7708GT-4(-F)
User Manual

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Version 1.0, August 2020

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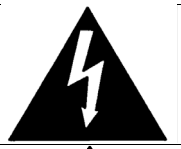
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of un-insulated “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 ac-companying the product.

- Read this information.
- 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 the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the plug provided 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.
- Connect mains power supply cord only to a mains socket outlet with a protective earthing connection.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the 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

Never look directly into an optical fiber. Irreversible eye damage can occur in a matter of milliseconds.

MODULES WITH LITHIUM BATTERIES

Some modules may be fitted with a 3V Lithium battery type CR2032. Consult servicing information individual chapters for specific safety information for replacing batteries.

CAUTION
Danger of explosion if battery is exposed to excessive heat such as direct sunlight, fire, etc.

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 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.

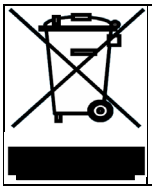
Compliance with these directives implies conformity to the following European standards:

- EN60065 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.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity



EN504192 2005
Waste electrical products should not be disposed of with household waste.
Contact your Local Authority for recycling advice

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 connected to the chassis ground of the device must be used.

Evertz Microsystems Ltd

FC

Tested to comply with FCC Standards

For Commercial Use

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	August 2020

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Figures

1. OVERVIEW

The 7708GT-4(-F) is a VistaLINK®-capable Quad Gigabit Ethernet Fiber Transceiver for up to four independent 10/100/1000BaseT Ethernet channels over optical fiber. Monitoring of card status and parameters are provided locally at the card edge and remotely via VistaLINK®. A pair of 7708GT-4 transceivers permit full duplex communication of all four channels up to 1GB/s each over a pair of optical fibers.
The 7708GT-4(-F) occupies one card slot and can be housed in the 1RU 7801FR frame which holds up to four single or two dual slot modules, the 3RU 7800FR frame which has a 15 slot capacity, the portable 3RU 350FR frame which has a 7 slot capacity, or a standalone enclosure which holds a single module.

Features & Benefits

- Four completely independent and isolated Ethernet streams
- Low latency
- Auto negotiation for 10/100/1000 speeds on all ports
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and VistaLINK®
- VistaLINK® capable for remote monitoring via SNMP (using VistaLINK® PRO) when installed in 7800FR frame with a 7800FC VistaLINK® Frame Controller
- Optical output wavelengths at 1310nm, 1550nm and up to sixteen CWDM wavelengths (ITU-T G.694.2 compliant)
- DWDM wavelengths (ITU-T G.694.1 compliant) also available
- Fully hot-swappable from front of frame
- Optical SFP supportable from the rear

Status Indication

- Frame status
- 10/100/1000 Speed indication on copper ports
- Full Duplex/Collision indication on copper ports
- Link activity on copper ports
- Received optical power level

1.1. 7708GT-4 APPLICATION CONFIGURATIONS

Model	Wavelength	Optical Output Power		Receiver Sensitivity	Receiver Max Input	Nominal Received Wavelength	Max Distance	Fiber Type & Connector
		Max	Min					
7708GT-4+SFP10G-TR13-A	1310nm	+0.5dBm	-8.5dBm	-12.5dBm	+0.5dBm	1310nm	10km	SMF, duplex LC/PC
7708GT-4+SFP10G-TR15S	1550nm	+4dBm	-5dBm	-14dBm	-1dBm	1550nm	40km	SMF, duplex LC/PC
7708GT-4+SFP10G-TR15H	1550nm	+3dBm	0dBm	-24dBm	-7dBm	1550nm	80km	SMF, duplex LC/PC
7708GT-4+SFP10G-TRxx	CWDM 1470nm - 1610nm	+2dBm	-1dBm	-14dBm	-1dBm	1270-1610nm	40km	SMF, duplex LC/PC
7708GT-4+SFP10G-CxxH	CWDM 1470nm-1610nm	+3dBm	0dBm	-24dBm	-7dBm	1270-1610nm	70/80km**	SMF, duplex LC/PC
7708GT-4+SFP10G-TRDxxxH	DWDM ch. 20 - ch. 59	+3dBm	-1dBm	-24dBm	-7dBm	1270-1610nm	80km	SMF, duplex LC/PC
**70km on 1590nm and 1610nm								

Figure 1-1: Application Configurations

1.2. ORDERING OPTIONS

- **7708GT-4** Quad Gigabit Ethernet fi ber transceiver, RJ45 ports for Ethernet connection
- **7708GT-4-F** Quad Gigabit Ethernet fi ber transceiver, SFP interface for Ethernet connection (SFP's not included)

Note: Select from optical and SFP options below

Ordering Options Rear Plate and Fiber Connector must be specifi ed at time of order (Eg. Model +3RU)

Rear Plate Suffix

- **+3RU** 3RU Rear Plate for use with 350FR, 7700FR-C or 7800FR Multiframe

Trunk Optical options

- **SFP10G-TR13** 1310nm laser, 10km max, SMF
- **SFP10G-TR15S** 1550nm laser, 40km max, SMF
- **SFP10G-TR15H** 1550nm laser, 80km max, SMF
- **SFP10G-TRCxx** CWDM laser (1470-1610nm), 40km max, SMF
- **SFP10G-TRCxxH** CWDM laser (1470-1610nm), 70km/80km max, SMF
- **SFP10G-TRDxxxH** DWDM laser (ch.20-ch.59), 80km max, SMF

7708GT-4-F Ethernet SFP Options

- **SFPTR-13** SFP GigE optical tranceiver, 1310nm, SMF, standard sensitivity
- **SFPTR-Cxx** SFP GigE optical transceiver, CWDM (1270-1610nm), SMF, standard sensitivity

Enclosures

- **350FR** 3RU Portable Multiframe which holds up to 7 single slot modules
- **7700FR-C** 3RU Multiframe which holds up to 15 single slot modules
- **7800FR** 3RU Multiframe which holds up to 15 single slot modules
- **7801FR** 1RU Multiframe which holds up to 4 single or 2 dual slot modules
- **7701FR** 1RU Multiframe which holds up to 3 single or dual slot modules
  S7701FR Standalone Enclosure

2. TECHNICAL SPECIFICATIONS

2.1. ETHERNET INPUT/OUTPUT (7708GT-4)

Standard: IEEE 802.3 10base-T
802.3u 100base-TX
802.3ab 1000base TX
Connectors: 4 RJ45 ports

Cable Requirements
10Base-T: UTP category 3, 4, or 5 cable up to 328ft/100m
100Base-T: UTP category 5 cable up to 328ft/100m
1000Base-T: UTP category 5 cable up to 164/50m
Latency 2ns @ 1GB/s (per link with 1m patch cable)

2.2. ETHERNET INPUT/OUTPUT (7708GT-4-F)

Connector: SFP Cage, optical or RJ45 SFP's may be installed

Standard
Optical SFP: 1000 Base X
RJ45 SFP: 1000 Base TX

2.3. ELECTRICAL

Voltage: +12V DC
Power: 12 Watts

2.4. COMPLIANCE

Laser Safety: Class 1 laser product
Complies with 24 CFR 1040.10 and 1040.11
IEC 60825-1
EMI/RFI: Complies with FCC Part 15, Class A
EU EMC Directive

2.5. PHYSICAL (NUMBER OF SLOTS):

350FR: 1
7700FR-C: 1
7800FR: 1

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3. GETTING STARTED

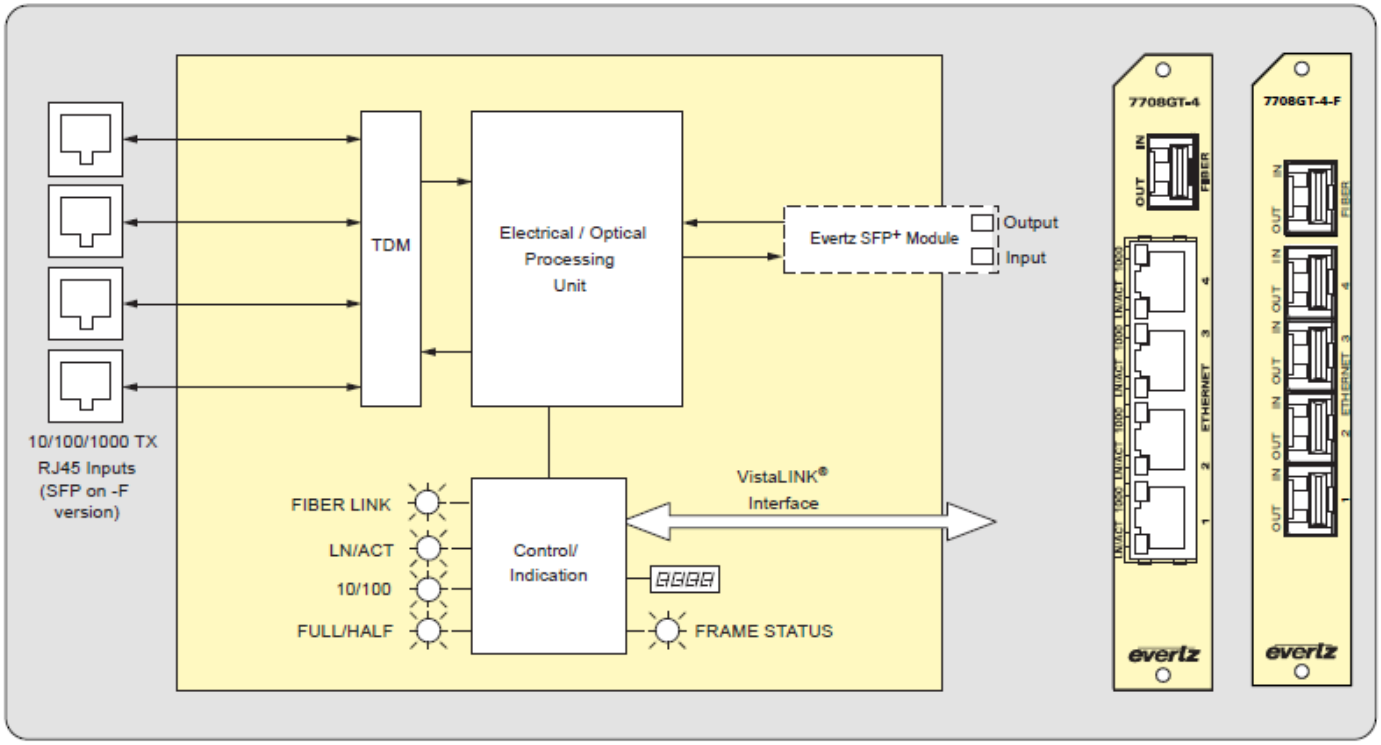

Figure 2-1: 7708GT-4(-F) Block Diagram and Rear Panels

3.1. HARDWARE INSTALLATION

To successfully install the 7708GT-4(-F) you will require the following:

1. 7800FR, 7801FR, or 350FR frame.
2. 7800FC frame controller.
3. VLPro Client connected to the VLPro Server.

Before handling the card it is important to minimize the potential effects of static electricity. It is therefore recommended that an ESD strap be worn.

Locate on the chassis a vacant slot. Unpack the 7708GT-4(-F) and insert the rear panel into the back of the chassis and secure using the screws provided. Slide in module on the slot runners that correspond to the location of the rear plate and lock card ejector

3.2. 7708GT-4(-F) STATUS LED AND CONTROLS

The 7708GT-4(-F) has 16 LED Status indicators and a 4 digit alphanumeric display on the front card edge to show operational status of the card at a glance. The card edge pushbutton and toggle switch are used to select various displays on the alphanumeric display. Figure 3-1 shows the locations of the indicators, pushbutton and toggle switch.

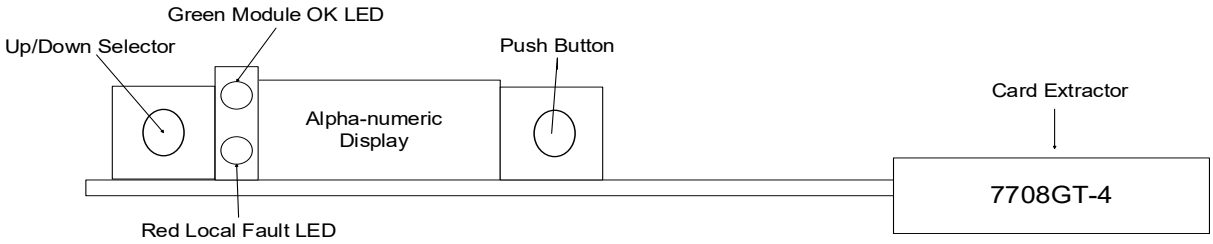

Figure 2-2: Location of Status Indicators and Controls

3.2.1. Status Indicator LEDs

LOCAL FAULT: On the 7708GT-4, this Red LED will be ON if a card fault exists, or if a local input power fault exists (i.e.: a blown fuse).

The LOCAL FAULT indications can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This Green LED indicates good module health. It will be ON when a valid link input signal is present

On the 7890AESD-8-IP, there are eight small LEDs on the front of the daughter board (top board) that indicate the presence of audio signals.

AUDIO 1-8 STATUS LED:	**GREEN**	Valid signal output. No errors.
	RED	Valid signal output. Errors detected.
	OFF	No valid output detected.

AUDIO 2-8 STATUS LEDs function similar to AUDIO 1 STATUS LED.

On the 7708GT-4, there are also eight small LEDs on the front of the main board that indicate the presence of signals.

LED 1/2:

GREEN:	IP Link Activity 4 Present
OFF:	IP Link Activity 4 Loss

LED 3/4:

GREEN:	IP Link Activity 3 Present
OFF:	IP Link Activity 3 Loss

LED 5/6:

GREEN:	IP Link Activity 2 Present
OFF:	IP Link Activity 2 Loss

LED 7/8:

GREEN:	IP Link Activity 1 Present
OFF:	IP Link Activity 1 Loss

3.2.2. 7708GT-4 –MENU STRUCTURE

The following table lists the various control menu items.

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
CTRL	DISP	VERT	
		HORZ	
	ETH	ETIF	COPP
			FIBE
		BWLM	ETH1
			ETH2
			ETH3
			ETH4
STAT	VER		
	SFP	WLEN	
		TPWR	
		RPWR	
	RXPW	SFP(1-4)	
	DUPX	ETH(1-4)	
	WSPD	ETH(1-4)	
	ELNK	ETH(1-4)	

Table 2-1 : 7708GT-4 Card Edge Menu Structure

CTRL This allows users to change settings on the card edge display and connectivity settings.

- **DISP** Display control. Allows the user to switch the text orientation of the card display between vertical (VERT) and horizontal (HORZ).
- **ETH** Ethernet connection control. Allows users to set connection type and limit speek on 1Gig Ethernet ports.
    - **ETIF** Presents user with option to select between **COPP** (copper) or **FIBE** (fiber) SFP type.
    - **BWLM** Allows user to rate cap Ethernet ports 1, 2, 3, and 4 (**ETH1, ETH2, ETH3, and ETH4)**

STAT Displays the status of the card including important information for firmware version of the card and connectivity information of the card network connection.

- **VER** Displays the firmware version currently installed on the card.
- **SFP** Displays status of installed SFP, including:
  - **WLEN** Displays wavelength of installed SFP.
  - **TPWR** Displays transmit power of installed SFP
  - **RPWR** Displays receive power of installed SFP
- **RXPW** Prompts to select from **SFP 1-4** and displays Rx optical power level.
- **DUPX** Prompts to select from **ETH 1-4** and displays if port is operating in half duplex or full duplex.
- **ESPD** Prompts to select from **ETH 1-4** and displays connection speed on that port.
- **ELNK** Prompts to select from **ETH 1-4** and displays link status (UP/DOWN) on that port.

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4. VISTALINK PRO INTERFACE

4.1. CARD CONTROL

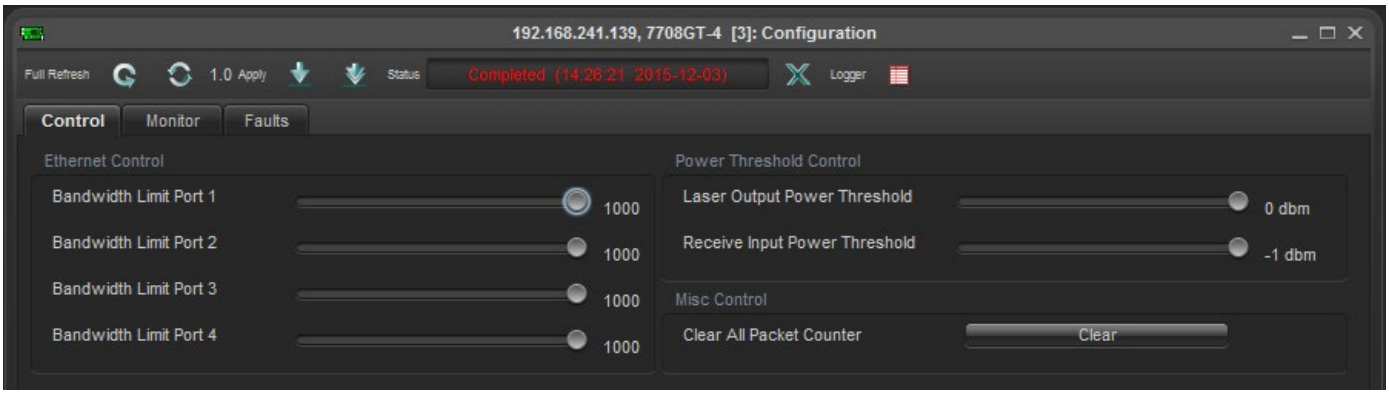

Figure 4-1: Card Control Tab

4.1.1. Ethernet Control

Bandwidth Limit Port 1-4: Slider control that allows bandwidth limit per port (in MB/s)

4.1.2. Power Threshold Control

Laser Output Power Threshold: Allows user to set threshold for output power (in dBM)

Receive Input Power Threshold: Allows user to set threshold for input power (in dBM)

4.1.3. Misc Control

Clear All Packet Counter: Clears packer counter

4.2. MONITOR

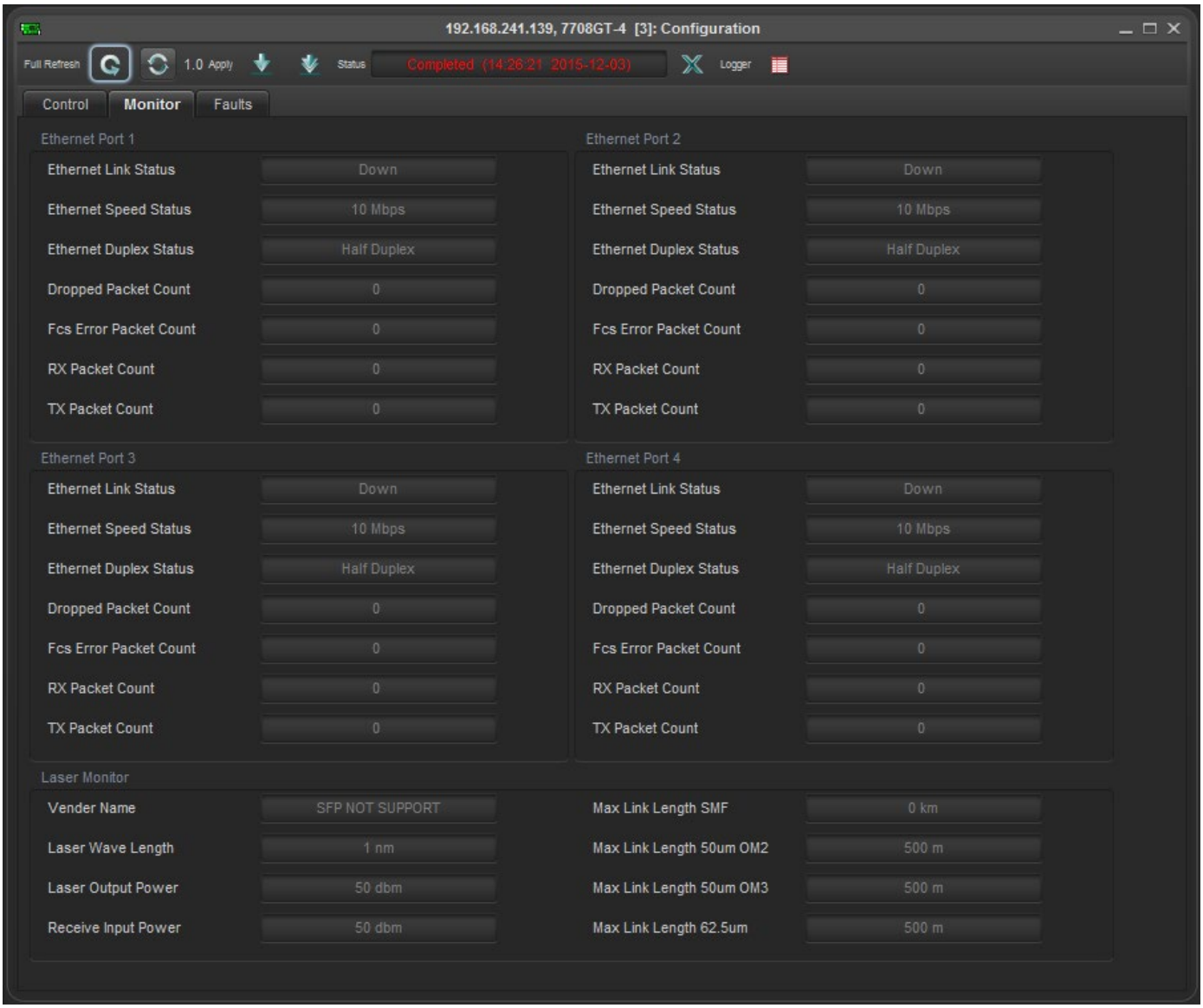

Figure 4-2: Monitor Tab

4.2.1. Ethernet Port 1-4

Ethernet Link Status: Displays current link status on Ethernet port.

Ethernet Speed Status: Displays current connection speed for Ethernet port.

Ethernet Duplex Status: Displays duplex status for Ethernet connection.

Dropped Packet Count: Displays counter of dropped packets for Ethernet port.

Fcs Error Packet Count: Displays counter of fcs errors for Ethernet port.

RX Packet Count: Displays counter of received packets.

TX Packet Count: Displays counter of transmitted packets.

4.2.2. Laser Monitor

Vendor Name: Displays name of vendor for connected SFP.

Laser Wave Length: Displays wavelength of SFP.

Laser Output Power: Displays output power of SFP (in dBm)

Receive Input Power: Displays input power of SFP (in dBm)

Max Link Length SMF: Displays max link length for a single mode fiber in km.

Max Link Length 50um OM2: Displays max link length for an OM2 multimode fiber in km.

Max Link Length 50um OM3: Displays max link length for an OM3 multimode fiber in km.

Max Link Length 62.5um: Displays max link length of a 62.5um multimode fiber.

4.3. FAULTS

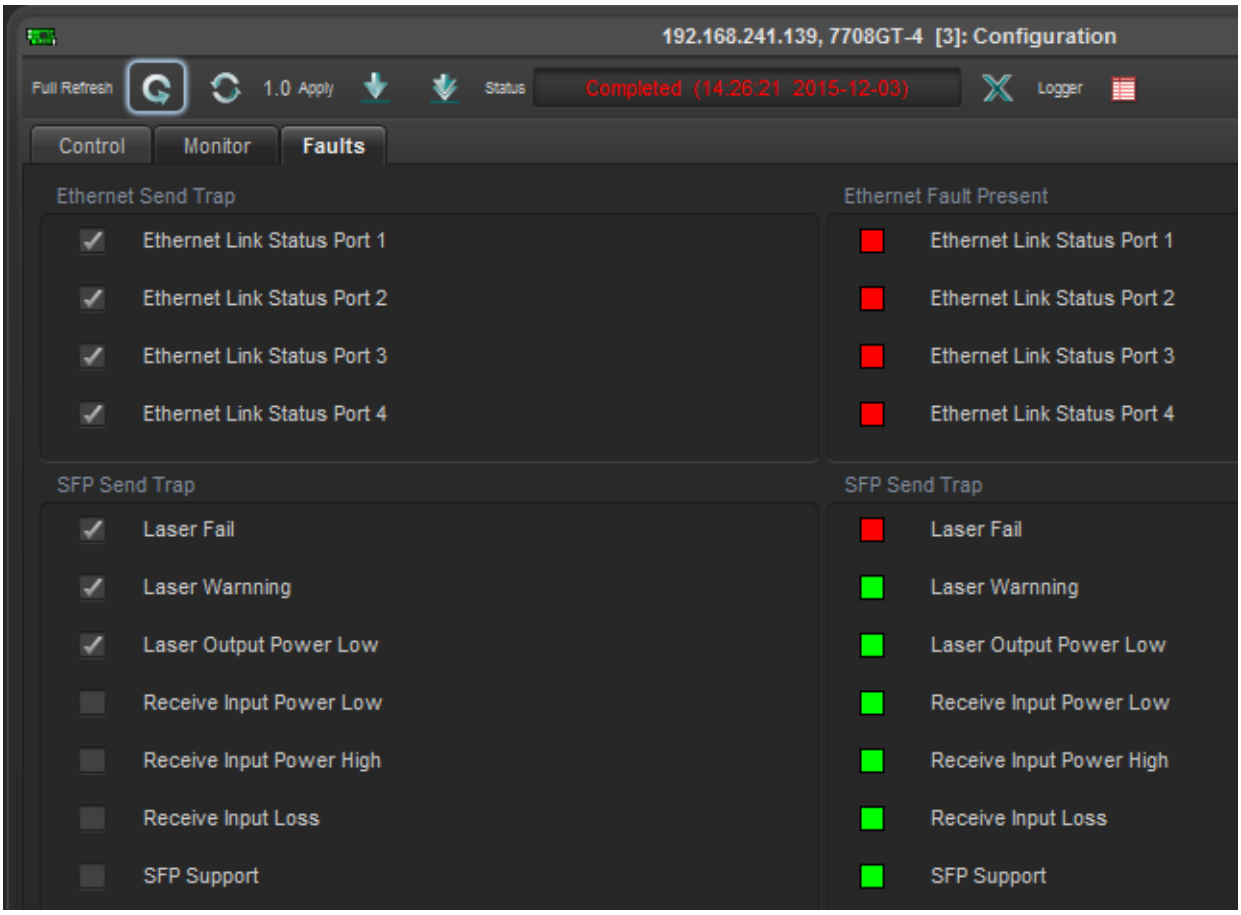

Figure 4-3: Faults Tab

This control allows the user to enable or disable the following Faults:

- Ethernet Status Port 1-4
- Laser Fail
- Laser Warning
- Laser Output Power Low
- Receive Input Power Low
- Receive Input Power High
- Receive Input Loss
- SFP Support

If the Fault status indicator is solid green, this means the control monitor is enabled and up and running.

5. FIRMWARE UPGRADE PROCEDURES

5.1. VLPRO UPGRADE

Ensure that the card is running the latest firmware, to check this simply right click on the frame controller cards address in VLPro Client and select ***Version Information***.

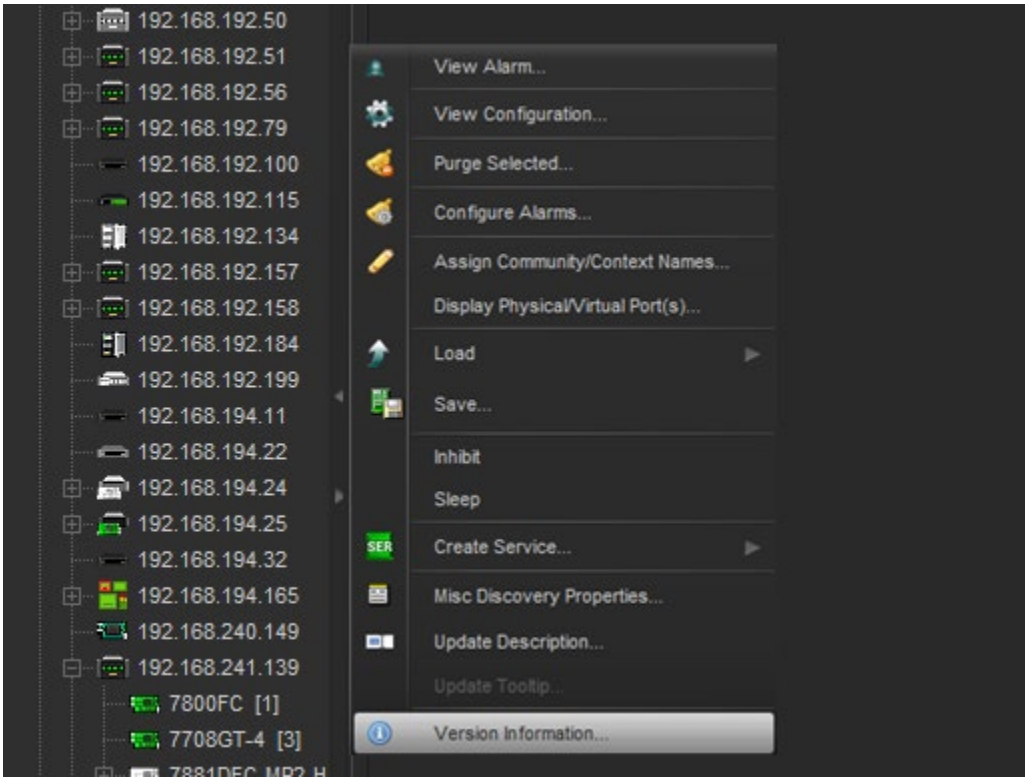

Figure 5-1: Version Information Drop-down Menu

The DHCP mode should be disabled before proceeding with the 7800FC Frame Controller to upgrade.

Note: Please contact Evertz for the latest firmware if it's not available on Evertz web site.

This will open a window that displays all of the current version information loaded onto the card.

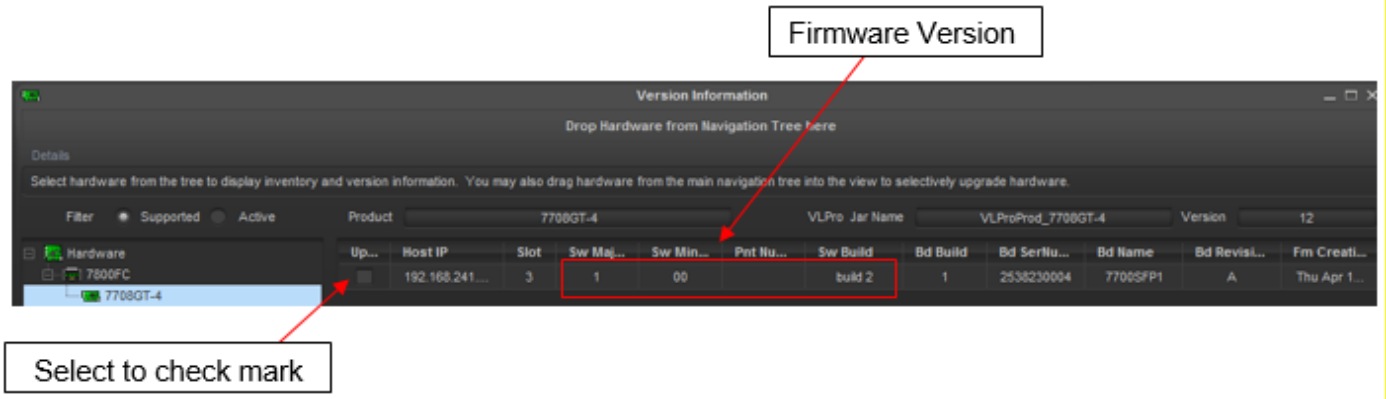

Figure 5-2: Version Information Screen

Check mark the product to be upgrade and click upgrade in the bottom right corner of the Version Information window. Multiple products of the same type may be selected to be upgraded at the same time.

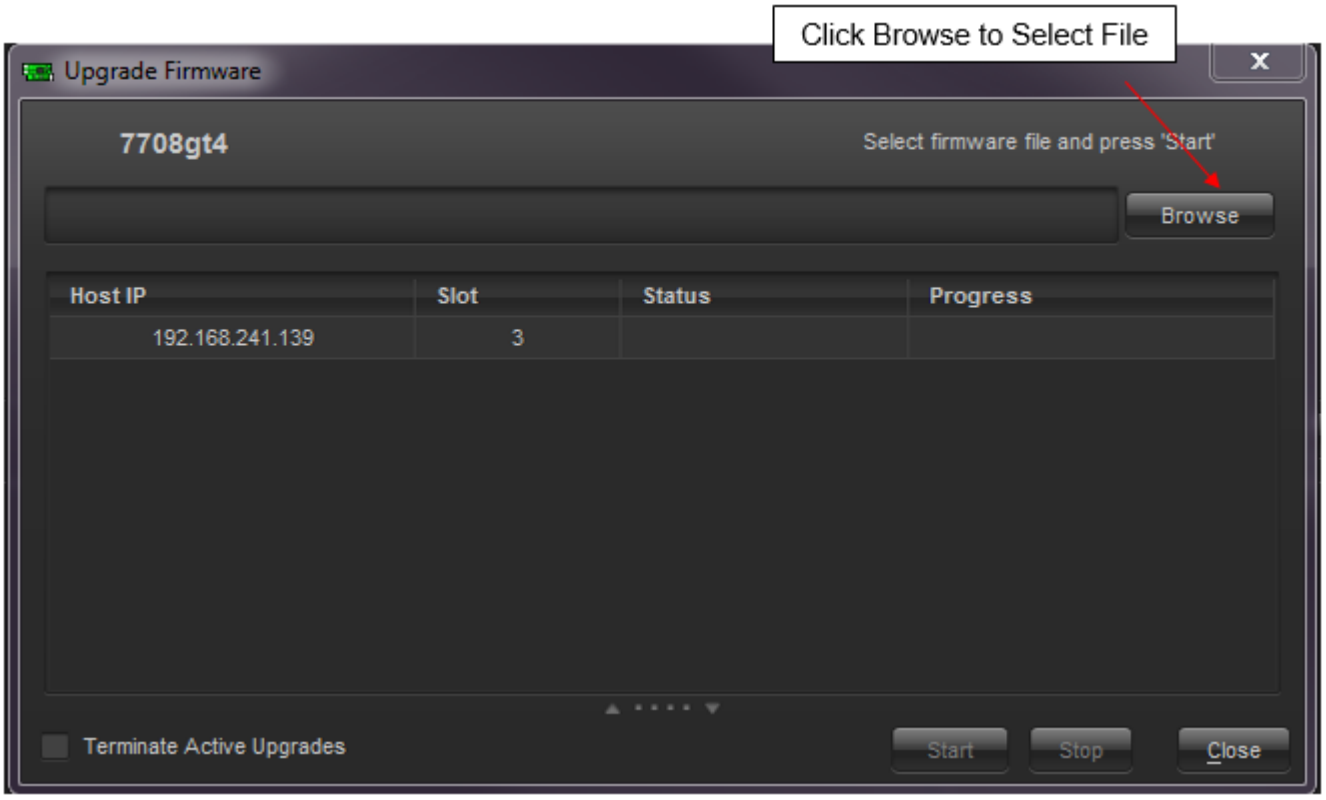

Figure 5-3: Product Upgrade Drop-down Menu

Click *Browse* to select *.bin* image file for downloading. Two files will be extracted. Select *Start* to begin the process.

5.2. JAR FILE UPGRADE PROCEDURES

Evertz products are constantly evolving and new features are often added. It is therefore important to update the JAR files in use to provide access to all the latest features or enhancements. It will also be necessary to add JAR files for new products

Ensure that the card is running the latest JAR file, to check this simply right click on the cards address in VLPro Client and select ***Version Information***.

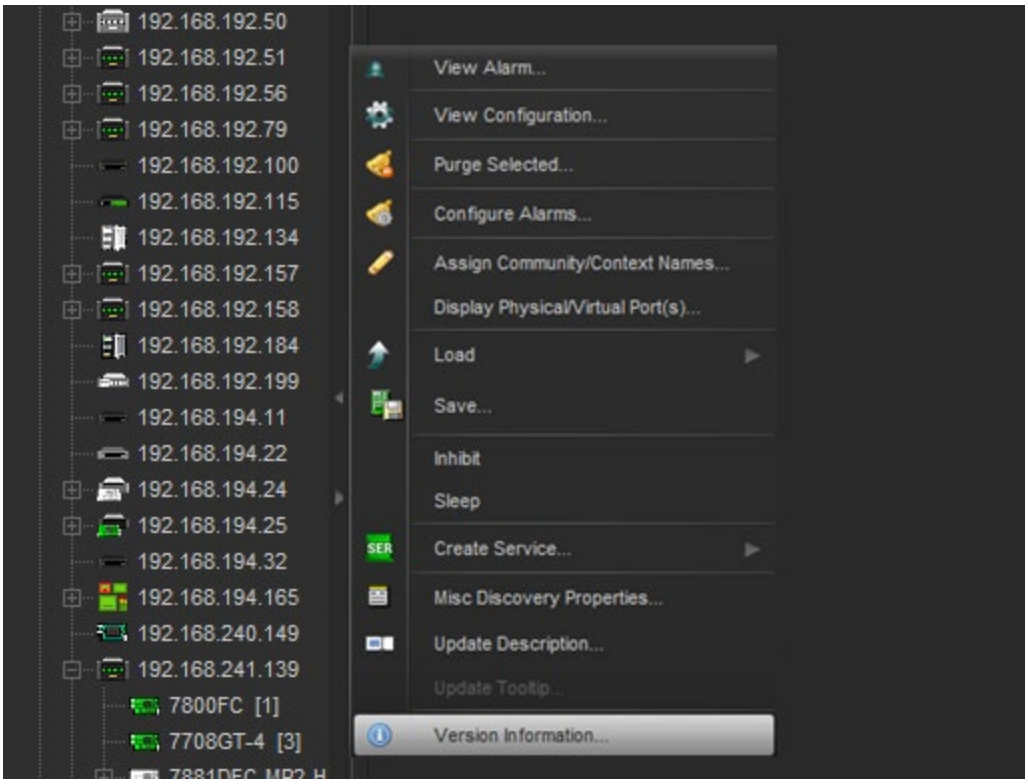

Figure 5-4: Version Information Drop-down Menu

This will open a window that displays all of the current version information loaded onto the card.

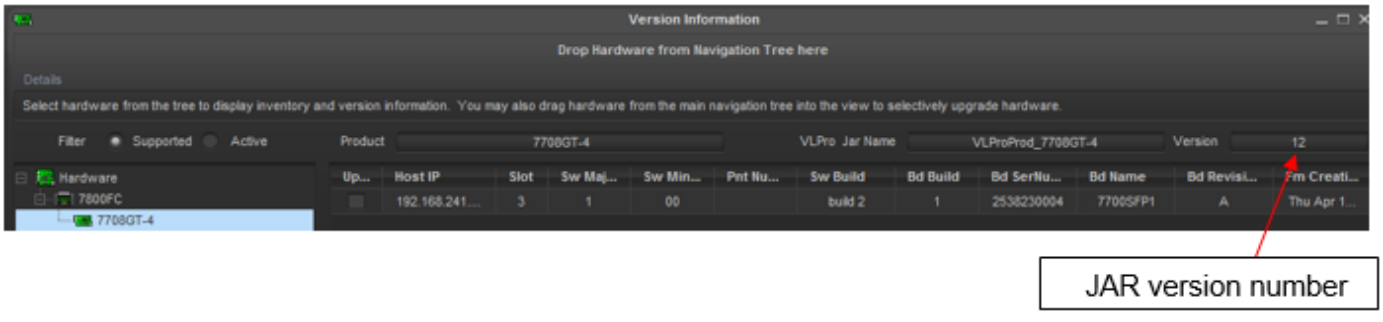

Figure 5-5: Version Information Screen

To retrieve the JAR file contact your Evertz sales representative or check Evertz web site for availability (www.evertz.com – Support> Downloads VistaLINK®PRO JAR File Downloads> > Type "7708GT-4" in the Model search and press "Go"). Save the files to the hard drive.

Please contact Evertz for JAR file if it not available on Evertz web site.

To perform a JAR update, ensure that all VistaLINK®PRO clients are closed (those clients which are not closed will automatically be disconnected as soon as the VistaLINK®PRO Server is restarted). Maximize the VistaLINK®PRO Server window from the Windows task bar, select *Help> Apply Update> Product* from the menu.

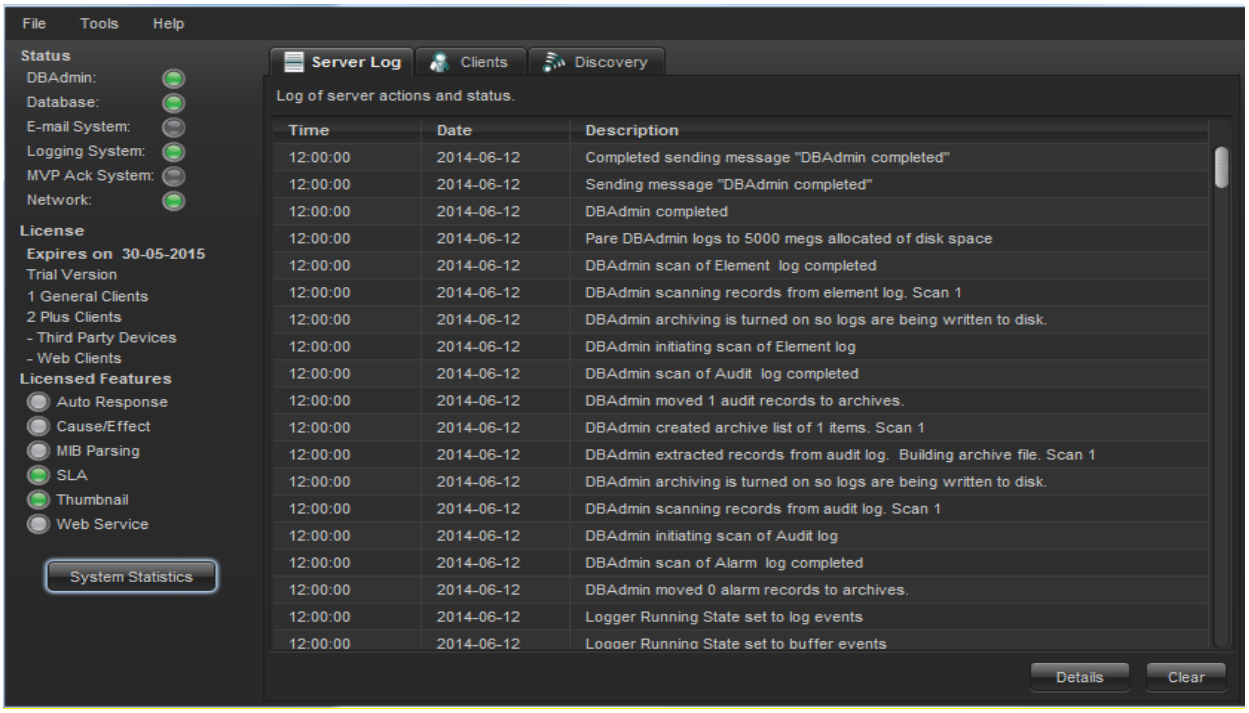

Figure 5-6: VistaLINK® PRO Server

A window will appear, as shown in **Error! Reference source not found.**, navigate to the location of the new JAR file and double click to select the file. The window will automatically close and the update will be applied in the background.

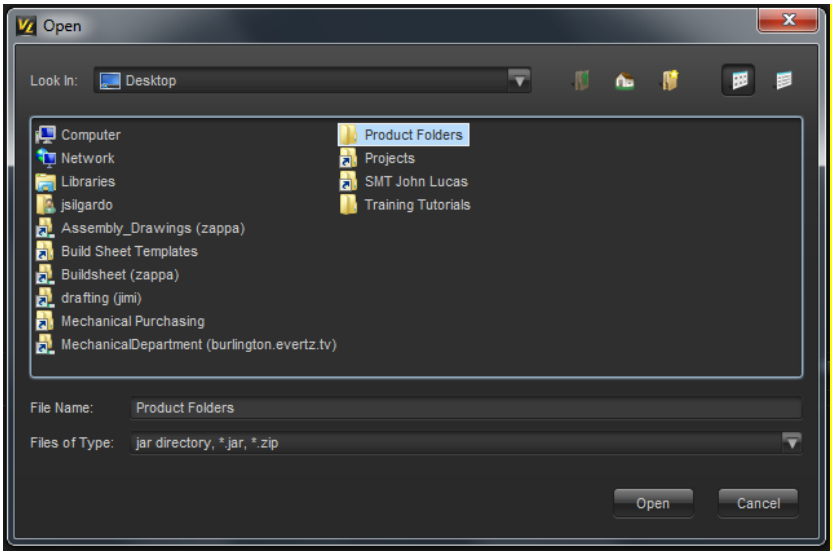

Figure 5-7: Firmware Version Location

When the window opens you want to select the latest .jar file from its saved location on the computer and select ***Open***.

At this point the VLPro Server will send a message asking to Restart, select ***Yes***. This will apply the update firmware to the card.

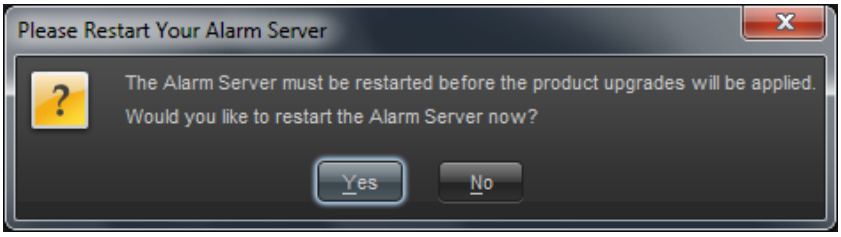

Figure 5-8: Alarm Server Restart Notification

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