Demux modules

**1.1. 3405FR-BNC FRAME**

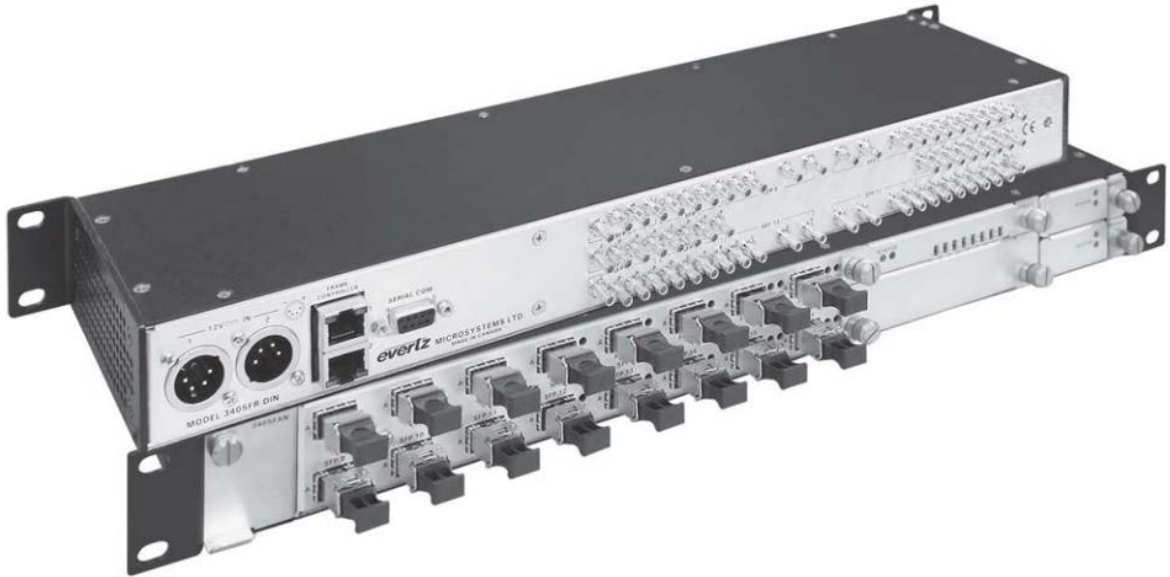


**Figure 1-1: 3405FR-BNC Frame**

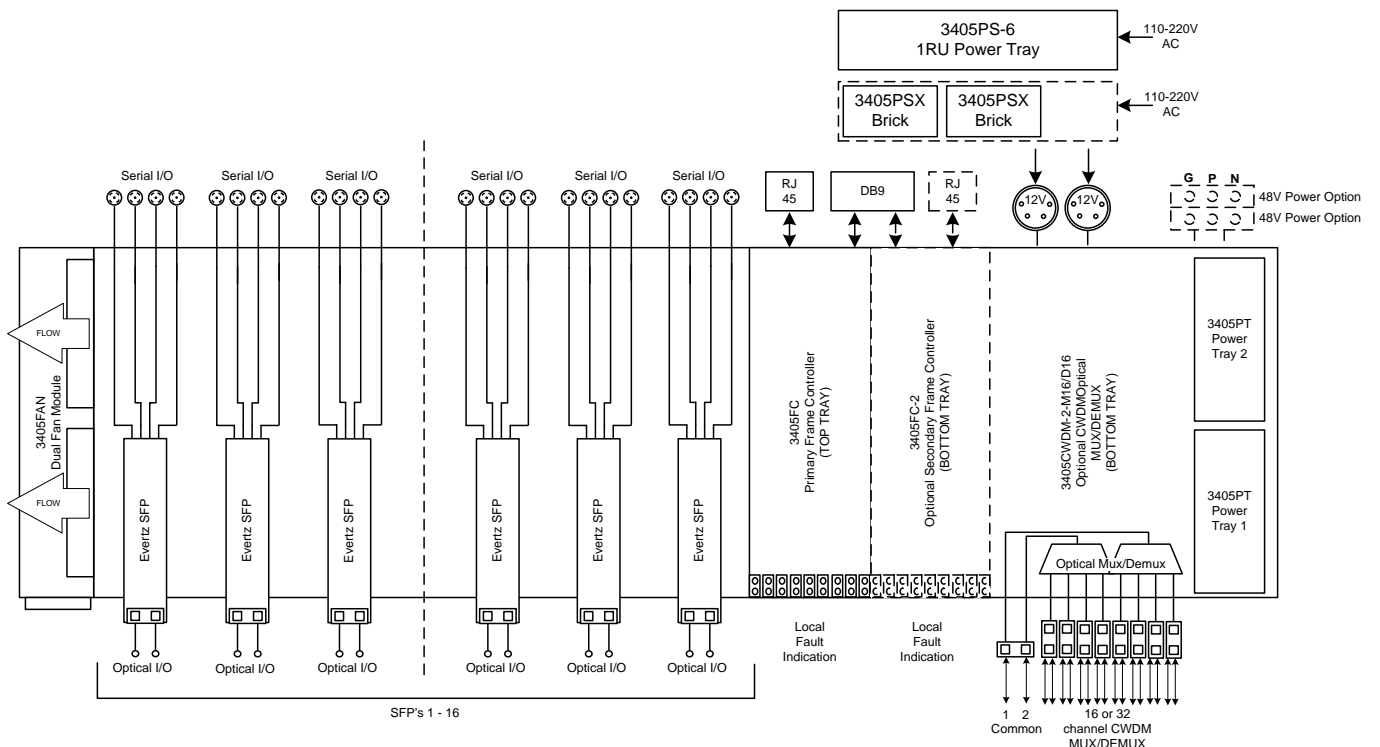


**Figure 1-2: 3405FR-BNC Block Diagram**

**1.2. 3405FR-DIN FRAME**



**Figure 1-3: 3405FR-DIN Frame**



**Figure 1-4: 3405FR-DIN Block Diagram**

1.3. 3405FR-XLINK FRAME



Figure 1-5: 3405FR-XLINK Frame

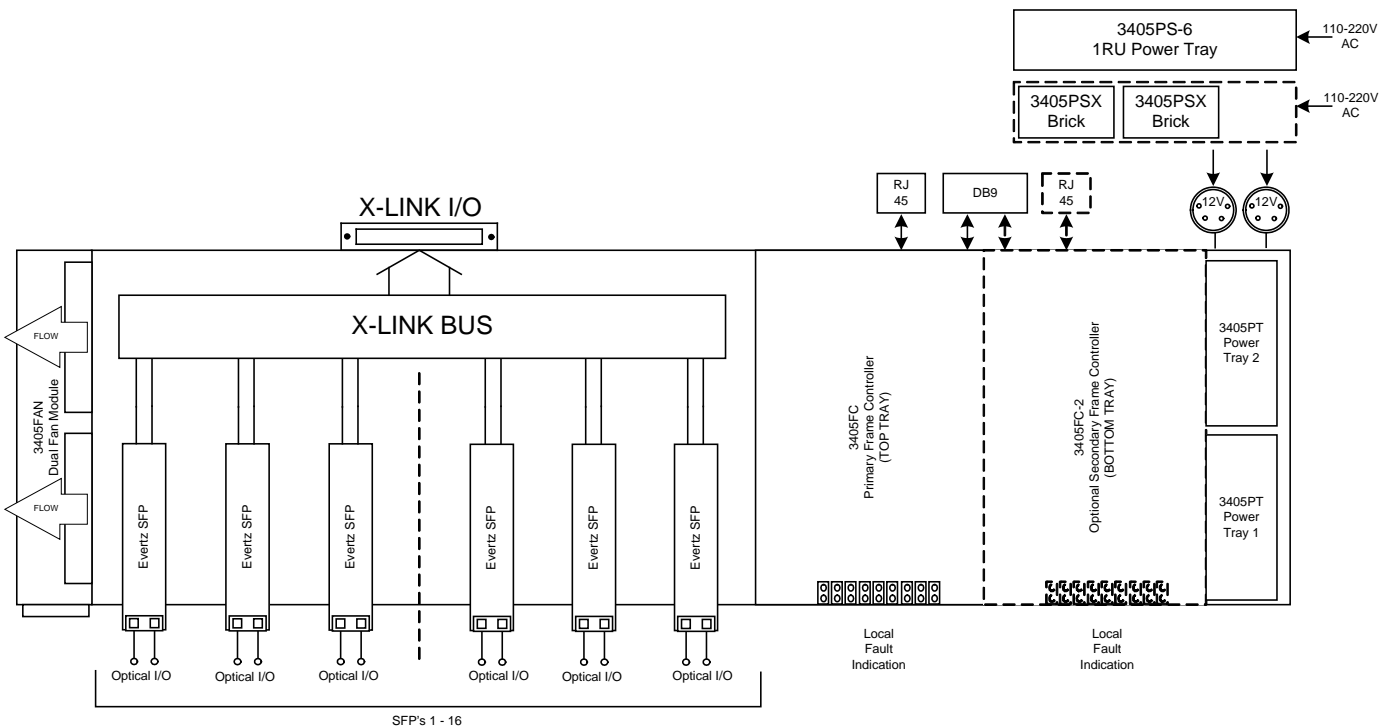
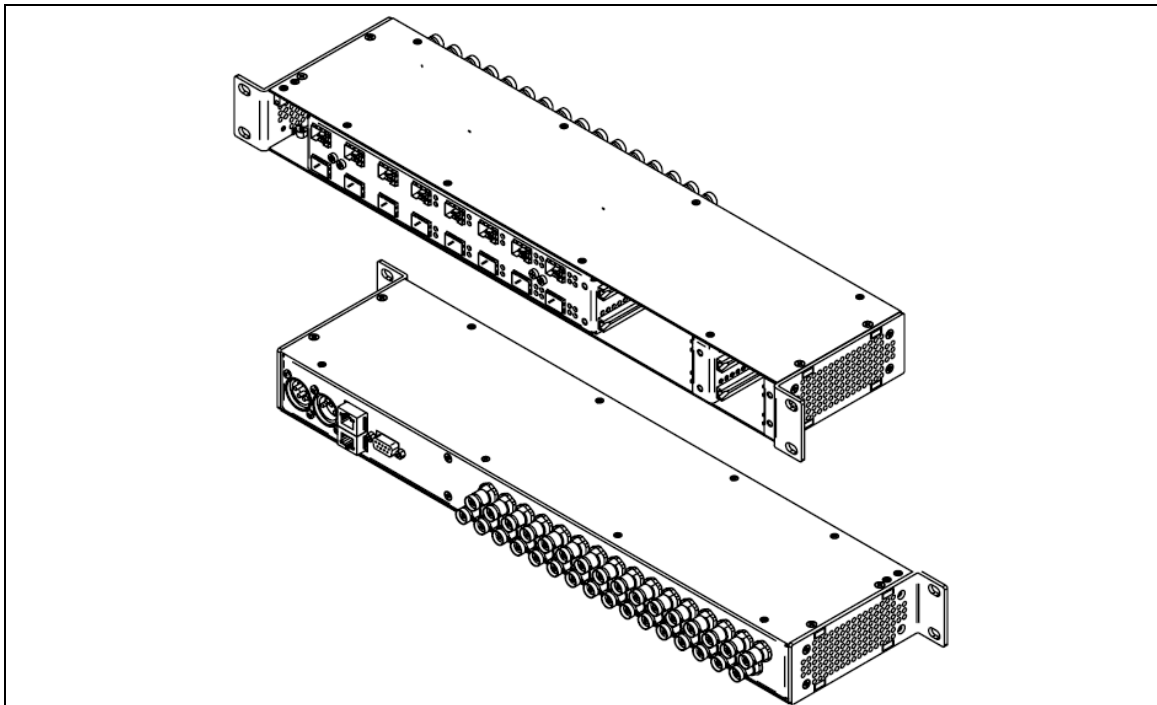


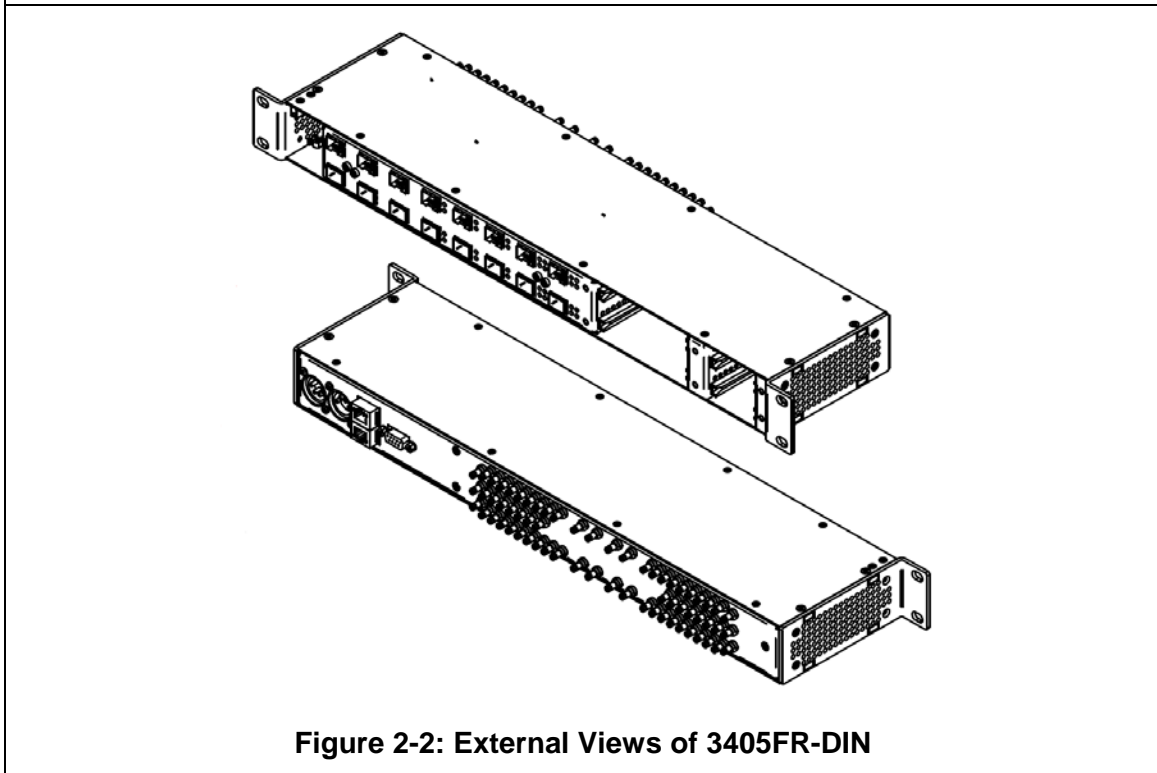
Figure 1-6: 3405FR-XLINK Block Diagram

## 2. INSTALLATION

The 3405FR Series frames require 1 rack unit (i.e. 1.75 inches (45 mm) of standard 19 inch (483 mm) wide rack space). To firmly fasten the frame to the equipment rack, make sure that all four mounting screws are securely tightened.



**Figure 2-1: External Views of 3405FR-BNC**



**Figure 2-2: External Views of 3405FR-DIN**

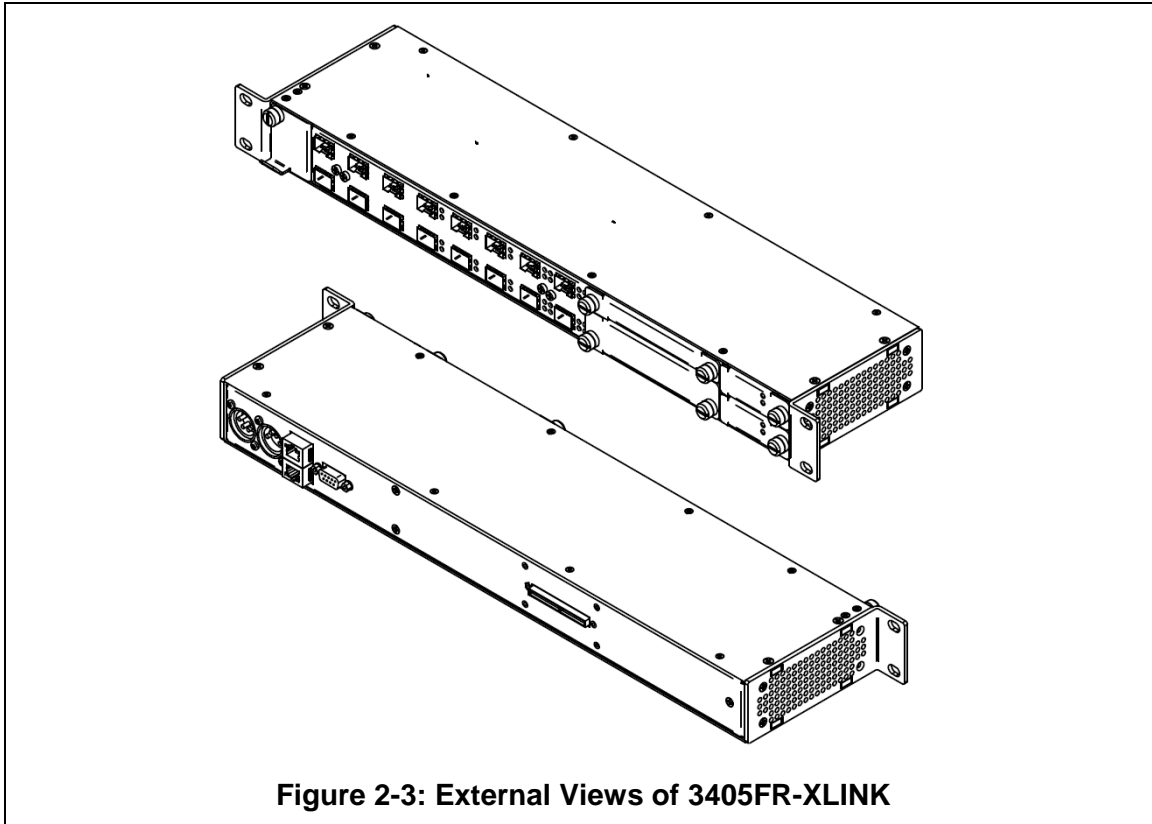


Figure 2-3: External Views of 3405FR-XLINK

## 2.1. 12V DC POWER (12V VERSIONS ONLY)



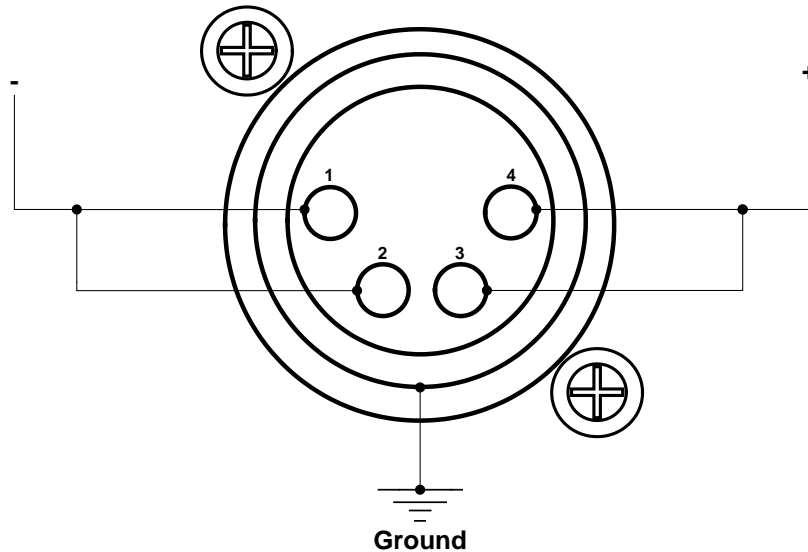
**CAUTION:** Section 2.1 does not apply to 3405FR-BNC-48V and 3405FR-DIN-48V. For information on connecting power to the 48VDC versions see section 2.2.

The 3405FR series frames require a nominal 12 Volt DC power source. Optionally you can connect one of two different external AC to DC power supply converters (3405PSX or 3405PS-6). 12 Volt DC power should be applied to the 3405FR by connecting a 4 PIN XLR power supply cord to the main power entry inlet on the rear panel (12V DC IN #1).



**CAUTION:** MAKE SURE THAT YOU OBSERVE THE DC POLARITY AS SHOWN IN Figure 2-4.



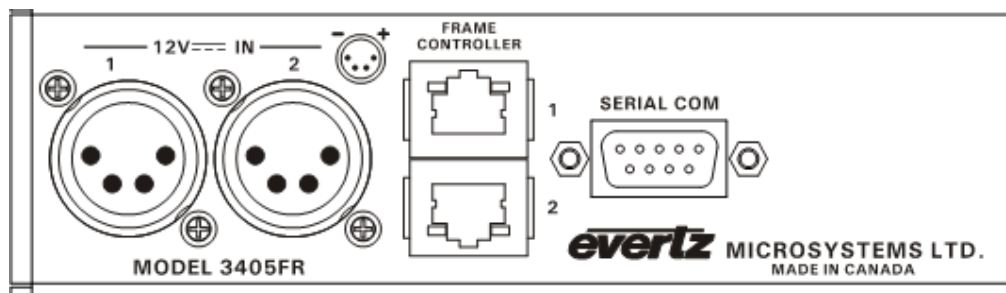


**Figure 2-4: DC Power Connector to Frame and 3405PS-6**

**2.1.1. Connecting a Redundant Power Supply**

An external redundant power supply (a second model 3405PSX or the backup tray of the 3405PS-6) is available to supply power in case of a failure in the main power supply. To provide further redundancy, the 3405PST is redundant to each other. DC inlet #1 corresponds to both 3405PST power supply trays. The same is true for DC inlet #2.

Power should be applied by connecting a 4 PIN XLR power supply cord to the power entry module on the rear panel (12V DC IN #2).

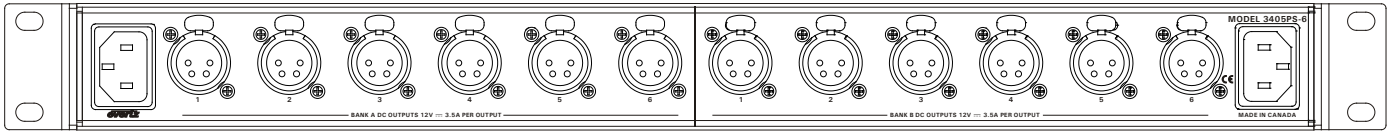


**Figure 2-5: Locating the External 12V DC Power Connector**

**2.1.2. Connecting the 1RU Power Supply Tray (3405PS-6/+PS-6 option)**

The 3405PS-6 tray holds two auto-ranging external power supplies that automatically sense the input voltage over the range of 100 to 240 VAC. AC Power will need to be applied to both power inlets to ensure redundant operation of the 3405PS-6 power supply tray and the 3405FR series frame it is connected to.

The 3405PS-6 is designed to supply power to six 3405FR frames in a redundant configuration. Bank A 4-pin XLR outlets will connect to the 3405FR 12V DC IN #1 and Bank B 4-pin XLR outlets will connect to the 12V DC IN #2 of each 3405FR.



**Figure 2-6: 3405PS-6 Power Supply Tray**

The 3405PS-6 has 2 status indicators LEDs on the power supply units. The green status indicator LED indicates fault free operation of the power supply unit and the presence of AC power. The red status indicator LED indicates a faulty power supply unit. If no AC power is applied to the power supply unit, the corresponding LEDs (green and red) will be off.

AC Power should be applied to the 3405PS-6 by connecting a 3-wire grounding type power supply cord to the power entry module on the rear panel of each power supply. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.



**CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, EARTHING OF THE EARTH PIN OF THE MAINS PLUGS MUST BE MAINTAINED**



**For NEBS compliant installations, the AC power cords of the 3405PS-6 shall be connected to an external surge protection device (SPD).**

The power entry modules contain a standard IEC power inlet connector and an EMI line filter. A separate fuse holder is provided for each AC input. The fuse holder is located on each side the front panel of the frame.

**Fuse Rating:** 4 amps, 250 Volt time delay 5 x 20 mm



**If there is a fuse failure, contact Evertz customer service regarding the power supply immediately. The power supplies are short circuit protected and should not blow the fuse under a short circuit condition.**

### 2.1.3. Connecting the Standalone Power Supply (3405PSX)



**Figure 2-7: 3405PSX Power Supply**

The 3405PSX unit is an auto-ranging external power supply that automatically senses the input voltage over the range of 100 to 240 VAC. The 3405PSX is designed to supply power to one 3405FR frame. The 4-pin XLR outlet connects to the 3405FR 12V DC IN #1 connector. For redundant power supply operation connect a second 3405PSX to the 12V DC IN #2 of the 3405FR.

The 3405PSX external power supply brick has 1 green status indicator LED. The green status indicator LED indicates fault free operation of the power supply brick and the presence of AC power. The green status indicator is off if AC power is absent or the 3405PSX is faulty.

Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry module on the rear panel of each power supply. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.



**CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, EARTHING OF THE EARTH PIN OF THE MAINS PLUG MUST BE MAINTAINED**



**For NEBS compliant installations, the AC power cord of the 3405PSX shall be connected to an external surge protection device (SPD).**

## 2.2. 48V DC POWER (48VDC VERSIONS ONLY)

The 3405FR-BNC-48V and 3405FR-DIN-48V frames come standard with two auto-ranging power supplies that automatically sense the input voltage over the range of 36 to 60 VDC. Power should be applied by connecting a 2 conductor twisted pair shielded power supply cord to the screw terminals on the rear panel of each power supply. The power cord should be minimum 18 AWG wire size; maximum 2.5 m in length.

The frame rear panel is fitted with 2 three terminal wiring block for primary and secondary power connections.



**For NEBS compliant installations, the Battery return terminal of this device is an isolated DC return also known as a DC-I configuration.**

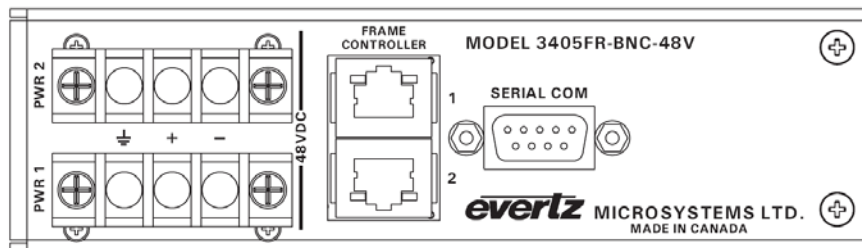


Figure 2-8: Locating the External 48V DC Power Connector



**CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, EARTHING OF THE EARTH PIN DC INPUT TERMINAL STRIP MUST BE MAINTAINED**



**If there is a fuse failure, contact Evertz customer service regarding the power supply immediately. The power supplies are short circuit protected and should not blow the fuse under a short circuit condition.**



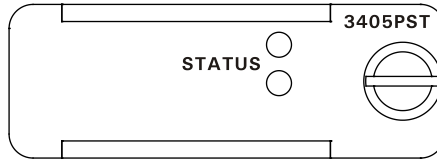
**CAUTION: Section 2.2 applies only to 3405FR-BNC-48V and 3405FR-DIN-48V. For information on connecting power to the 12V version see section 2.1**

### 2.2.1. Power Supply Status Indicators

For orders shipped before September 2009, the 3405PST power supply tray has 2 status indicator LEDs. The green status indicator LED indicates fault free operation of the 3405PST unit and the presence of DC power. The upper 3405PST unit corresponds to DC 12V IN1 while, the lower 3405PST unit corresponds

to DC 12V IN2. The red status indicator LED indicates a faulty 3405PST unit or the absence of DC 12V IN.

For orders shipped post September 2009, the 3405PST power supply tray has 2 status indicator LEDs. The green status indicator LED indicates fault free operation of the PST unit. The red status indicator LED indicates a faulty 3405PST unit.

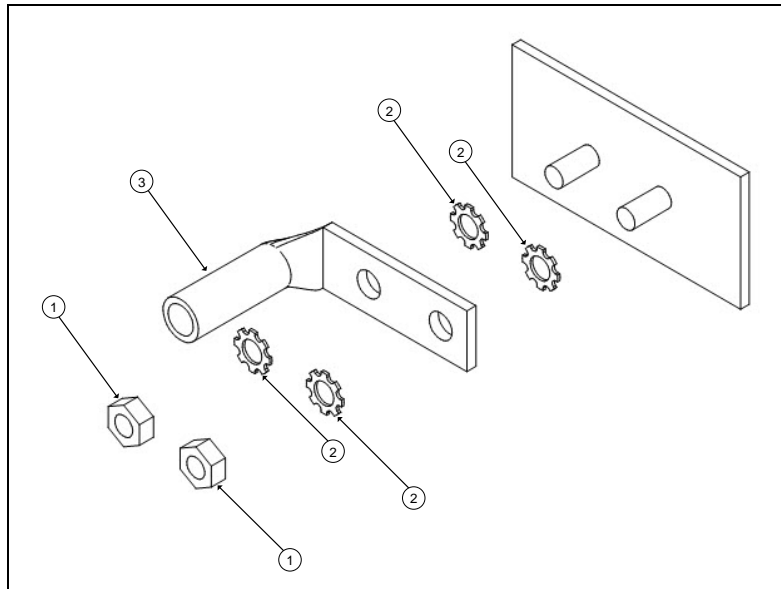


**Figure 2-9: 3405PST Status Indicators**

**2.3. GROUNDING AND BONDING – NEBS APPLICATIONS**



The NEBS compliant version of this equipment is to be connected to a Common Bonding Network.



**Figure 2-10: NEBS Bonding System**

This NEBS compliant version of the frame is provided with the following components to facilitate connection to a common bonding network.

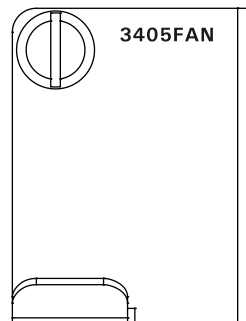
Item#	Description	Qty.
1	M4 HEX Nut	2
2	#6 external tooth lock washer	4
3	Bonding Lug	1

**Table 2-1: Bonding Parts Included with NEBS Compliant Version**

- This equipment is to be installed in the network telecommunication facilities.
- Provide a dedicated connection from a common bonding network to this equipment by connecting a stranded AWG #6 (16 mm<sup>2</sup>) copper wire to the bonding lug provided.
- When using insulated wire, strip 7/8 inch (2 cm) of insulation.
- Bare conductors of the bonding wire must be coated with antioxidant before crimp connections to the bonding lug are made.
- Fasten the bonding lug to the equipment as shown in Figure 2-10. The ground lug must be secured as shown using four star washers (to prevent anti-rotation of the nuts) and two M4 nuts. Tighten the nuts securely to provide a good bonding connection.

## 2.4. FAN INSTALLATION AND REMOVAL (3405FAN)

Figure 2-11 provides an illustration of the 3405FAN front view.

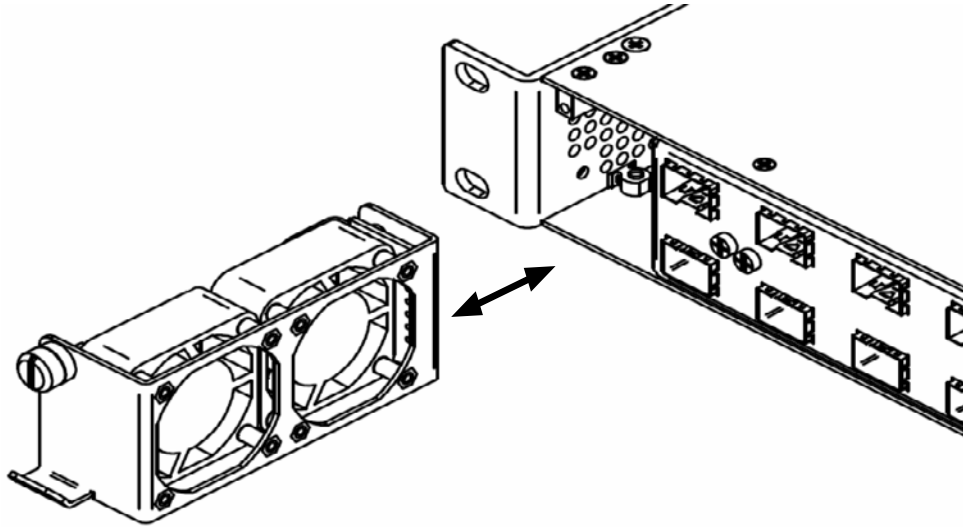


**Figure 2-11: Front View of 3405FAN**

### 2.4.1. Cooling

The 3405FR frame is designed to ensure adequate cooling for up to 40 watts of processing power per frame. Fans at the sides of the frame accomplish forced air cooling. Adjacent equipment may be mounted immediately to the top and bottom of the 3405FR frame. Additional module cooling is provided by interior cooling channels to ensure that even fully loaded frames mounted adjacent to each other will operate within the normal temperature range.

The 3405FAN module is capable of cooling the 3405FR from an operating ambient temperature of 0-50°C. A 3405FAN-Q (quiet fan) is also available to ensure adequate cooling for an ambient operating temperature of 0-30°C.



**Figure 2-12: Cooling Fan Installation and Removal**

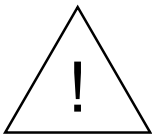
If necessary, the cooling fans can be removed for the purposes of fan replacement. Always ensure that this procedure is applied while the frame is off. Removing the fans will cause unwanted heat build-up in the 3405FR. Undo the captive screw and pull outwards on the metal tab at the bottom of the 3405FAN. Installation is the reverse of removal.



**CAUTION:** To achieve adequate cooling, care should be taken to ensure that the fan inlets and exhaust openings are free of obstructions.

## 2.5. CARE AND HANDLING OF OPTICAL FIBER

### 2.5.1. Safety



Background colour: yellow  
Triangular band: black  
Symbol: black

**CLASS 1 LASER PRODUCT**

### 2.5.2. Assembly

Assembly or repair of the Evertz<sup>®</sup> SFP modules is done only at Evertz facility and performed only by qualified Evertz technical personnel.

### 2.5.3. Labeling

Certification and Identification labels are combined into one label. As there is inadequate space on the product to place the label, it is reproduced here in the manuals.

- There is no date of manufacture on this label as it can be traced by bar code label placed on the Evertz® SFP module.
- The model number of the SFPs containing lasers is one of: 3405T13-2, 3405Txx/yy-2, 3405R-2, 3405R-2R, 3405OO13-DA4, and 3405OOxx-DA4.  
where xx and yy = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61

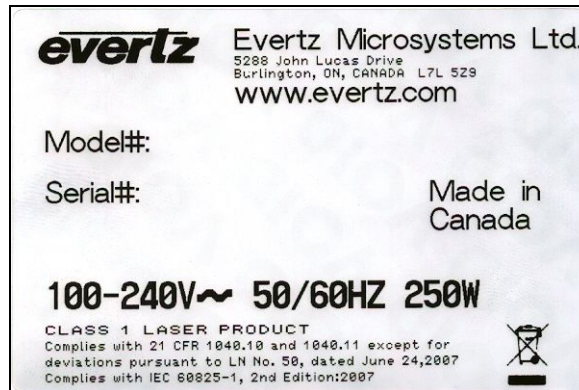


Figure 2-13: Reproduction of Laser Certification and Identification Label

### 2.5.4. Handling and Connecting Fibers



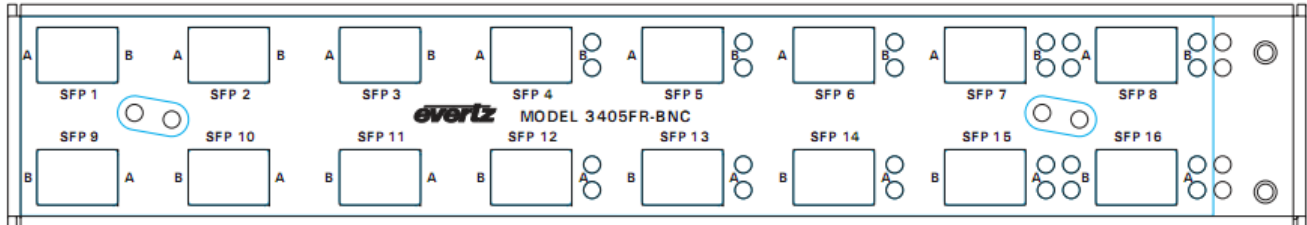
**Never touch the end face of an optical fiber. Always keep dust caps on optical fiber connectors when not connected and always remember to properly clean the optical end face of a connector before making a connection.**

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that the user maintains a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. For further information about care and handling of fiber optic cable see the Evertz website. (<http://www.evertz.com/resources/>)



## 2.6. FIBER INPUT AND OUTPUT CONNECTIONS

These connections are made using standard LC fiber connector ends on single mode fiber optic cable. There are a total of 16 dual SFP slots. There can be a mix of 32 fiber inputs or outputs on the 3405FR front panel. A high quality fiber optic cable such as Corning SMF-28 or suitable equivalents should be used for optimum performance. Compatible SFP modules currently come in four configurations: dual transmitters, dual receivers, reclocking transmitter, and reclocking receiver.



**Figure 2-14: 3405FR Front View with Fiber Inputs and Outputs**

Unpopulated SFP slots will remain inactive until the appropriate SFP is installed. Please ensure flat or ultra flat polished fiber LC connectors are used for the SFPs.



**NOTE: Channels A and B on the front of the 3405FR frame correspond to channels A and B on the rear of the frame (Figure 2-16).**

Figure 2-15 depicts any one of the following Evertz® SFP modules: 3405T13-2, 3405Txx/yy-2, 3405R-2, 3405R-2R, 3405OO13-DA4, and 3405OOxx-DA4.



**Figure 2-15: 3405T, 3405R, 3405T13-R, and 3405OO13-DA4 Evertz® SFP Modules**

The SFP fiber modules are equipped with a class 1 laser and emit invisible radiation. Avoid exposure to the laser emitter and do not stare directly into unconnected SFP emitter ports or fiber ends that are connected to SFP ports.

- It is recommended that trained and qualified personnel install, replace or handle this equipment.
- Ensure ESD precautions are followed during SFP installation.
- Store SFP modules in static bags and wear an ESD strap when handling the optical modules. SFP modules are also dust sensitive.
- To prevent dust from entering the apertures of an SFP module, keep plugs inserted into the optical bores.
- Do not repeatedly remove and insert SFP modules more often than necessary. Repeated removals and insertions of an SFP module can shorten its life.

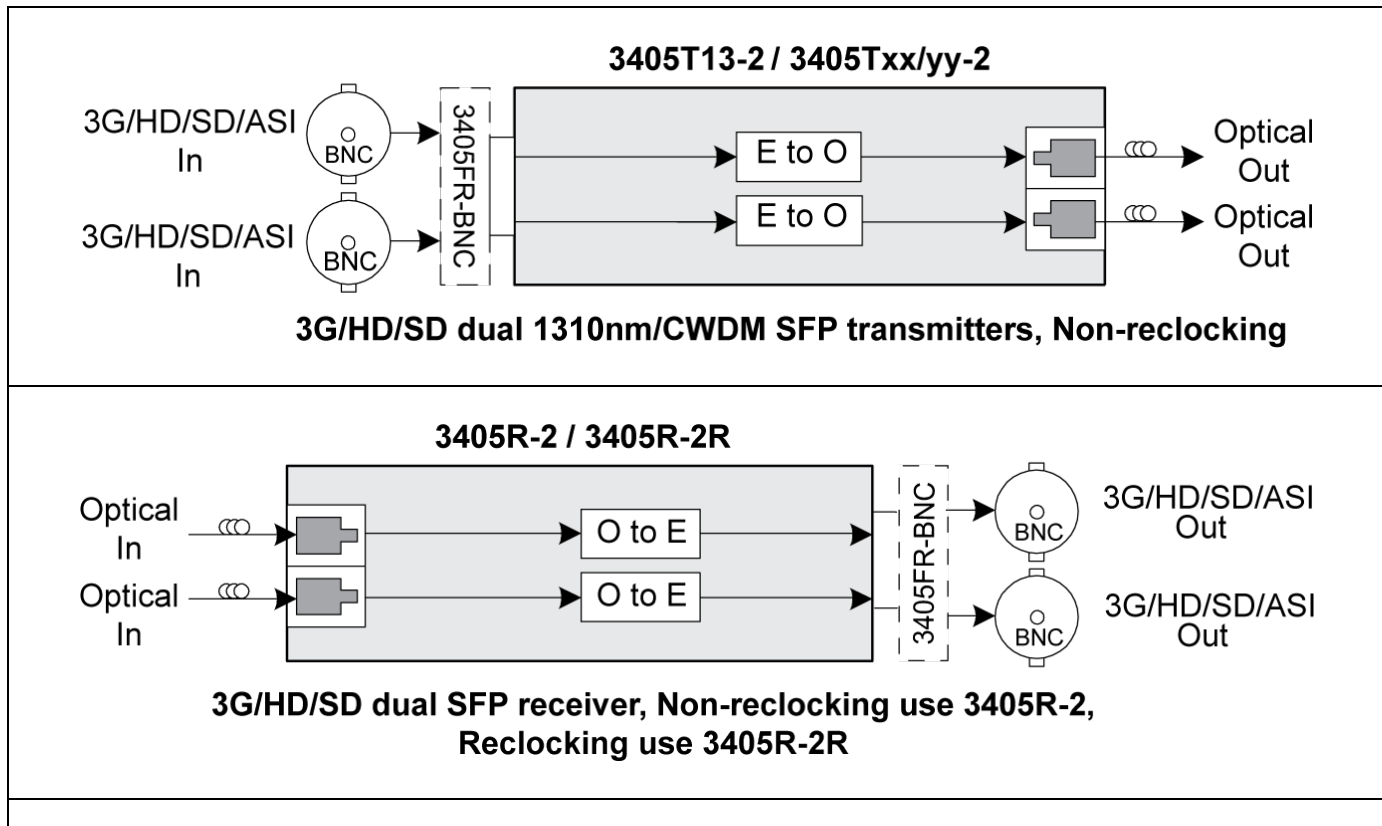
**2.6.1. Electro Static Discharge (ESD) Precautions**

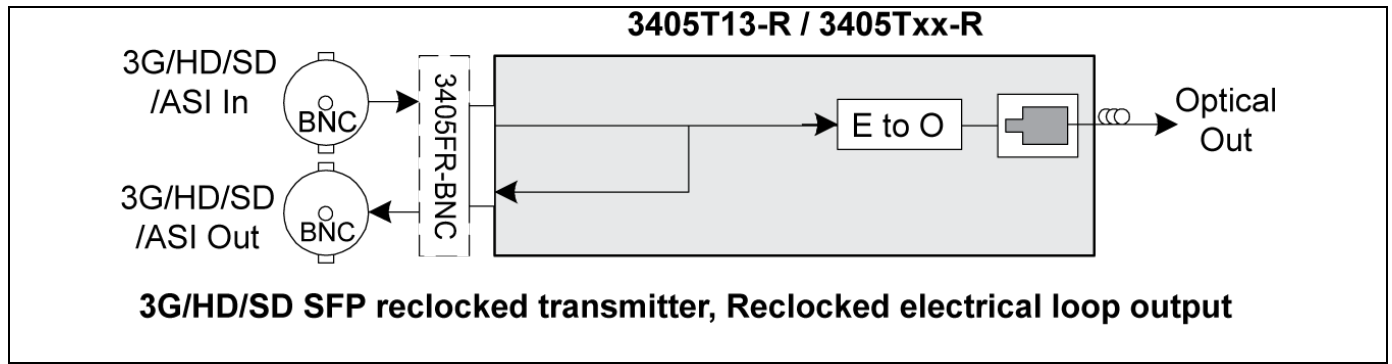


**All semiconductor devices are sensitive to ESD. To prevent any damage or degradation on components of the product caused by ESD, observe these precautions when installing or removing modules from the frame.**

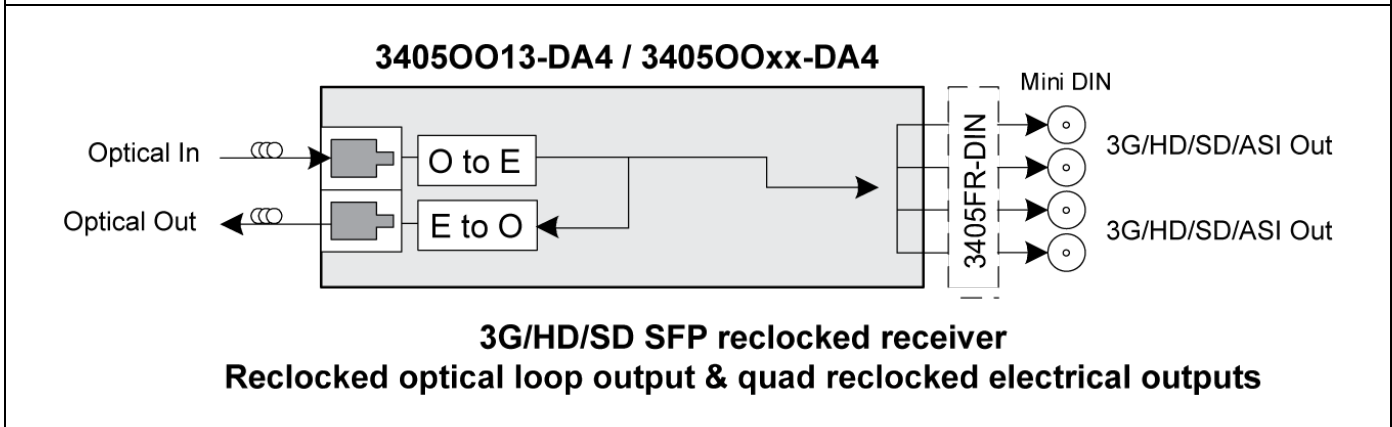
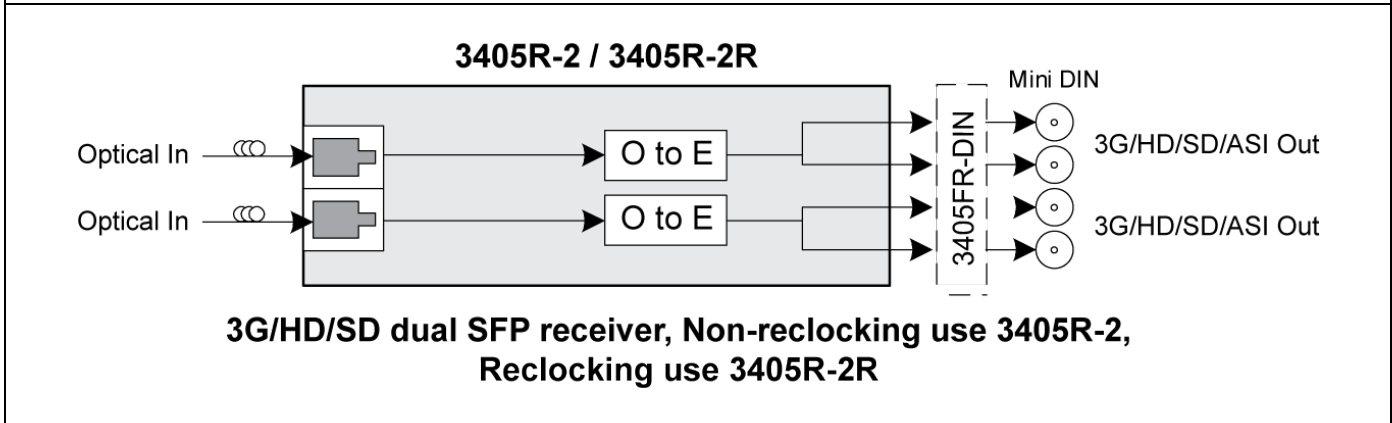
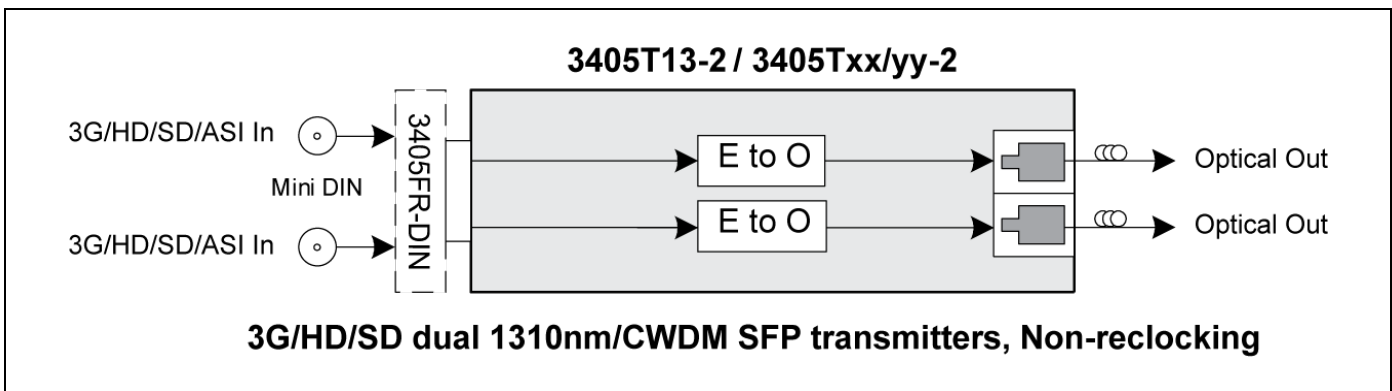
1. Discharge static from your body. Wear a grounded anti-static wrist or heel strap, to discharge the static voltage from your body.
2. Use a Safe Work Area. Avoid handling modules in areas that have a floor or work surface covering capable of generating a static charge. Also nothing capable of generating or holding a static charge should be allowed in the work area.
3. Handle ESD sensitive modules carefully. Do not slide modules over any surface. Do not touch exposed connector pins. Pick-up modules by the edges of the modules, never by touching exposed leads.
4. Transport and store sensitive components or assemblies in a static-protected bag or container.

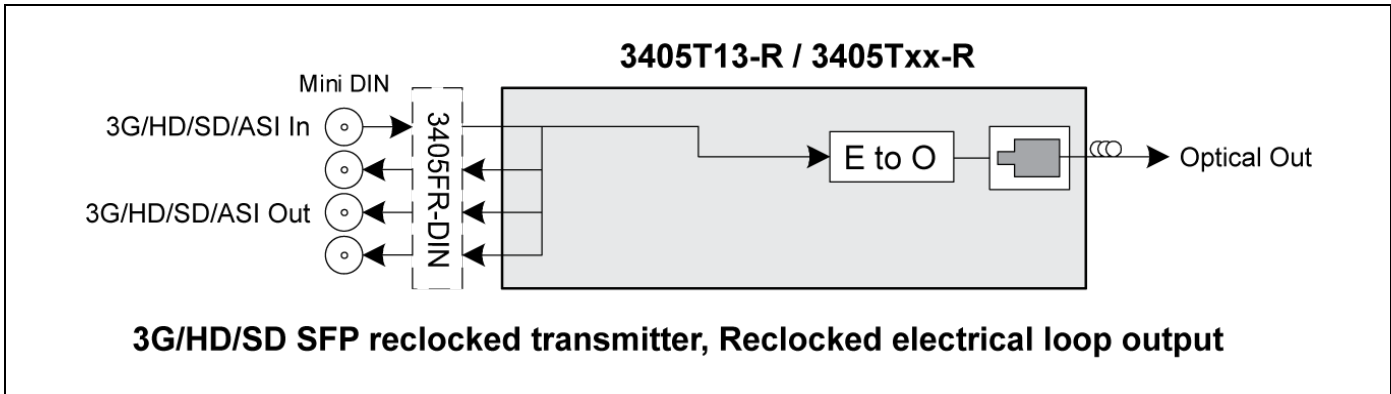
**2.6.2. 3405FR-BNC SFP Module Variants**



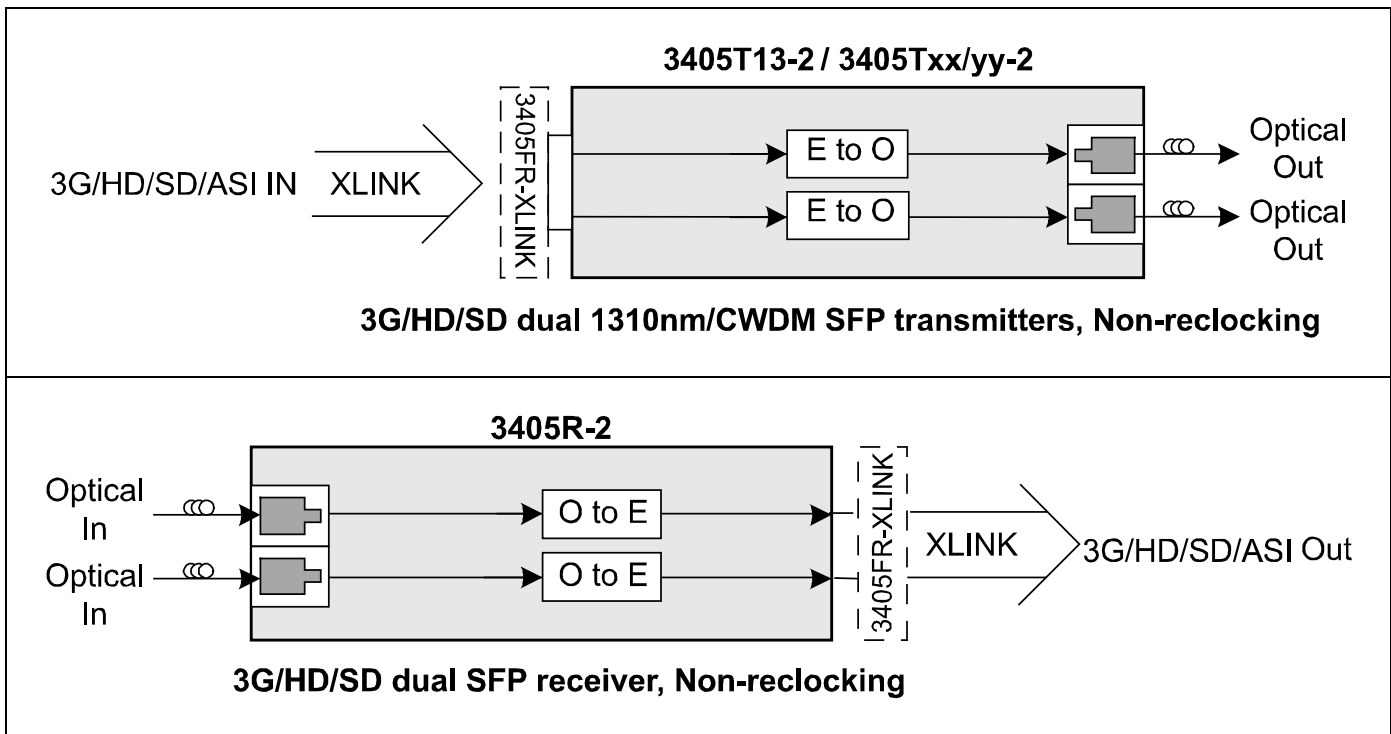


**2.6.3. 3405FR-DIN SFP Module Variants**





**2.6.4. 3405FR-XLINK SFP Module Variants**



**2.6.5. Installing an SFP Module**



**Note:** In most cases, SFP modules will come from the factory preinstalled into its respective slot. The following steps outline the procedure for replacing or installing a new SFP module.

1. Remove the SFP module from its protective packaging. You can identify if your particular SFP module is a duplex transmitter or duplex receiver. Observe the top of the SFP module. The part number is located on the top of the SFP module. A 3405T-2 part number denotes a duplex transmitter module (output) and a 3405R-2 denotes a duplex receiver module (input). A 3405T13-R part number denotes a reclocking simplex transmitter module (output) and a 3405OO13-DA4 denotes a reclocking simplex receiver module (input).

2. Hold the sides of the SFP module between your thumb and forefinger, position the alignment grooves on the sides of the SFP with the corresponding guides in the SFP slot on your module.
3. Slide the SFP gently but firmly into the SFP slot. You should hear a click when the clips on either side of the SFP snap into place, locking the SFP in the port receptacle.



**Note: Do not remove the dust plugs from the optical bores of the SFP or the dust caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP optical ports and the cable connectors from contamination.**

**2.6.6. Removing an SFP Module**



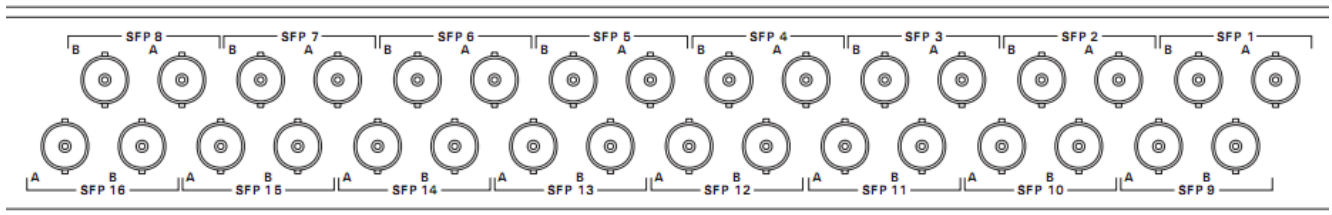
**Note: It is strongly recommended that SFP modules are not installed or removed with fiber-optic cables attached. Doing so may cause damage to the cables, the connectors, or the optical interfaces in the SFP module. Disconnect all cables before removing or installing SFP modules.**

1. Pull the bale-clasp latch out and down to eject the module. If the latch is obstructed and you are not able to release the clasp, use a small flat-blade screwdriver or other narrow flat instrument to open the bale-clasp latch.
2. Grasp the SFP module between your thumb and index finger and carefully remove the SFP from its slot.
3. Place the removed SFP module into an anti-static bag, or other ESD protective container.

**2.7. ELECTRICAL INPUT AND OUTPUT CONNECTIONS**

**2.7.1. Rear Panel BNC Connections**

The BNC's on the rear of the 3405FR-BNC are fixed and correspond to a particular SFP module. These BNC connectors are agile and thus configured as inputs or outputs. A BNC will become an electrical input if its corresponding SFP spigot is an optical transmitter (Electrical to Optical converter). Conversely a BNC will become an electrical output if its corresponding SFP spigot is an optical receiver (Optical to Electrical converter).



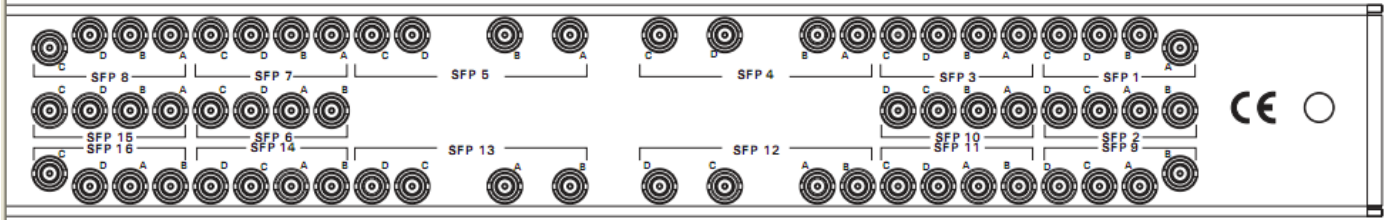
**Figure 2-16: 3405FR-BNC Fixed Electrical Connections**



**NOTE: Channels A and B on the front of the 3405FR-BNC frame (Figure 2-14) correspond to channels A and B on the rear of the frame.**

**2.7.2. Rear Panel DIN Connections**

A group of 4 MiniDINs on the rear of the 3405FR-DIN are fixed and correspond to a particular SFP module. These BNC MiniDINs are agile and are assigned as inputs or outputs depending on the type of SFP inserted. For detailed input and output assignments, please see section 2.6.3.



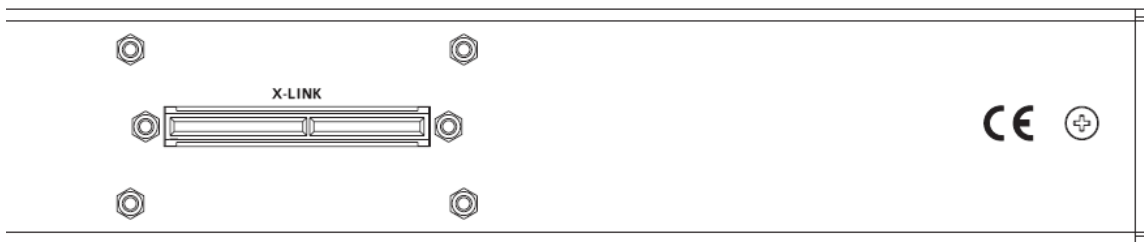
**Figure 2-17: 3405FR-DIN Fixed Electrical Connections**



**NOTE: Channels A and B on the front of the 3405FR-DIN frame (Figure 2-14) correspond to channels A and B on the rear of the frame.**

**2.7.3. Rear Panel XLINK Connections**

The X-LINK IO's on the rear of the 3405FR-XLINK are fixed and correspond to a particular SFP module. This X-LINK connector is agile and thus configured as inputs or outputs. An X-LINK connector will become an electrical input if its corresponding SFP spigot is an optical transmitter (Electrical to Optical converter). Conversely the X-LINK connector will become an electrical output if its corresponding SFP spigot is an optical receiver (Optical to Electrical converter).



**Figure 2-18: 3405FR-XLINK Fixed Electrical Connections**

The following is the mapping scheme between the XLINK input/output number to the SFP input/output location:

XLINK Input/Output	SFP
1	16-A
2	8-B
3	16-B
4	8-A
5	15-A
6	7-B
7	15-B
8	7-A
9	14-A
10	6-B
11	14-B
12	6-A
13	13-A
14	5-B
15	13-B
16	5-A
17	12-A
18	4-B
19	12-B
20	4-A
21	11-A
22	3-B
23	11-B
24	3-A
25	10-A
26	2-B
27	10-B
28	2-A
29	9-A
30	1-B
31	9-B
32	1-A

2.7.4. 3405FR-BNC-48V and 3405FR-DIN-48V Rear Panels

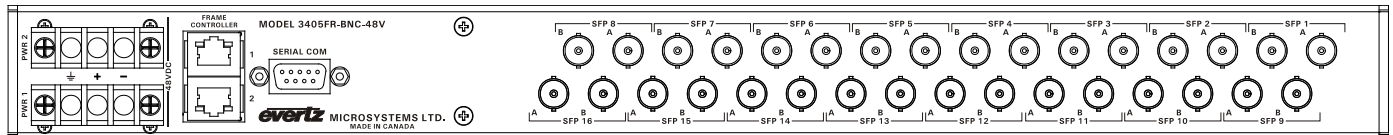


Figure 2-19: 3405FR-BNC-48V Rear Panel

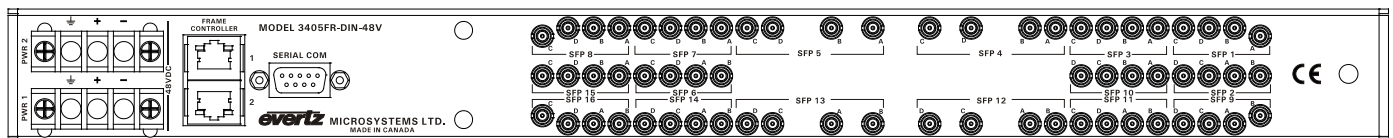


Figure 2-20: 3405FR-DIN-48V Rear Panel

## 2.8. SERVICING INSTRUCTIONS



**CAUTION – These servicing instructions are for use by qualified service personnel only. To reduce risk of electric shock do not perform any servicing instructions in this section of the manual unless you are qualified to do so.**

## 2.9. REPLACING THE 3405PS-6 POWER SUPPLY

The 3405PS-6 tray contains two power supply modules (model 3405PS-6-SPARE) Each power supply is a complete assembly and includes three frame cooling fans. In the event that the power supply or one of the fans malfunction, you will need to replace the power supply assembly with a spare one while the failed assembly is being repaired.



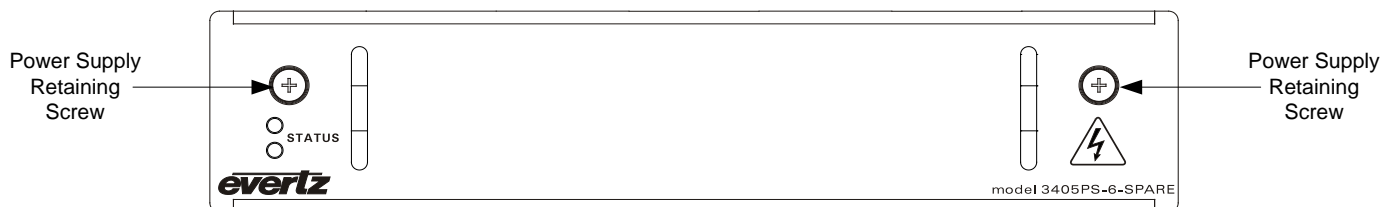
**Do not run the frame for extended periods of time with one of the power supplies removed. Proper cooling of the frame requires both power supplies to be inserted into the frame.**

The 3405PS-6 power supplies are hot swappable and can be easily replaced from the front without interrupting the power being supplied by the redundant supply. Each power supply is capable of supplying full power to up to 6 3405FR series frames by itself, however we recommend running with both supplies powered for power redundancy. The left and right power supplies are identical.



**If the Power supply is removed with the power cord still connected to the mains, there is a potential shock hazard present as there will be mains voltages present on the power supply connector. Use care when removing the power supply to reduce the risk of shock.**

The power supply is secured into the frame by two retaining screws on the front panel (as shown in Figure 2-21). These screws must be loosened before the power supply can be extracted from the front.



**Figure 2-21: Power Supply Retaining Screw**

To replace the power supply the following procedure should be used.

1. Locate the power supply retaining screws and loosen them using a Phillips screwdriver.
3. Pull the power supply out of the frame.
4. Reinsert the new power supply into the frame taking care that it is properly aligned with the card guides. Press firmly to make sure that the power supply is fully seated into the rear panel connector.
5. Tighten the power supply retaining screws.



6. After a few seconds you should see the PSU STATUS LED come on indicating that the power supply is working correctly.



**To reduce risk of electric shock you must tighten the mounting screw after replacing the power supply.**

## 2.10. CHANGING THE FUSES



**If there is a fuse failure, contact Evertz customer service regarding the power supply immediately. The power supplies are short circuit protected and should not blow the fuse under a short circuit condition.**

The fuse holders are located on the front of the power tray. To change the fuse for one of the supplies, you should first disconnect the power cord for the power supply. Insert a flat blade screwdriver in the fuse holder and turn clockwise. Pull out the fuse from the fuse holder using a small screwdriver. Remove the blown fuse and replace with a fuse of the correct value. The correct fuse rating is marked on the front panel. Carefully reinsert the fuse into the fuse holder. Tighten by turning the fuse holder counter clockwise.

The correct fuse rating is shown below.

**Fuse Rating:** 4 amps, 250 Volt time delay, 5 x 20 mm



**Check that the line fuse is rated for the correct value. Never replace with a fuse of greater value.**

---

### 3. TECHNICAL SPECIFICATIONS

#### 3.1. 3405FR-BNC FRAME

**Density:** Up to 32 EO, OE, or mixture of EO and OE in a 1RU unit  
**Impedance:** 75  $\Omega$   
**Connector:** BNC per IEC 61169-8 Annex A (F-type connector optional)

#### 3.2. 3405FR-DIN FRAME

**Density:** Up to 32 EO, OE, or mixture of EO and OE in a 1RU unit  
**Impedance:** 75  $\Omega$   
**Connector:** DIN 1.0/2.3 Female connector

#### 3.3. 3405FR-XLINK FRAME

**Density:** Up to 32 EO, OE, or mixture of EO and OE to X-LINK conversion in a 1RU unit  
**Impedance:** 75  $\Omega$   
**Connector:** XLINK

#### 3.4. COMMUNICATION AND CONTROL

**Serial:** RS-232 single Female 9 pin D connector  
**Ethernet:** SNMP over IEEE 802.3/U (10/100 BaseTx) RJ-45 connector  
**Control:** VistaLINK<sup>®</sup>

#### 3.5. OPTICAL OUTPUT

**Number of Outputs:**  
    **3405FR-BNC:** Up to 2 per SFP  
    **3405FR-DIN:** Up to 2 per SFP  
    **3405FR-XLINK:** 2 per SFP  
**Connector:** LC/UPC  
**Rise/Fall Time:** <270ps  
**Optical Power:**  
    **Standard:** -1dBm +/- 1dBm  
    **CWDM:** +1dBm +/- 1dBm  
**Wavelength:**  
    **Standard:** 1310nm  
    **CWDM:** 1270nm-1610nm  
    ITU-T G.694.2 compliant

### 3.6. OPTICAL INPUT

**Number of Inputs:**

<b>3405FR-BNC:</b>	Up to 2 per SFP
<b>3405FR-DIN:</b>	Up to 2 per SFP
<b>3405FR-XLINK:</b>	2 per SFP

**Connector:** LC/UPC**Operating Wavelength:** 1270nm to 1610nm**Maximum Input Power:** -1dBm**Optical Sensitivity:**

<b>Standard:</b>	-21dBm at 2.97Gb/s pathological Level A
	-23dBm at 2.97Gb/s color bars

### 3.7. ELECTRICAL INPUTS (3405FR-BNC & 3405FR-DIN ONLY)

\*NOTE: Electrical outputs specs only apply to reclocking SFP modules (3405T13-R & 3405OO13-DA4)

**Standard:** SMPTE 424M (3Gb/s), SMPTE 292M (1.5Gb/s), SMPTE 259M (270Mb/s), DVB-ASI**Connector:****3405FR-BNC:** BNC per IEC 61169-8 Annex A**3405FR-DIN:** DIN 1.0/2.3 Female connector**Equalization:** Automatic to 80m @ 3Gb/s, 100m @ 1.5Gb/s, 250m @ 270Mb/s (with Belden 1694A or equivalent)**Return Loss:**  
> 15dB up to 1.5GHz  
> 10dB up to 3GHz

### 3.8. ELECTRICAL OUTPUTS (3405FR-BNC & 3405FR-DIN ONLY)

\*NOTE: Electrical outputs specs only apply to reclocking SFP modules (3405T13-R & 3405OO13-DA4)

**Connector:****3405FR-BNC:** BNC per IEC 61169-8 Annex A**3405FR-DIN:** DIN 1.0/2.3 Female Connector**Impedance:** 75  $\Omega$  (nominal)**Signal Level:** 800mV (nominal)**DC Offset:** 0V +/- 0.5V**Rise and Fall Time:**  
< 135ps (HD/3G)  
< 900ps (SD)**Overshoot:** < 10% of amplitude**Return Loss:**  
> 15dB to 1.5GHz  
> 10dB to 3GHz**Alignment Jitter:**  
< 0.2UI (Reclocked) to 1.485Gb/s  
< 0.3UI (Reclocked) to 2.97Gb/s

### 3.9. PHYSICAL

<b>Dimensions:</b>	1.8"H x 19"W x 4.16"D
<b>Module Capacity:</b>	16 Evertz® SFP modules. Dual TX or Dual RX
<b>Operating Temperature:</b>	0-50°C (3405FAN installed) 0-30°C (3405FAN-Q installed)

### 3.10. POWER (12V DC VERSIONS)

<b>Power Supply Configuration:</b>	Dual External Supplies (primary/secondary 3405PSX) Or 1RU Power Supply Tray (3405PS-6)
<b>Voltage:</b>	DC Input 12V DC (external power supplies required for 110-220V)
<b>Maximum Power Consumption:</b>	40 W (fully loaded frame with all accessories) Note: Power consumption dependent on SFP type
<b>Connectors:</b>	4 Pin Male XLR (12V DC)
<b>Status Indicators:</b>	PST status LEDs (each per power supply tray)

### 3.11. POWER (48V DC)

<b>Power Supply Configuration:</b>	Dual External Supplies (primary/secondary)
<b>Voltage:</b>	Auto ranging 36 ⇔ 72V DC
<b>Maximum Power Consumption:</b>	50W Typical (fully loaded frame with all accessories) Note: Power consumption dependent on SFP type
<b>Connectors:</b>	3 pin screw terminal strip – 1 per power supply
<b>Status Indicators:</b>	PST status LEDs (each per power supply tray)

### 3.12. 3405PSX EXTERNAL POWER SUPPLY BRICK

<b>AC Mains Input:</b>	Auto ranging, 100 ⇔ 240 VAC, 50/60 Hz
<b>Number of Outputs:</b>	1
<b>Output Voltage:</b>	12V DC
<b>Output Connector:</b>	4 Pin Female XLR
<b>Maximum Power Dissipation:</b>	120 W
<b>Status Indicators:</b>	Green OK LED

### 3.13. 3405PS-6 1RU POWER SUPPLY TRAY

<b>Input Voltage:</b>	Auto ranging, 100 ⇔ 240 VAC, 50/60 Hz
<b>Input Current:</b>	3 A per cord
<b>Input Power:</b>	300W (Main), 300W (Redundant)
<b>Fuses:</b>	4 amp, time delay – 1 per power supply tray
<b>Number of Outputs:</b>	12 (6 main/6 redundant)
<b>Output Voltage:</b>	12V DC
<b>Output Current:</b>	3.5A per output
<b>Output Connector:</b>	4 Pin Female XLR
<b>Status Indicators:</b>	Green OK LED Red Fault LED

**3.14. COMPLIANCE**

<b>Safety:</b>	CSA Listed to CSA C22.2 No. 60950-1:2007, UL 60950 2 <sup>nd</sup> Edition, IEC 60950-1:2006 incl. Am 11 Complies with CE Low voltage Directive 2004/108/EC
<b>Laser Safety:</b>	Class 1 laser product Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007, Complies with IEC 60825-1:2007 Edition 2
<b>EMC:</b>	Complies with FCC part 15, class A Complies with EU EMC directive 2006/95/EC
<b>ROHS:</b>	Complies with EU restriction on hazardous substances 2002/95/EC

## 4. STATUS AND LEDS

The 3405FC frame controller card is inserted through the front of the frame and is secured to the 3405FR frame with the one captive screws fastened on either side of the unit.

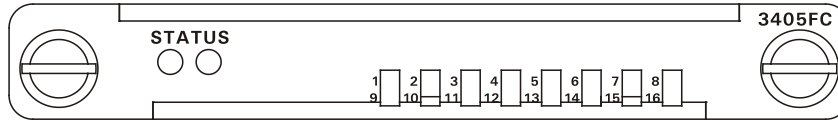


Figure 4-1: Front of 3405FC

### 4.1.1. STATUS LED

The two LEDs under the “STATUS” label on the front of the 3405FC identify the health of the frame and frame controller.

LED	Description
<b>Red LED</b>	<p><b>Red LED</b> indicates failure of the power supply, fan or frame controller. The following parameters are monitored by the RED Status LED:</p> <ol style="list-style-type: none"> <li>1. 3405 Power Supply unit (blown fuse, short circuit condition)</li> <li>2. Failure of the 3405FAN</li> <li>3. Failure of 3405FC or 3405FC-2</li> </ol>
<b>Green LED</b>	<b>Green LED</b> frame, frame controller and power supplies are all functioning normally.

Table 4-1: Status LED Chart

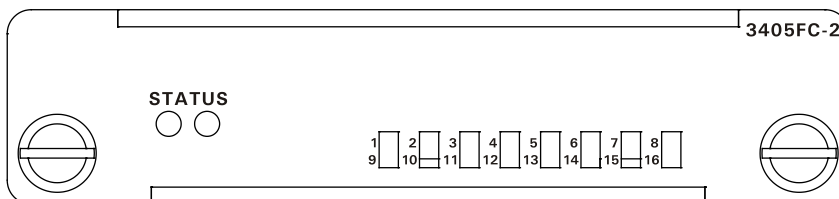
### 4.1.2. SFP Monitoring LEDs

The 16 LEDs on the front of the 3405FC signify SFP module presence and signal status (1 through 16).

LED	Description
<b>No LED</b>	An unlit LED indicates that there is no SFP plugged into the associated port number.
<b>Red LED</b>	<b>Red LEDs</b> indicate the presence of an error with the particular SFP inserted in the corresponding port number, or it indicates a loss of signal (fiber or coax). A Red LED indicates that the SFP is Present, but there are errors on the input signal and an input has been unplugged from the SFP.
<b>Green LED</b>	<p><b>Green LEDs</b> indicate the presence of a working SFP module corresponding to the SFP port number. A Green LED indicates that the SFP is Present, there is a valid signal input, and both inputs are plugged into the SFP.</p> <p><b>Note:</b> Both fiber inputs (for receiver) or both coax inputs (for transmitter) will need to be connected to the SFP in order for the LED to go Green.</p>

Table 4-2: SFP LED Chart

A backup 3405FC frame controller module can optionally be installed in the frame in the same manner as the primary 3405FC.



**Figure 4-2: Front of 3405FC-2**



**Note: The Redundancy of the frame controller is currently not supported.**

## **5. CONFIGURATION AND CONTROL**

The 3405FC Frame Controller card provides a single point of access to communicate with the VistaLINK® enabled 3405FR. The 3405FC provides a 10Base-T/100Base-TX Ethernet port and communication is facilitated through the use of Simple Network Management Protocol (SNMP). The 3405FC handles all SNMP communications between the frame (3405FR) and the network manager (NMS), and serves as a gateway to individual SFP's in the frame. The 3405FC also provides a custom RS-232 serial port for customer configurations.

### **5.1. 3405 FRAME CONTROLLER CONFIGURATION**

This step by step guide will allow the user to change the Ethernet settings for SNMP communications.

- 1) From the top of the 3405FC, please ensure jumper J2 is set to run mode.
- 2) Connect the serial cable on the back of the 3405FR unit and start up HyperTerminal.
  - a. Baud: 57600
  - b. Data: 8 bit
  - c. Parity: none
  - d. Stop Bits: 2
  - e. Flow Control: none

3) Power on the 3405FR unit.

4) From the main menu two selections are available:

```
<<<S-3405 Menu Engine V0.1>>>
1  3405 Controller Settings
2  TX/RX SFP Modules Settings
```

5) Under menu item #1 *3405 Controller Settings*, the following items are available:

```
<<<S-3405 Menu Engine V0.1>>>
1- View Network Settings           Displays current network settings
2  Change IP Address               Enter new IP Address
3  Change Subnet Mask              Enter new Subnet Mask
4  Change Gateway Address          Enter new Gateway Address
5  Change Broadcast Address        Enter new Broadcast Address
6  Controller Firmware Upgrade     Prepares frame for firmware upgrade
7  Controller Reboot               Reboots frames
B  Back                            Return to previous menu
```

6) Under menu item #2 *SFP Module Settings*, the following items are available:

```
<<<S-3405 Menu Engine V0.1>>>
1  SFP TX Settings                 Enter settings menu for TX SFPs
2  SFP RX Settings                 Enter settings menu for RX SFPs
3  Display SFP Status              Displays all parameters of SFP
4  Display SFP Serial Number        Displays Serial Number of SFP
5  Display SFP Error Message        Displays Error of SFP
6  Back                             Return to previous menu
```

7) The following items are available for the specific SFP option specified:



**3405T13-2, 3405Txx-2, 3405T12-R**

- |   |                                |   |
|---|--------------------------------|---|
| 1 | Display SFP Status             | <i>Displays SFP status parameters (under SFP Module Settings)</i>                 |
| 2 | Display SFP Serial Number      | <i>Displays SFP serial number (under SFP Module Settings)</i>                     |
| 3 | Display SFP Error Message      | <i>Displays SFP error message (under SFP Module Settings)</i>                     |
| 4 | Enable/Disable TX Laser Driver | <i>Enable/Disable optical output channels 1 and/or 2 (under SFP TX Settings)</i>  |
| 5 | Set TX Laser Automute          | <i>Enable/Disable squelch mode of channels 1 and/or 2 (under SFP TX Settings)</i> |

**3405R2**

- |   |                           |  |
|---|---------------------------|--|
| 1 | Display SFP Status        | <i>Displays SFP status parameters (under SFP Module Settings)</i>                |
| 2 | Display SFP Serial Number | <i>Displays SFP serial number (under SFP Module Settings)</i>                    |
| 3 | Display SFP Error Message | <i>Displays SFP error message (under SFP Module Settings)</i>                    |
| 4 | Set RX Automute           | <i>Sets output squelch mode of channels 1 and/or 2 (under SFP RX Settings)</i>   |
| 5 | Set RX Polarity           | <i>Sets output inversion mode of channels 1 and/or 2 (under SFP RX Settings)</i> |
| 6 | Set RX SD/HD              | <i>Set output slew rate of channels 1 and/or 2 (under SFP RX Settings)</i>       |

**3405R-2R**

- |   |                           |   |
|---|---------------------------|---|
| 1 | Display SFP Status        | <i>Displays SFP status parameters (under SFP Module Settings)</i>                 |
| 2 | Display SFP Serial Number | <i>Displays SFP serial number (under SFP Module Settings)</i>                     |
| 3 | Display SFP Error Message | <i>Displays SFP error message (under SFP Module Settings)</i>                     |
| 4 | Set RX Automute           | <i>Enable/Disable squelch mode of channels 1 and/or 2 (under SFP RX Settings)</i> |
| 5 | Set RX Polarity           | <i>Sets output inversion mode of channels 1 and/or 2 (under SFP RX Settings)</i>  |
| 6 | Set RX Crosspoint Control | <i>Sets output swap mode. (under SFP RX Settings)</i>                             |

**3405OO13-DA4**

- |   |                                |   |
|---|--------------------------------|---|
| 1 | Display SFP Status             | <i>Displays SFP status parameters (under SFP Module Settings)</i> |
| 2 | Display SFP Serial Number      | <i>Displays SFP serial number (under SFP Module Settings)</i>     |
| 3 | Display SFP Error Message      | <i>Displays SFP error message (under SFP Module Settings)</i>     |
| 4 | Set RX Automute                | <i>Enable/Disable squelch mode (under SFP RX Settings)</i>        |
| 5 | Set RX Polarity                | <i>Sets output inversion mode (under SFP RX Settings)</i>         |
| 6 | Enable/Disable TX Laser Driver | <i>Enable/Disable optical output (under SFP TX Settings)</i>      |

## 5.2. VISTALINK® CONFIGURATION



The screenshots throughout sections 5.2.1 to 5.2.3 illustrate VistaLINK® parameters for the following SFP types: 3405T13-2, 3405T13-R, 3405R-2, 3405R-2R, and 3405OO13-DA4.

### 5.2.1. General Tab

The **General** tab enables the user to view the status of various parameters such as SFP *Type*, *Serial Number*, and *SFP Firmware Version*.

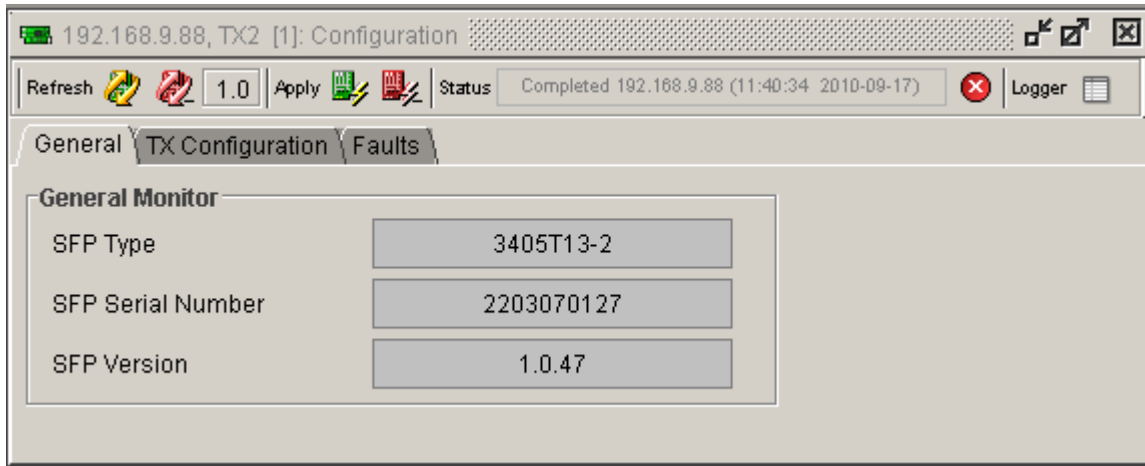


Figure 5-1: 3405T13-2 VistaLINK® General Tab

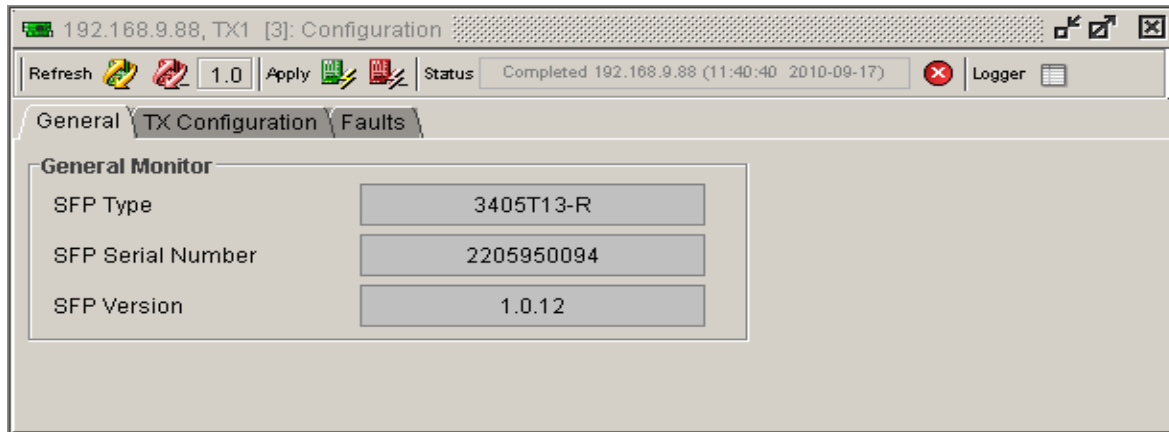
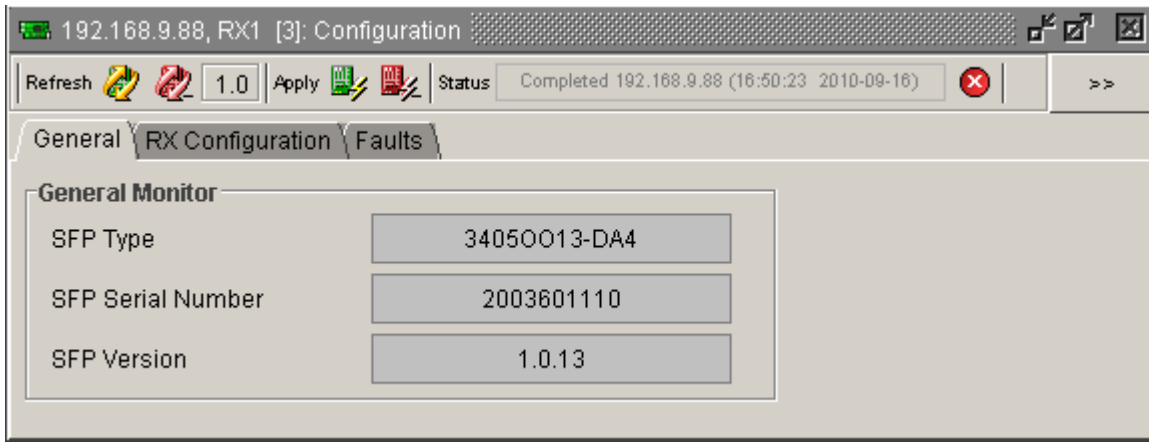
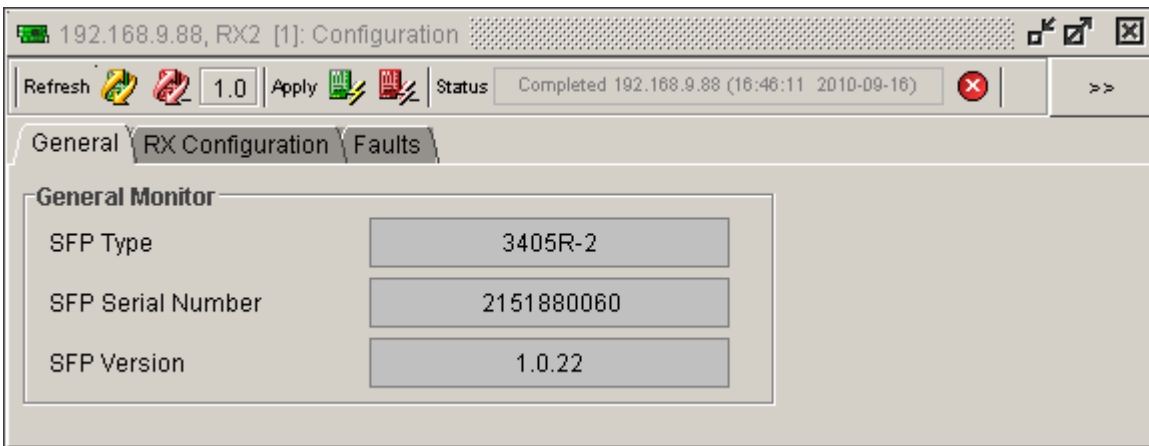


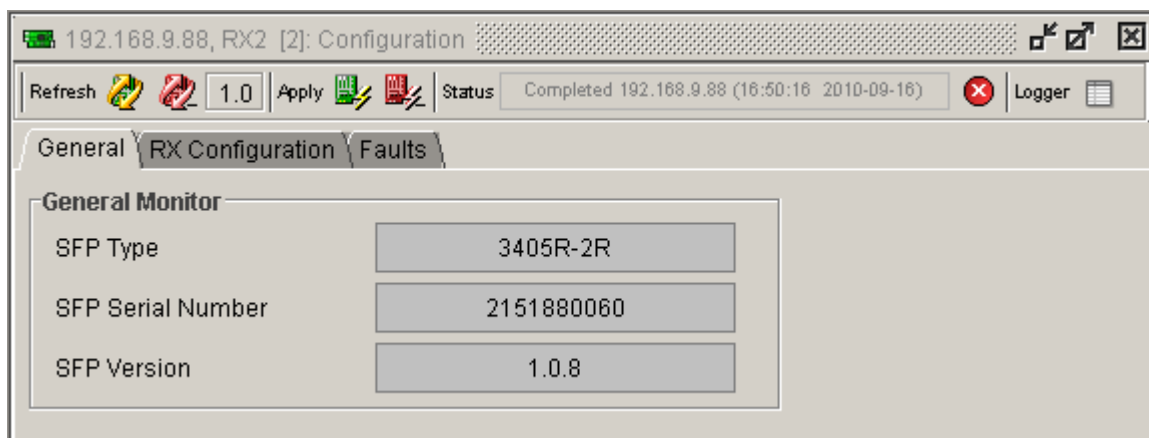
Figure 5-2: 3405T13-R VistaLINK® General Tab



**Figure 5-3: 34050013-DA4 VistaLINK® General Tab**



**Figure 5-4: 3405R-2 VistaLINK® General Tab**



**Figure 5-5: 3405R-2R VistaLINK® General Tab**

- **SFP Type:** Displays the type of SFP plugged into a particular slot.
- **SFP Serial Number:** Displays the SFP serial number.

- **SFP Version:** Displays the current SFP version number.

### 5.2.2. TX/RX Configuration Tabs

The **TX Configuration** tab displays the current *Laser Status*, *Wavelength*, *SFP Status*, and *Reclocker Status*. It also allows the user to set *Squelch mode*.

The **RX Configuration** tab displays the *Received Optical Power* and *Reclocker Status*. It also allows the user to set *Optical Input Power Threshold*, *Inversion mode*, *Slew Rate mode*, *Squelch Mode*, and *Swap Channel mode*.

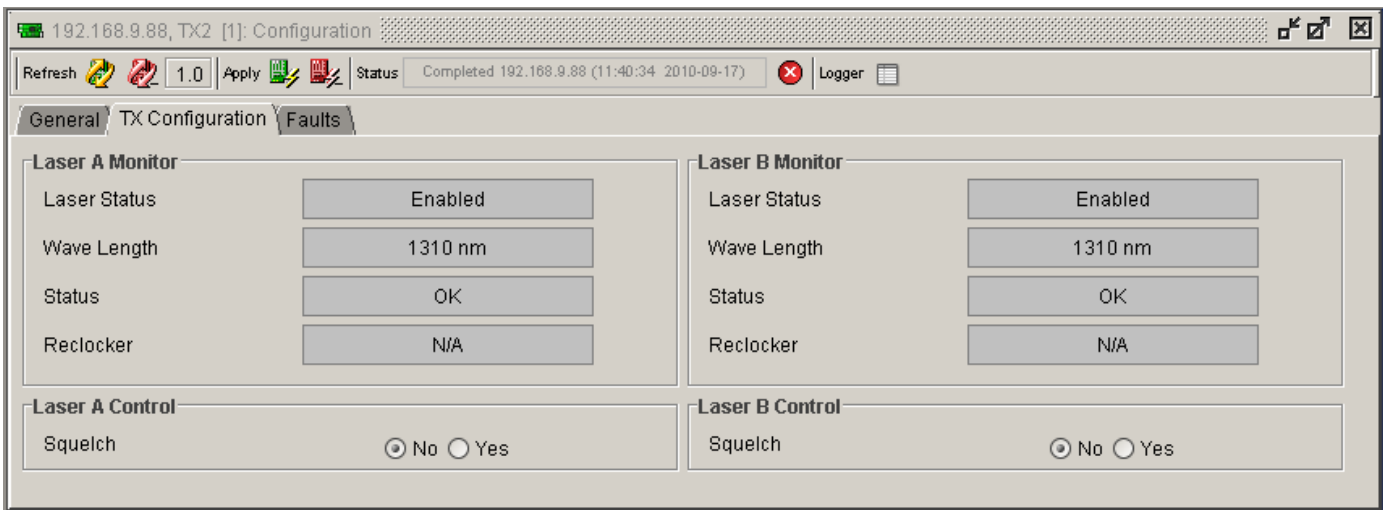


Figure 5-6: 3405T13-2 VistaLINK® TX Configuration Tab

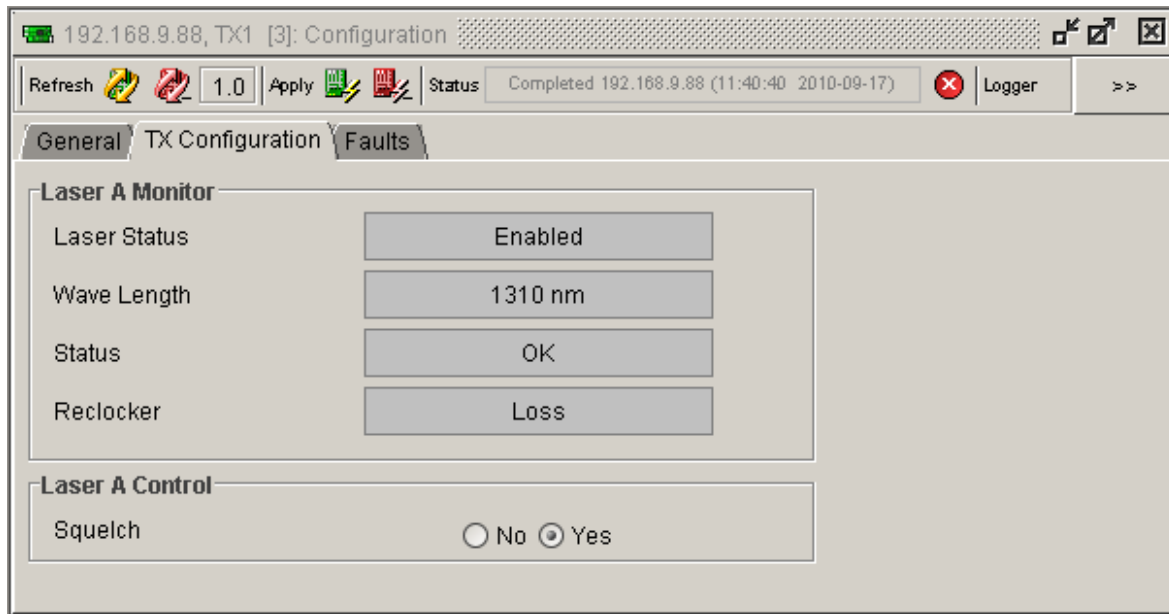
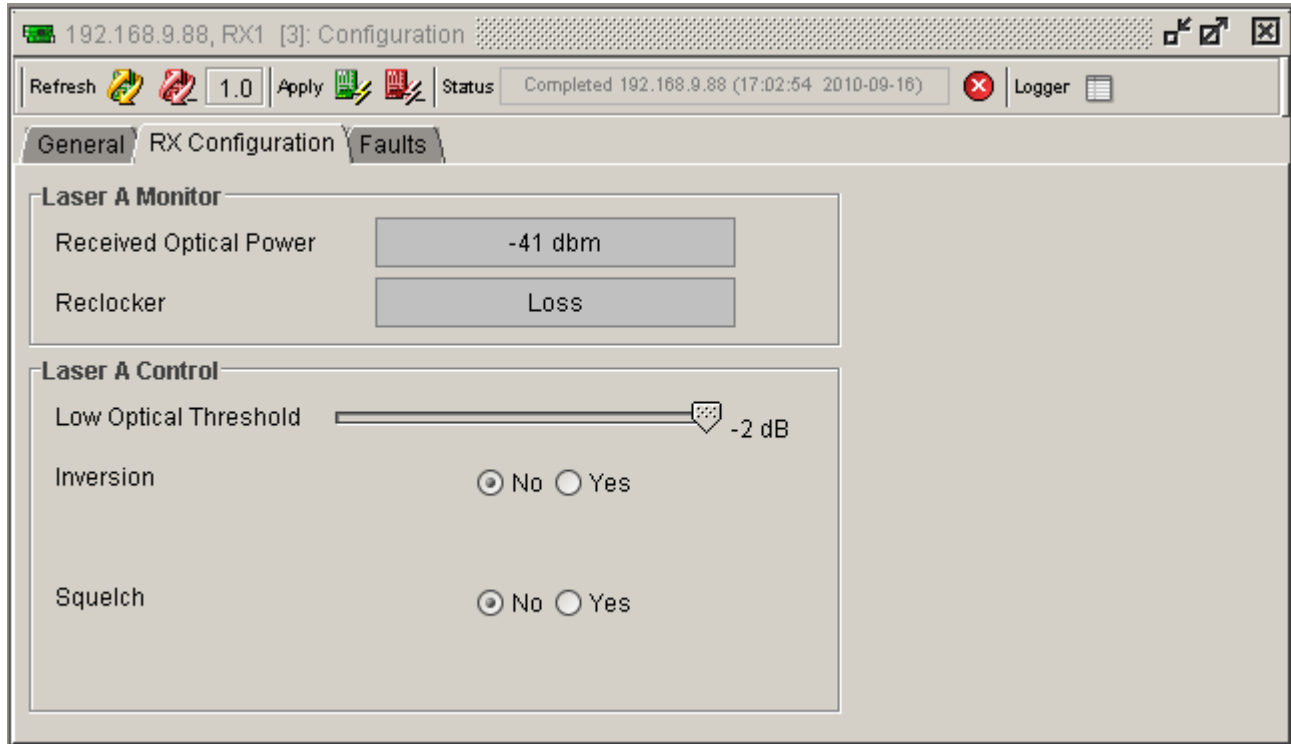
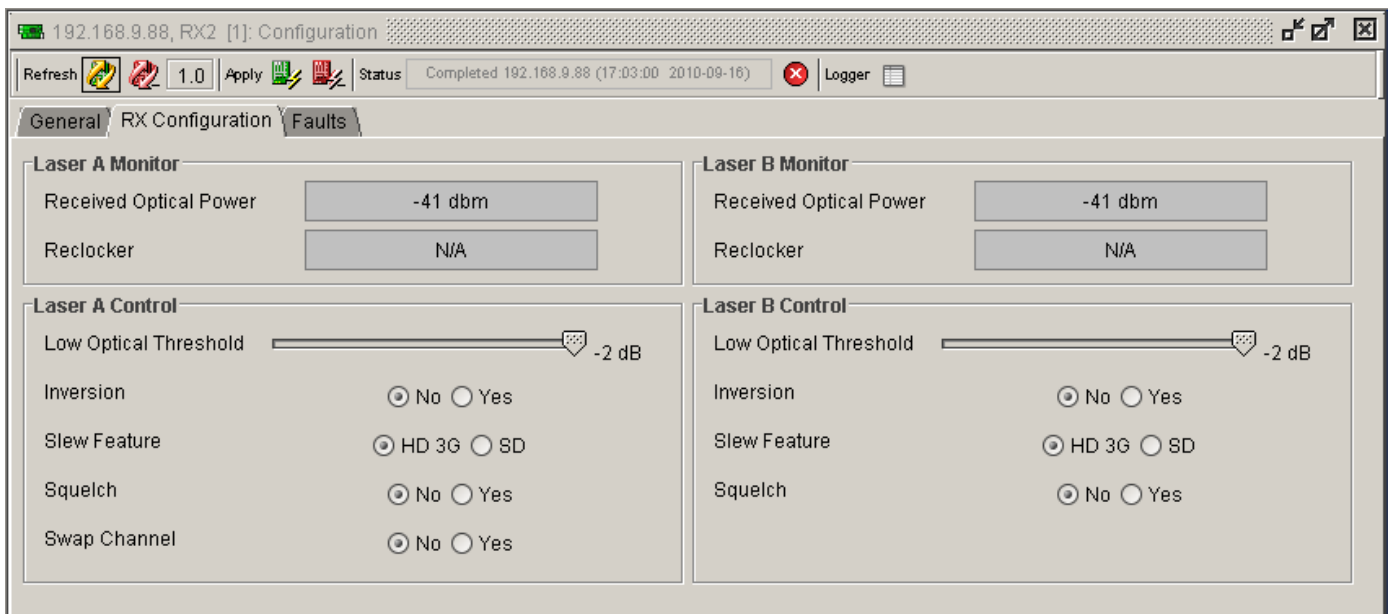


Figure 5-7: 3405T13-R VistaLINK® TX Configuration Tab



**Figure 5-8: 3405OO13-DA4 VistaLINK® RX Configuration Tab**



**Figure 5-9: 3405R-2 VistaLINK® RX Configuration Tab**

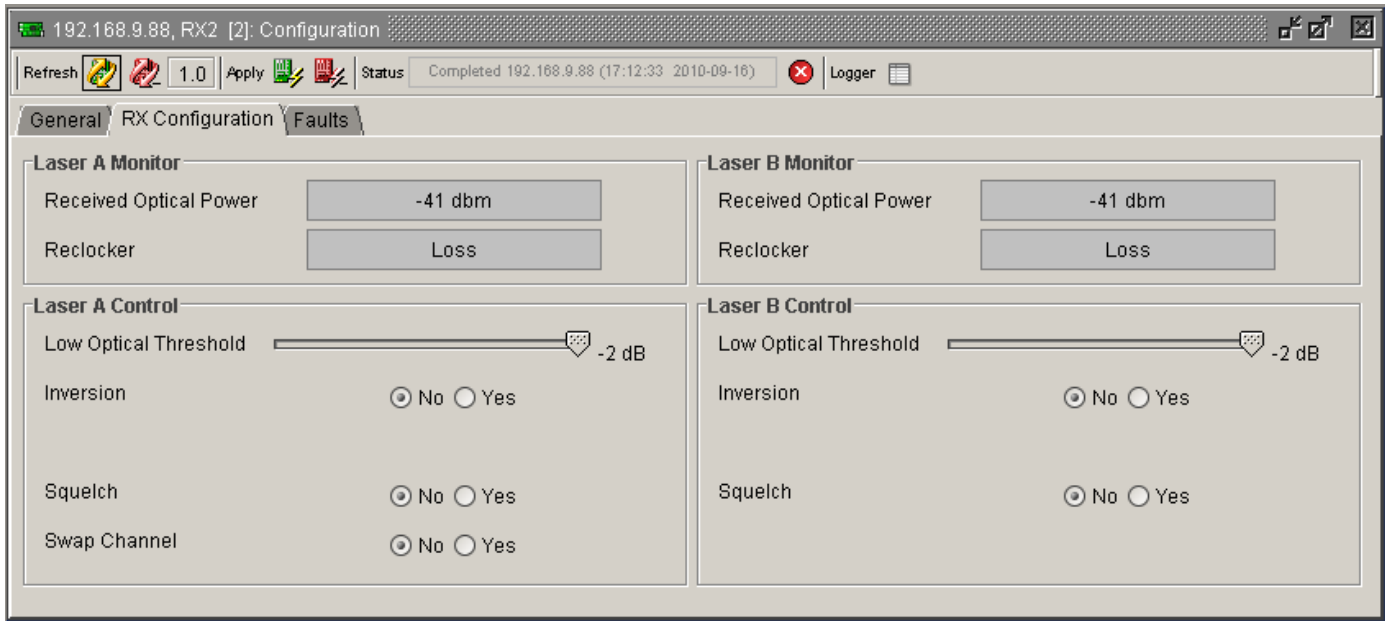


Figure 5-10: 3405R-2R VistaLINK® RX Configuration Tab

#### 5.2.2.1. Tx Configuration

- **Laser Status:** Displays the status of the laser in a SFP transmitter module.
- **Wavelength:** Displays the wavelength of the SFP transmitter.
- **Status:** Displays the general health of the SFP.
- **Reclocker:** Displays Reclocking Standard if applicable.
- **Squelch:** Sets Squelch Mode.

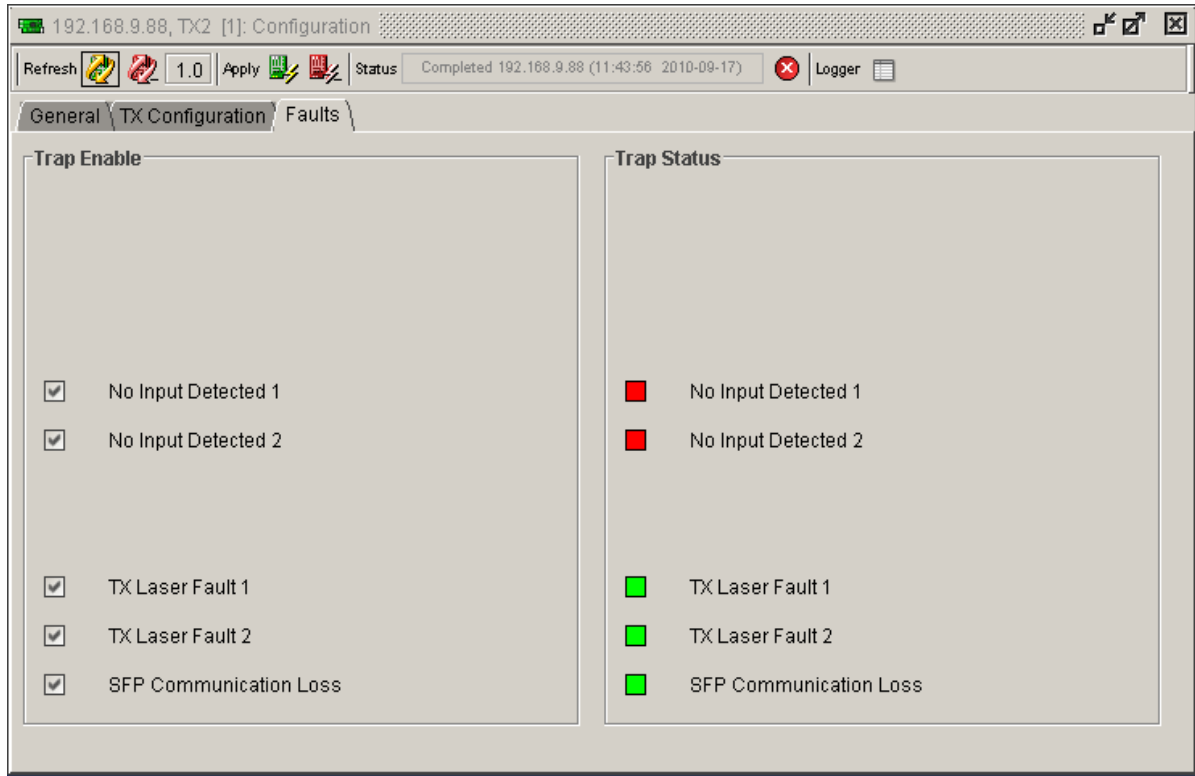
#### 5.2.2.2. Rx Configuration

- **Received Optical Power:** Displays the optical input power of a SFP receiver.
- **Reclocker:** Displays Reclocking Standard if applicable
- **Low Optical Threshold:** Sets Low Optical Threshold value
- **Inversion:** Sets output inversion mode
- **Slew Feature:** Sets output Slew rate mode
- **Squelch:** Sets output squelch mode
- **Swap Channel:** Sets output mapping mode

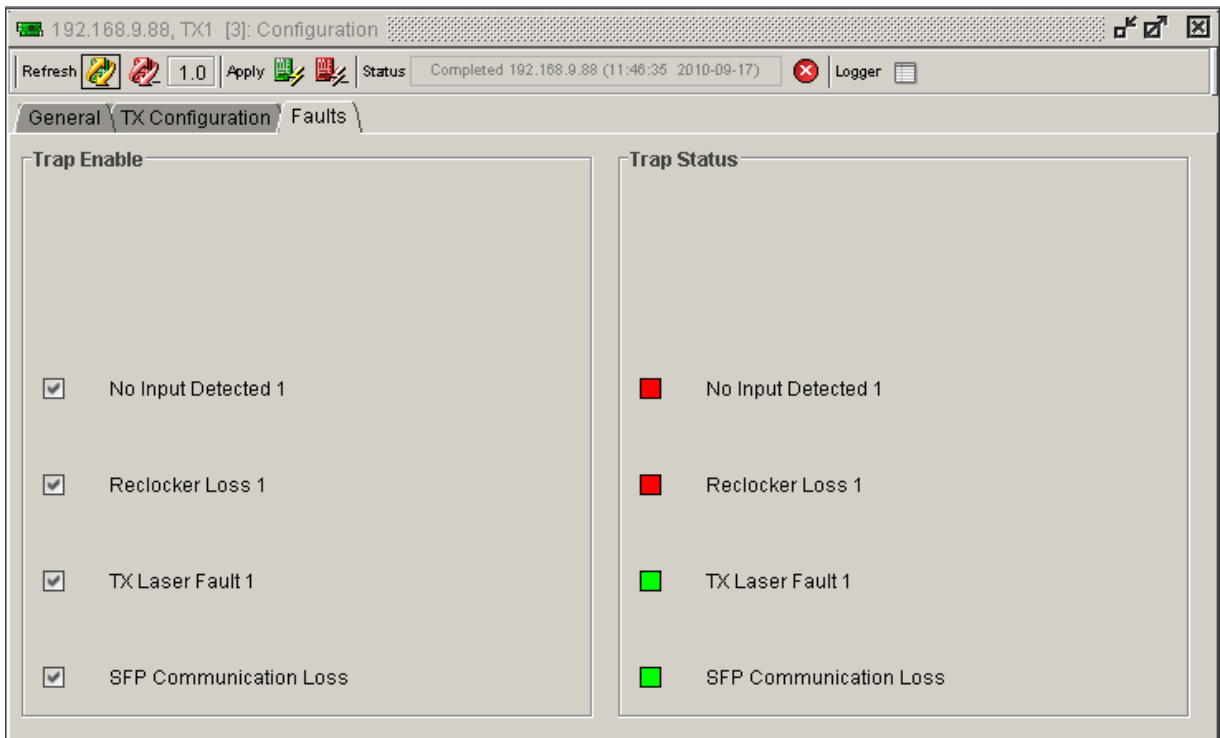
#### 5.2.3. Faults Tab

The **Faults** tab allows the user to enable a variety of traps. To enable a particular trap, simply click the box adjacent to each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

The *Trap Status* section defines whether a trap is present or missing. If the box is green, then the corresponding trap is present. If the box is red, then the corresponding trap is missing.



**Figure 5-11: 3405T13-2 VistaLINK® Faults Tab**



**Figure 5-12: 3405T13-R VistaLINK® Faults Tab**

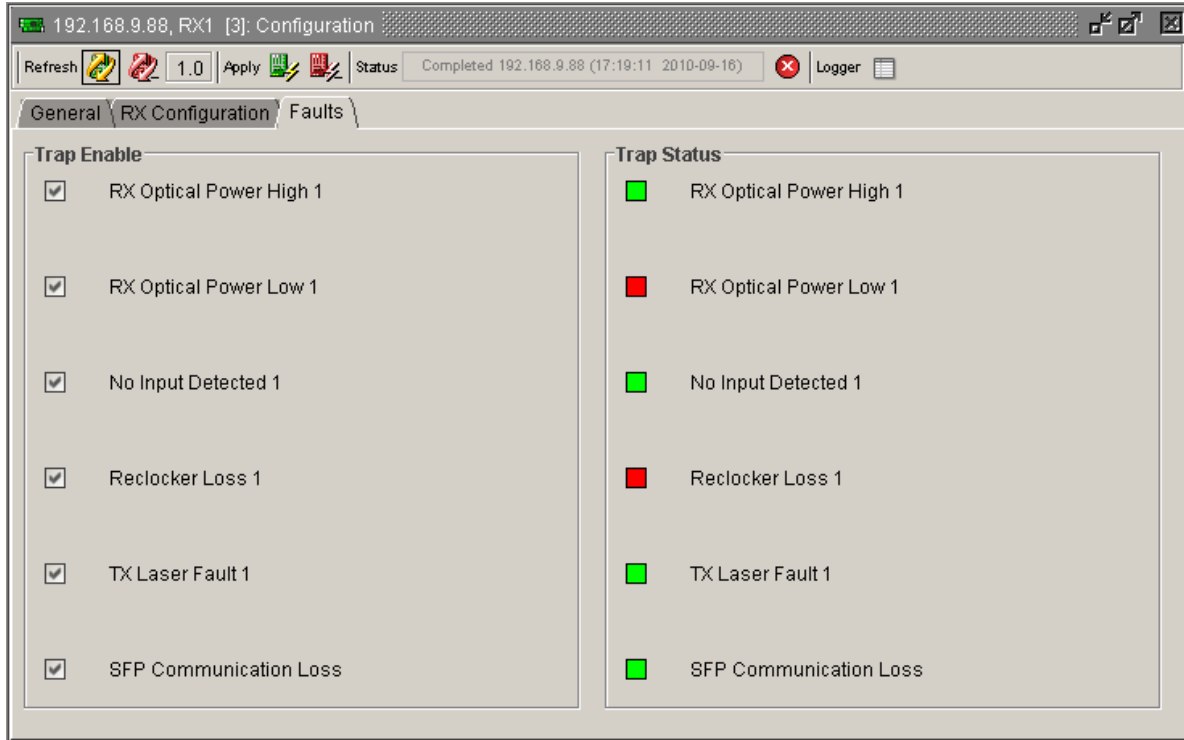


Figure 5-13: 3405OO13-DA4 VistaLINK® Faults Tab

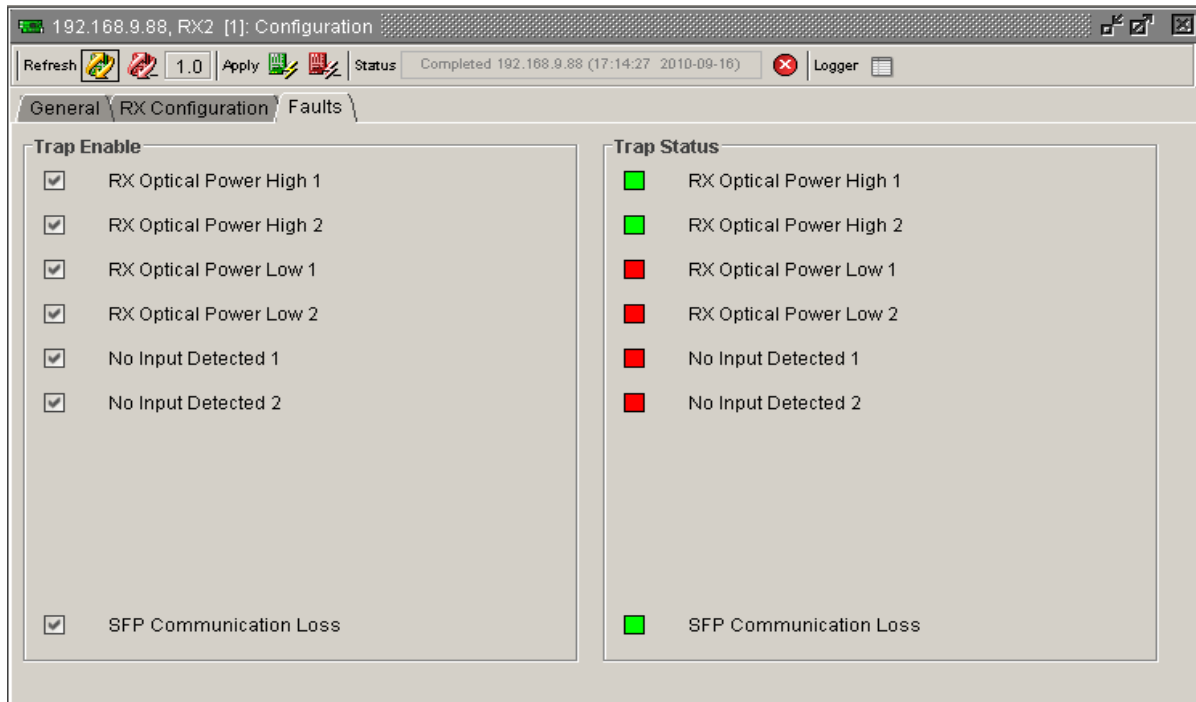


Figure 5-14: 3405R-2 VistaLINK® Faults Tab



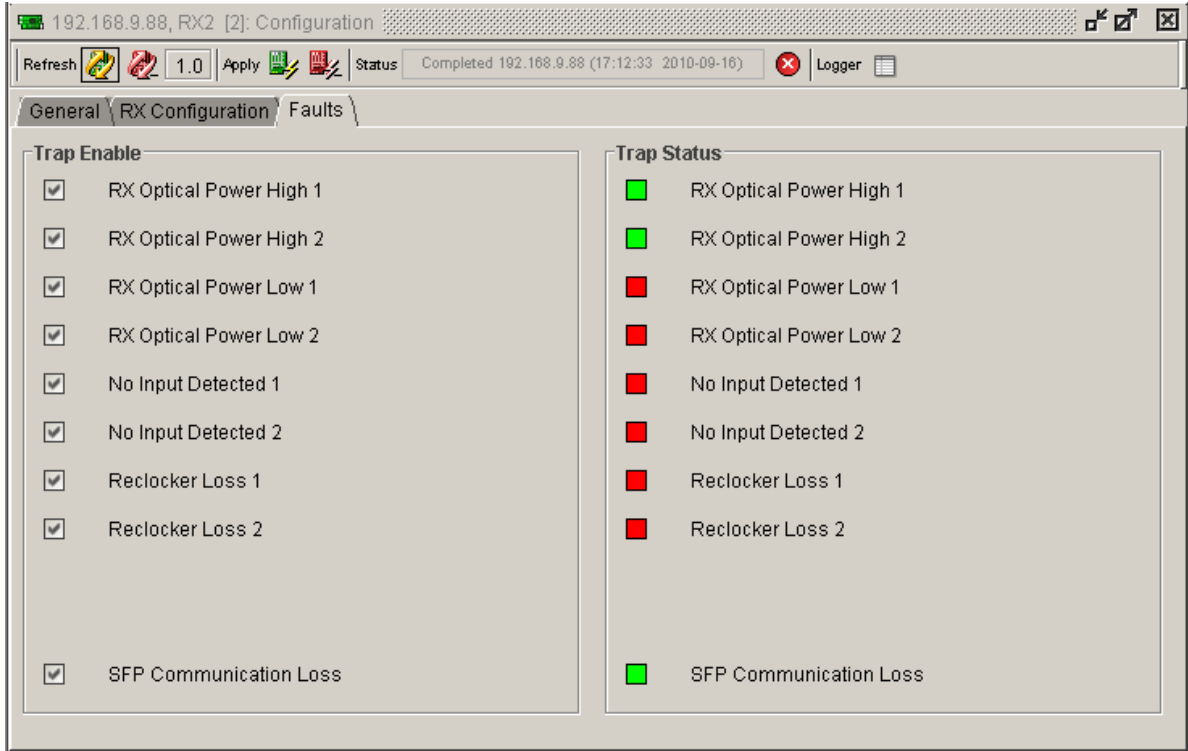


Figure 5-15: 3405R-2R VistaLINK® Faults Tab



The screenshots throughout sections 5.2.4 and 5.2.6 illustrate VistaLINK® parameters for the 3405FC Frame Controller.

### 5.2.4. Network Parameters Tab

The **Network** parameter tab enables the user to define the network parameters of the 3405FC. IP Address, Subnet Mask, Gateway Address, and Broadcast Address can be modified. Under this tab, there is also an option to reboot the frame.

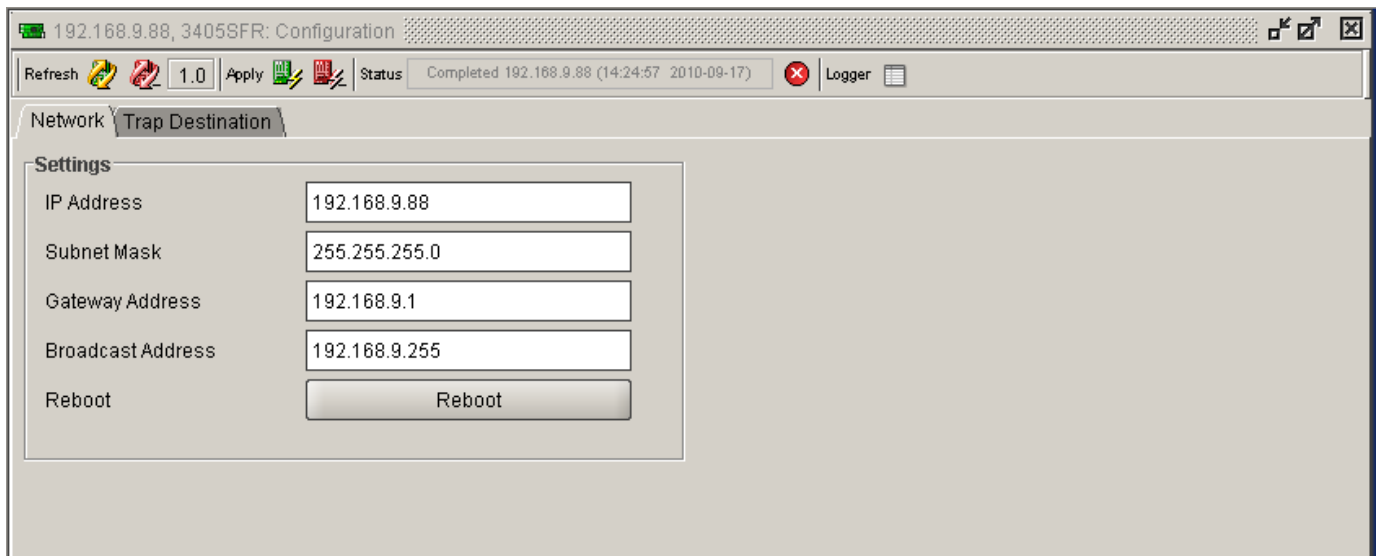


Figure 5-16: 3405FC VistaLINK® Network Parameter Tab

### 5.2.5. Trap Destination Tab

The **Trap Destination** tab enables the user to define the IP address where SNMP traps will be sent.

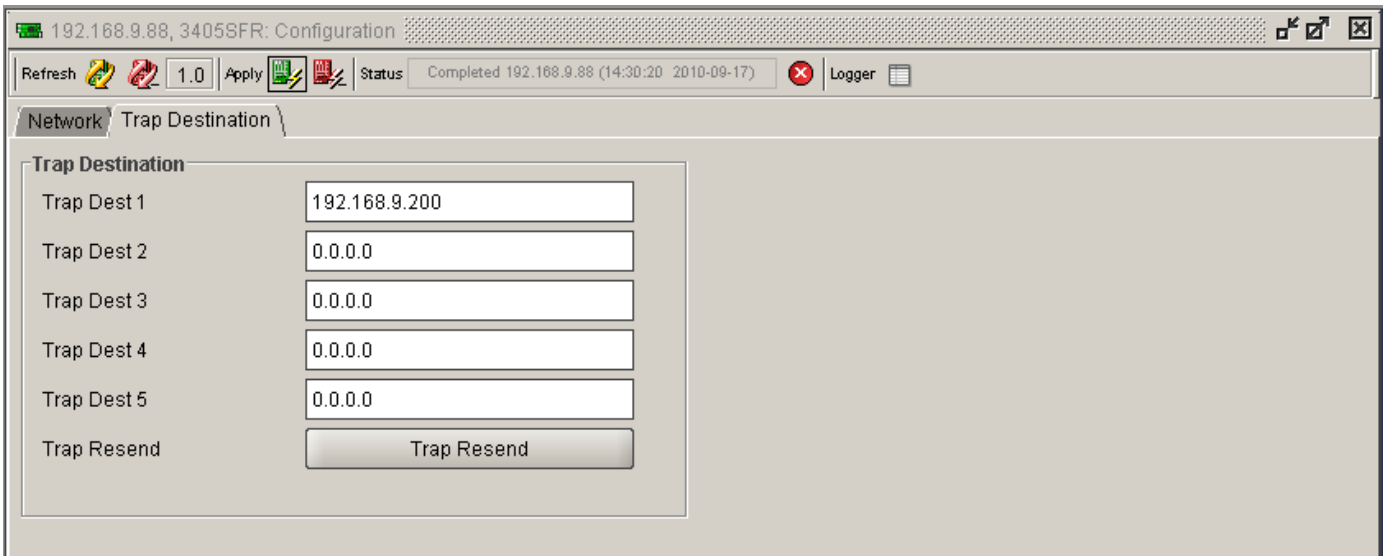


Figure 5-17: 3405FC VistaLINK® Trap Destination Tab

- **Trap Resend:** Select this button to resend the current trap state of the card. All existing traps occurring on the card will be re-broadcast to the VistaLINK® SNMP Client and can be viewed in the trap log.

### 5.2.6. FC Faults Tab

The **FC Faults** tab allows the user to enable a variety of traps. To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

The *Trap Status* section defines whether a trap is present or missing. If the box is green, then the corresponding trap is present. If the box is red, then the corresponding trap is missing.

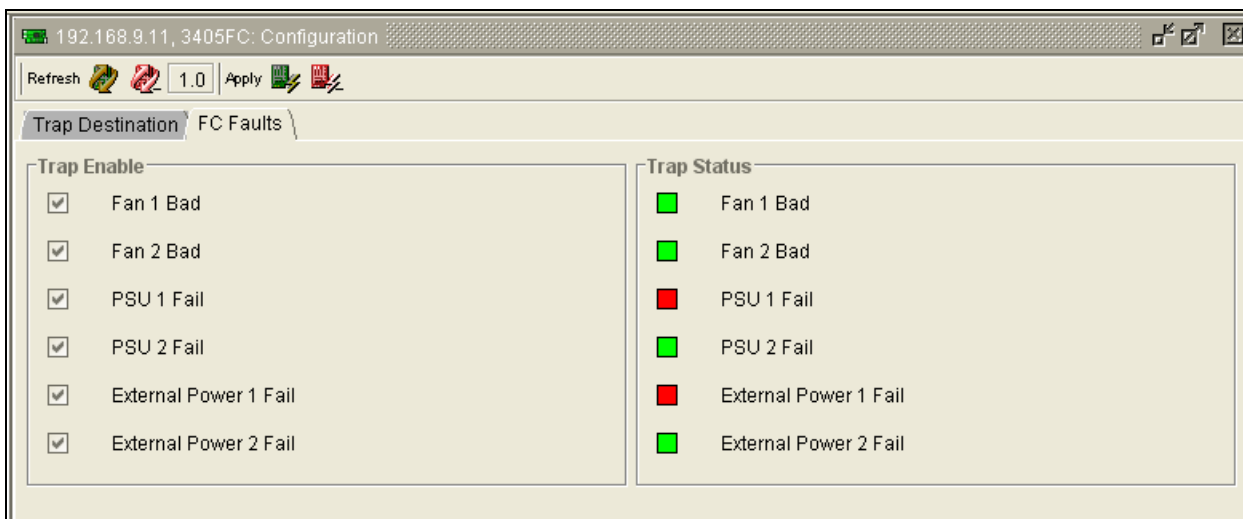


Figure 5-18: 3405FC VistaLINK® FC Faults Tab

## 6. VISTALINK® MONITORING/CONTROL

### 6.1. WHAT IS VISTALINK®?

VistaLINK® is Evertz’s remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. VistaLINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through VistaLINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled products.

### 6.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be monitored via the VistaLINK® interface.

Parameter	Description
<b>SFP Type</b>	Monitors the type of SFP plugged into a particular slot (TX/RX/OO).
<b>SFP Serial Number</b>	Monitors the SFP serial number.
<b>SFP Version</b>	Monitors the SFP code version.
<b>Received Optical Power</b>	Detects optical input power into each individual SFP receiver.
<b>Reclocker</b>	Detects the reclocking rate of an incoming signal.
<b>Laser Status</b>	Monitors the health of the laser in a SFP transmitter module.
<b>Laser Wavelength</b>	Monitors the wavelength of the SFP transmitter.
<b>Status</b>	Monitors the general health of the SFP

**Table 6-1: VistaLINK® Monitoring**

### 6.3. VISTALINK® TRAPS

The following traps can be enabled and monitored through the VistaLINK® interface.

Parameter	Description
<b>Rx Optical Power High 1</b>	Monitors high optical input on channel 1
<b>Rx Optical Power High 2</b>	Monitors high optical input on channel 2
<b>Rx Optical Power Low 1</b>	Monitors low optical input on channel 1
<b>Rx Optical Power Low 2</b>	Monitors low optical input on channel 2
<b>No Input Detected 1</b>	Monitors video input on channel 1
<b>No Input Detected 2</b>	Monitors video input on channel 2
<b>Reclocker Loss 1</b>	Monitors reclocking status on channel 1
<b>Reclocker Loss 2</b>	Monitors reclocking status on channel 2
<b>Tx Laser Fault 1</b>	Monitors laser 1 health
<b>Tx Laser Fault 2</b>	Monitors laser 2 health
<b>SFP Communication Loss</b>	Monitors SFP communication with frame controller
<b>Fan 1 Bad</b>	Monitors health of fan #1 of 3405FAN unit
<b>Fan 2 Bad</b>	Monitors health of fan #2 of 3405FAN unit
<b>PSU 1 Fail</b>	Monitors health of upper 3405PST unit
<b>PSU 2 Fail</b>	Monitors health of lower 3405PST unit
<b>External Power 1 Fail</b>	Monitors the presence of AC power to DC inlet #1
<b>External Power 2 Fail</b>	Monitors the presence of AC power to DC inlet #2

**Table 6-2: VistaLINK® Traps**

### 6.4. VISTALINK® CONTROLLED PARAMETERS

The following parameters can be controlled via the VistaLINK® interface.

Parameter	Description
<b>IP Address</b>	Sets IP Address.
<b>Subnet Mask</b>	Sets Subnet Mask.
<b>Gateway Address</b>	Sets Gateway Address.
<b>Broadcast Address</b>	Sets Broadcast Address.
<b>Reboot</b>	Reboots the 3405FR frame.
<b>Frame Controller Trap Destination</b>	Defines the IP address where SNMP traps will be sent to.
<b>Trap Resend</b>	Resends the current traps state.
<b>Low Optical Threshold</b>	Sets the Input Optical Power Threshold.
<b>Inversion</b>	Sets the Inversion.

<b>Squelch</b>	Sets the Output Squelch mode.
<b>Swap Channel</b>	Sets the Channel Swap mode.
<b>Slew Feature</b>	Sets the Output Slew rate.

**Table 6-3: VistaLINK<sup>®</sup> Controlled Parameters**

## 7. 3405 SERIES CWDM PASSIVE OPTICAL MODULES

### 7.1. OVERVIEW

In fiber optic transmission systems it is often necessary to split or combine optical signals. The 3405CWDM series passive CWDM mux/demux modules provide high capacity optical mux and demux for use with the 3405FR series frames.

There are currently 8 modules in the passive optical module family.

MODEL	DESCRIPTION	FUNCTION
<b>3405CWDM-2-M16</b>	Dual 16 Channel Mux	Combines two of each of 1270nm to 1610nm onto two separate fibers.
<b>3405CWDM-2-D16</b>	Dual 16 Channel Demux	Separates two of each of 1270nm to 1610nm from two separate fibers.
<b>3405CWDM-M16</b>	16 Channel Mux	Combines 1270nm to 1610nm onto one separate fiber.
<b>3405CWDM-D16</b>	16 Channel Demux	Separates 1270nm to 1610nm from one separate fiber.
<b>3405CWDM-2-M8</b>	Dual 8 Channel Mux	Combines two of each of 1470nm to 1610nm onto two separate fibers.
<b>3405CWDM-2-D8</b>	Dual 8 Channel Demux	Separates two of each of 1470nm to 1610nm from two separate fibers.
<b>3405CWDM-M8</b>	8 Channel Mux	Combines 1470nm to 1610nm onto one separate fiber.
<b>3405CWDM-D8</b>	8 Channel Demux	Separates 1470nm to 1610nm from one separate fiber.

**Table 7-1: Passive Optical Modules**

#### 7.1.1. 3405CWDM Coarse Wavelength Division Multiplexor

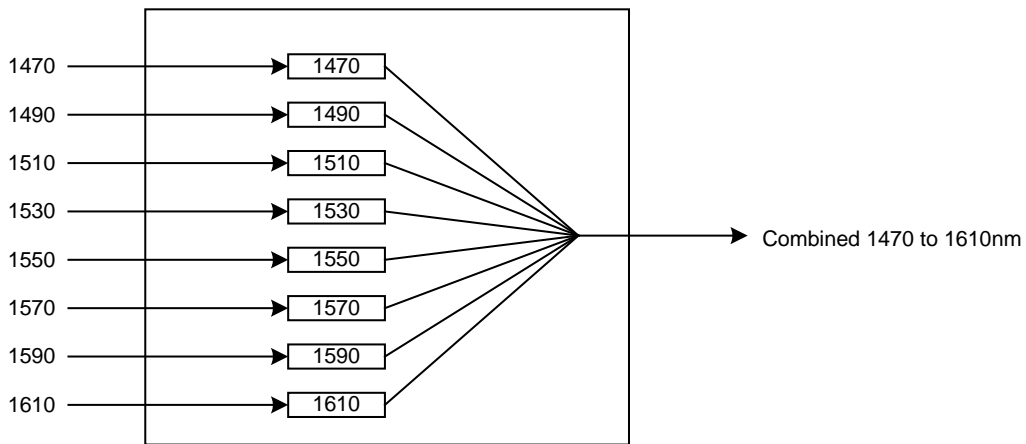
The 3405CWDM's are bi-directional Multiplexors/De-multiplexors that combine or separate up to 2 times sixteen different wavelengths over two optical fibers.

The 3405CWDM is available in the following versions:

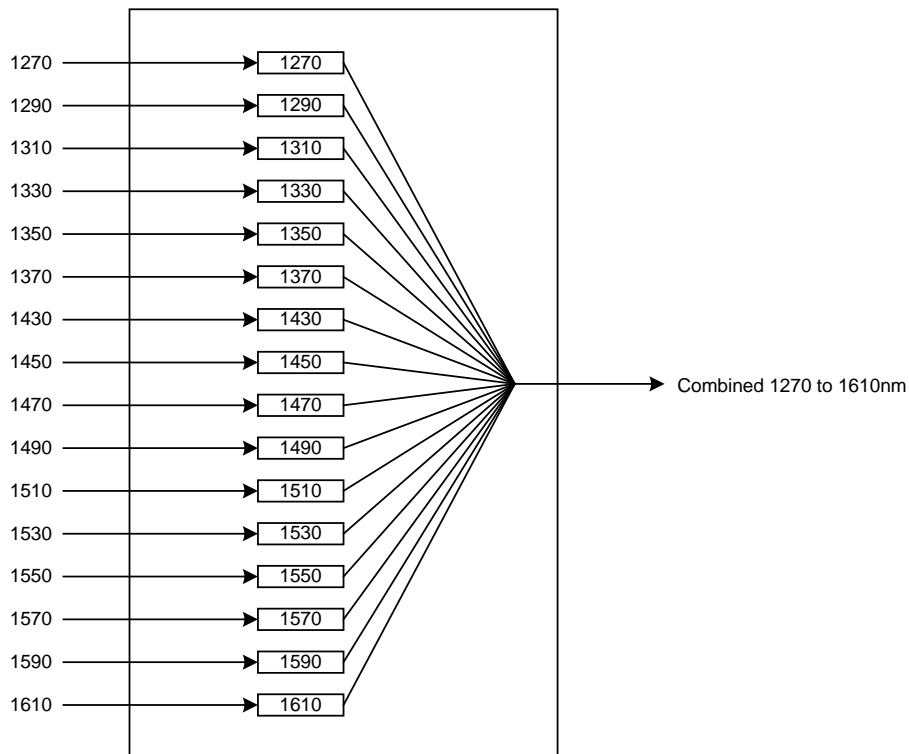
3405CWDM-M8	8 Channel CWDM Multiplexor (1470nm -1610nm)
3405CWDM-D8	8 Channel CWDM Demultiplexor (1470nm -1610nm)
3405CWDM-M16	16 Channel CWDM Multiplexor (1270nm -1610nm)
3405CWDM-D16	16 Channel CWDM Demultiplexor (1270nm -1610nm)
3405CWDM-2-M8	Dual 8 Channel CWDM Multiplexor (1470nm -1610nm)
3405CWDM-2-D8	Dual 8 Channel CWDM Demultiplexor (1470nm -1610nm)
3405CWDM-2-M16	Dual 16 Channel CWDM Multiplexor (1270nm -1610nm)
3405CWDM-2-D16	Dual 16 Channel CWDM Demultiplexor (1510nm -1570nm)

**Features:**

- Bi-directional mux/demux of up to 16 wavelengths in the 1270nm to 1610nm spectrum (ITU-T G.694.2 compliant)
- Passive design for any bit rate
- Low insertion loss to conserve system power
- High optical isolation for low crosstalk
- Fully hot-swappable from front of frame with minimal fiber disconnect/reconnect
- LC/PC connector option
- Fiber protector to prevent connector damage



**Figure 7-1: 3405CWDM-M8 Simplified Block Diagram**



**Figure 7-2: 3405CWDM-M16 Simplified Block Diagram**

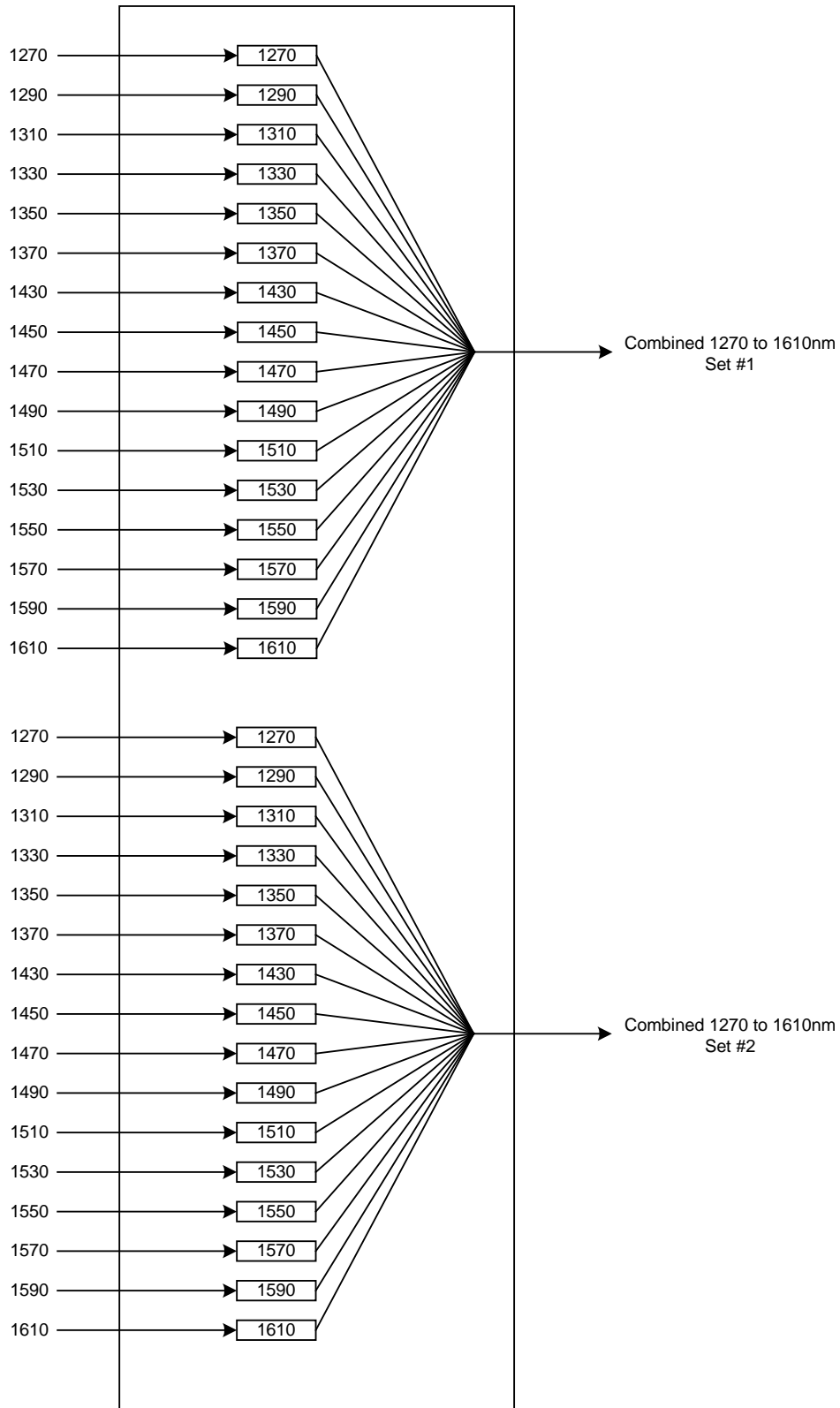
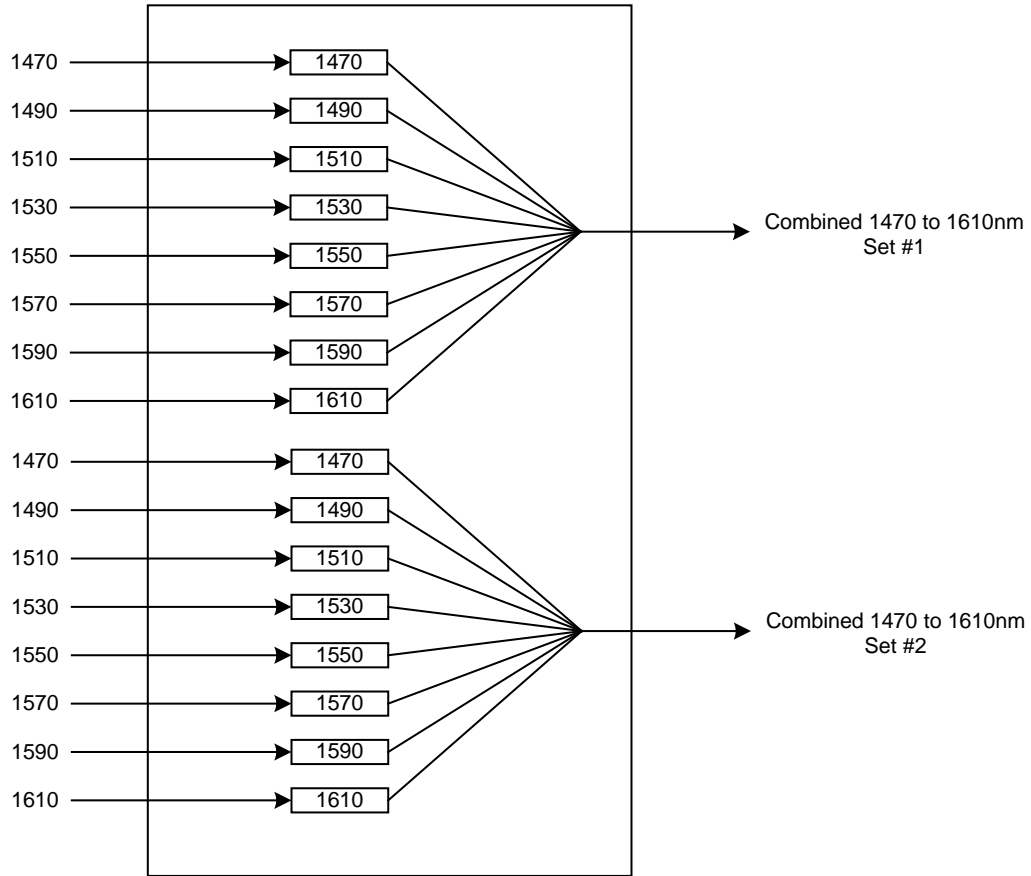


Figure 7-3: 3405CWDM-2-M16 Simplified Block Diagram





**Figure 7-4: 3405CWDM-2-M8 Simplified Block Diagram**

## 7.2. INSTALLATION

The 3405 series optical CWDM modules are for use with the 3405FR-BNC and 3405FR-DIN frames. The multiplexing and demultiplexing can be split into 8 X LO and 8 X HI band channels.

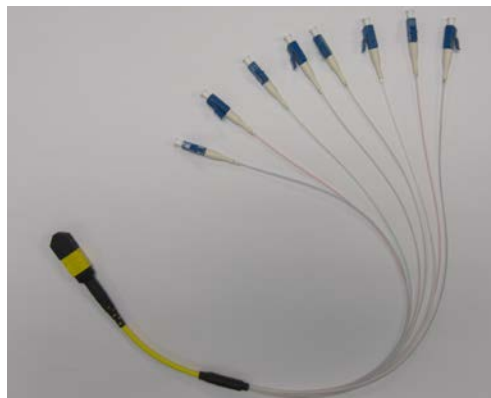
The LO band channels include the following wavelengths:

1270nm  
1290nm  
1310nm  
1330nm  
1350nm  
1370nm  
1430nm  
1450nm

The HI band channels include the following wavelengths:

1470nm  
1490nm  
1510nm  
1530nm  
1550nm  
1570nm  
1590nm  
1610nm

Connection from output lasers of the 3405FR SFP's to the input of the Mux requires a series of LC to MTP break out cables.



**Figure 7-5: 8 Channel Breakout Cable**

The LO band break out cable is for use with the LO band channels and the HI band break out cable is for use with the HI band channels.

MODEL	DESCRIPTION	REQUIRED FANOUT CABLE
<b>3405CWDM-2-M16</b>	Dual 16 Channel Mux	2 X LO 2 X HI
<b>3405CWDM-2-D16</b>	Dual 16 Channel Demux	2 X LO 2 X HI
<b>3405CWDM-M16</b>	16 Channel Mux	1 X LO 1 X HI
<b>3405CWDM-D16</b>	16 Channel Demux	1 X LO 1 X HI
<b>3405CWDM-2-M8</b>	Dual 8 Channel Mux	2 X HI
<b>3405CWDM-2-D8</b>	Dual 8 Channel Demux	2 X HI
<b>3405CWDM-M8</b>	8 Channel Mux	1 X HI
<b>3405CWDM-D8</b>	8 Channel Demux	1 X HI

**Table 7-2: 3405CWDM Model and The Associated Required Fanout Cable**

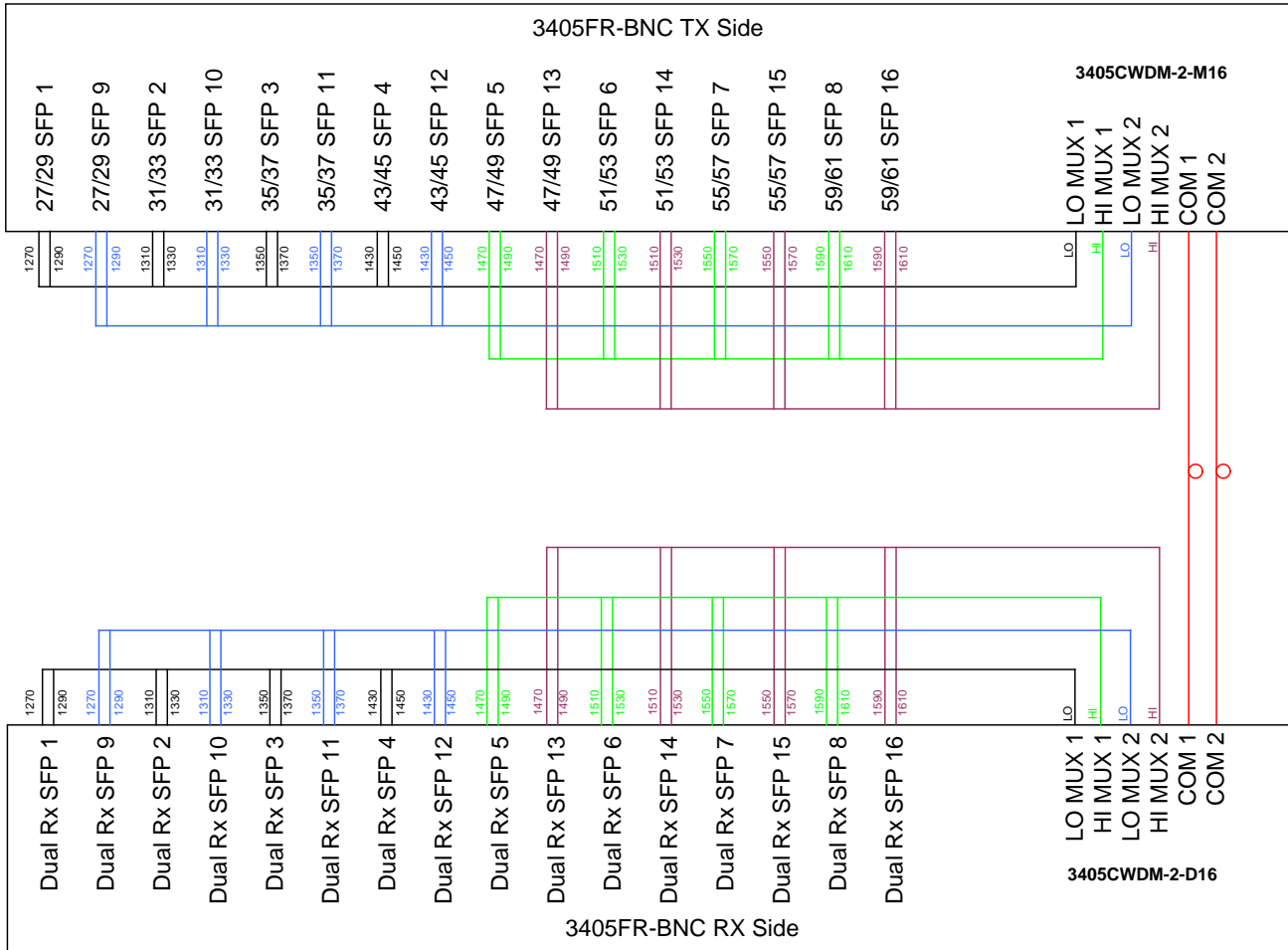


**Note:**

For LO breakout cable, use Evertz Part number: CB-MTP40CM-LCPC-LB

For HI breakout cable, use Evertz Part number: CB-MTP40CM-LCPC-HB

Example Using 3405CWDM-2-M16 And 3405CWDM-2-D16



**Figure 7-6: Wiring Diagram of the 3405CWDM-2-M16 and 3405CWDM-D16**

### 7.3. SPECIFICATIONS

#### 7.3.1. Optical Input/Output

Connector: LC/PC

Wavelength

**3405CWDM-2-M16:** Dual 1270nm to 1610nm, 20nm spacing

**3405CWDM-2-D16:** Dual 1270nm to 1610nm, 20nm spacing

**3405CWDM-M16:** 1270nm to 1610nm, 20nm spacing

**3405CWDM-D16:** 1270nm to 1610nm, 20nm spacing

**3405CWDM-2-M8:** Dual 1470nm to 1610nm, 20nm spacing

**3405CWDM-2-D8:** Dual 1470nm to 1610nm, 20nm spacing

**3405CWDM-M8:** 1470nm to 1610nm, 20nm spacing

**3405CWDM-D8:** 1470nm to 1610nm, 20nm spacing

Fiber Size: 9 μm core / 125 μm overall

Insertion Loss:

Module	Insertion Loss
<b>3405CWDM-2-M16 + 3405CWDM-2-D16</b>	<6.5 dB
<b>3405CWDM-M16 + 3405CWDM-D16</b>	< 6.5 dB
<b>3405CWDM-2-M8 + 3405CWDM-2-D8</b>	< 6.5 dB
<b>3405CWDM-M8 + 3405CWDM-D8</b>	< 6.5dB

**Table 7-3: Insertion Loss Specifications**

Isolation:

**3405CWDM-2-M16:** >30dB

**3405CWDM-2-D16:** >30dB

**3405CWDM-M16:** >30dB

**3405CWDM-D16:** >30dB

**3405CWDM-2-M8:** >30dB

**3405CWDM-2-D8:** >30dB

**3405CWDM-M8:** >30dB

**3405CWDM-D8:** >30dB

#### 7.3.2. Physical

**3405FR-BNC or 3405FR-DIN frame mounting:**

Number of slots: 1

*This page left intentionally blank*