3700FR Series
USER MANUAL

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Version 1.0, November 2011

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 accompanying 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.

MODULES WITH FIBER OPTIC LASER OUTPUTS

Some modules in the ATP™ system have fiber optic outputs. Consult servicing information sections of this manual for laser safety information and specific procedures for handling fiber optic outputs.

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

MODULES WITH LITHIUM BATTERIES

Some modules may be fitted with a 3V Lithium battery type CR2032. Consult servicing information sections of this manual for specific procedures and 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 EN55103-1: 1996 EN55103-2: 1996	Safety Emission 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 d

Evertz Microsystems Ltd  For Commercial Use	Tested to comply with FCC Standards	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.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Released version	Nov 2011

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1. OVERVIEW

The 3700FR Multiframe provides a universal platform for Video, Audio, Data and Telco signal transport over Telco and IP networks. Its 16 3RU slots accommodate Evertz' 779x family of Service/Customer and Trunk/Line interface modules. In addition, these 3RU slots are fully compatible with all of Evertz' existing 7700 and 7800 series modules for signal processing, multiplexing, and conversion.

Six 6RU slots are also available to accommodate Evertz ATP switch fabric (primary and redundant) which allows the routing of any signal to any destination point on the network. The combination of these two slot formats provides a single platform to accept any Video, Audio, Data, Telco signal, format / process the signal as required, then output over dark fiber, TDM (e.g SONET/SDH) or IP (e.g 10Gbe) network. The 'IP' version of the frame 3700FR-IP, applicable for solutions over IP/MPLS Networks is identical to the standard frames with additional support for high density 6RU slot IPX Ethernet cross connect and IPG Ethernet gateway modules

The combination of these two slot formats provides a single platform to accept any Video, Audio, Data, Telco signal, and then format/process the signal as required, and output over dark fiber, TDM (e.g. SONET/SDH) or IP (e.g. 10Gbe) network. The 3700FR Multiframe supports hot extraction of the modules and power supplies from the front of the frame to allow optimum network availability and serviceability.

The 3700FR frame is also equipped with 3 frame controller units used for facilitating network communications between the frame modules and the configuration software. The main and redundant frame controller modules (3700FC) are located under the left and right power supply units, when looking directly at the front of the frame. In addition, a 7700FC frame controller resides in slot 1 of the 3RU section of the frame. The 7700FC provides control and monitoring for any of the 7700/7800 series modules installed in the frame.

The 3700FR is available two power supply configurations. The standard 3700FR and 3700Fr-IP frames are powered by auto sensing AC power supplies. The 3700FR-48VDC and 3700FR-IP-48VDC frames are powered by 48VDC power supplies. Each frame can accommodate up to 2 hot-swappable power supply units (3000PS-HF or 3000PS-48VDC).

The 3700FR Multiframe series provides a universal platform, for Video, Audio, Data and Telco signal transport over Telco and IP networks. Its 16, 3RU slots accommodate Evertz's 779x family of Service/Customer and Trunk/Line interface modules. In addition, these 3RU slots are fully compatible with all Evertz existing 7700 and 7800 modules for signal processing, multiplexing, conversion, etc.

The 3700FR series frames support hot extraction of the modules from the front of frame to allow optimum network availability and serviceability (MTTR). All frames offer hot swappable dual redundant power supplies that allow for power supply and fan replacement without compromising the integrity of critical signal paths. AC and 48VDC power supply configurations are available.

Features & Benefits

- 16 x 3RU slots to house up to 16 77xx/78xx series modules
- 6 x 6RU slots to house up to 6 3xxx series modules·
- IP versions for support of high density 6RU modules for IP/MPLS Network applications.
- Dual redundant, hot swappable (front of frame) power supplies and fan modules

- AC and 48VDC power supply configurations available
- Dual redundant, hot swappable (front of frame) frame controllers
- Monitoring window for verifying modules status and power supply status Full SNMP (over TCP/IP) configuration, monitoring and control capability when used with associated frame controllers
- Frame status contact closure/open on power supply failure, fan failures and user selectable module alarms
- Relay based contact closure is provided with common, ground, normally open and normally closed contacts
- High-speed bussing and control system provided for modular applications
- No recabling required when hot swapping modules

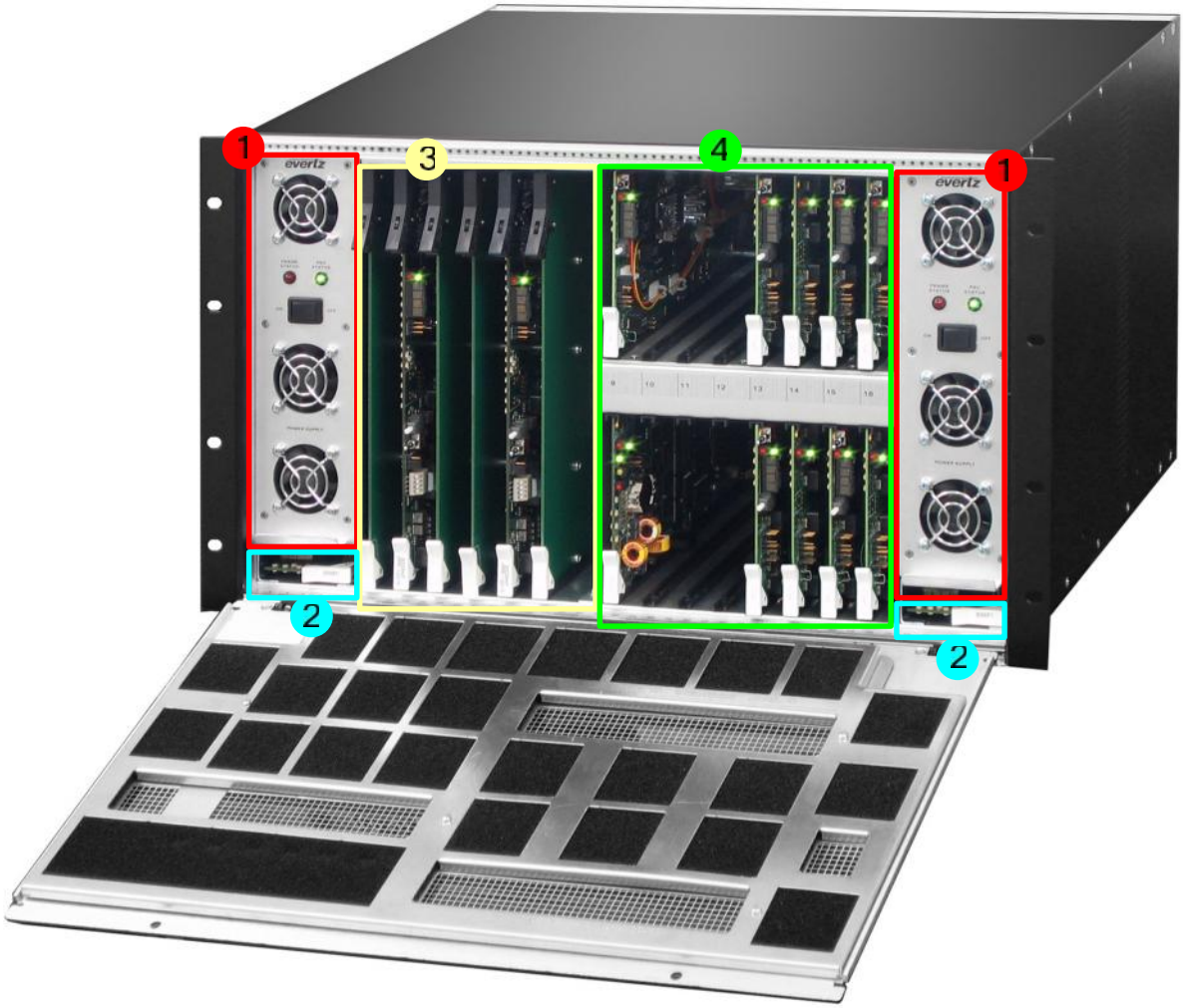

Figure 1-1: 3700FR – 6RU Multiframe

1. 3700FR power supplies (3000PS-HF or 3000PS-48VDC)
2. 3700 series frame controller slots (3700FC main/backup)
3. 6RU card slots
4. 3RU card slots for 77xx/78xx series cards

2. INSTALLATION

2.1. 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.

2.2. INSTALLING AND REMOVING MODULES

The standard 3700FR series frames and the 3700R-IP series frames are identical except for the rear panel. The standard frame, shown in Figure 2-1 allows you to use any of the standard 6RU modules as well as all of the 77xx/78xx series modules. The IP frame, shown in Figure 2-1 allows you to use the high density 6RU modules such as the 3080IPX, as well as all of the 77xx/78xx series modules. The high density modules will not fit into the standard frame because of the metal bars between the 6RU slots.

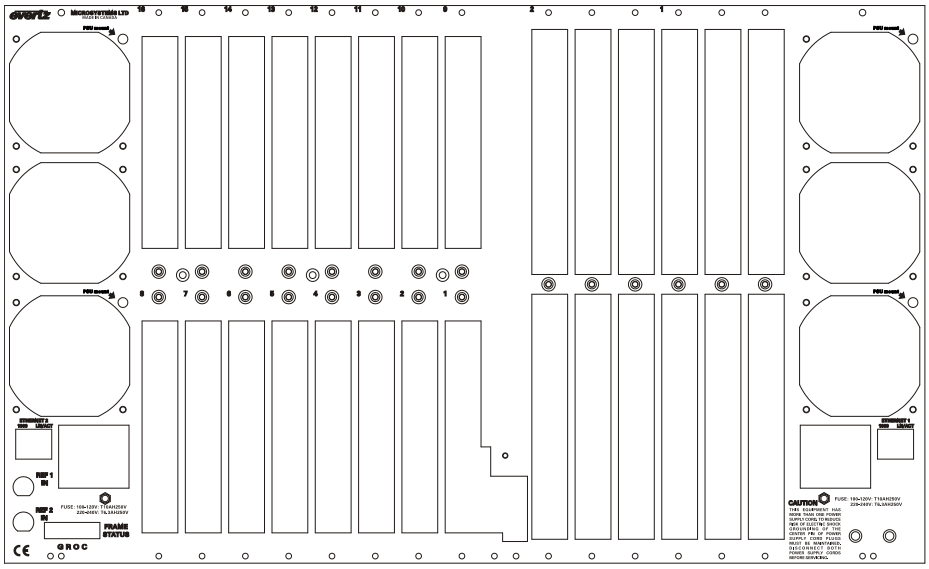

Figure 2-1: 3700FR Standard version frame rear view

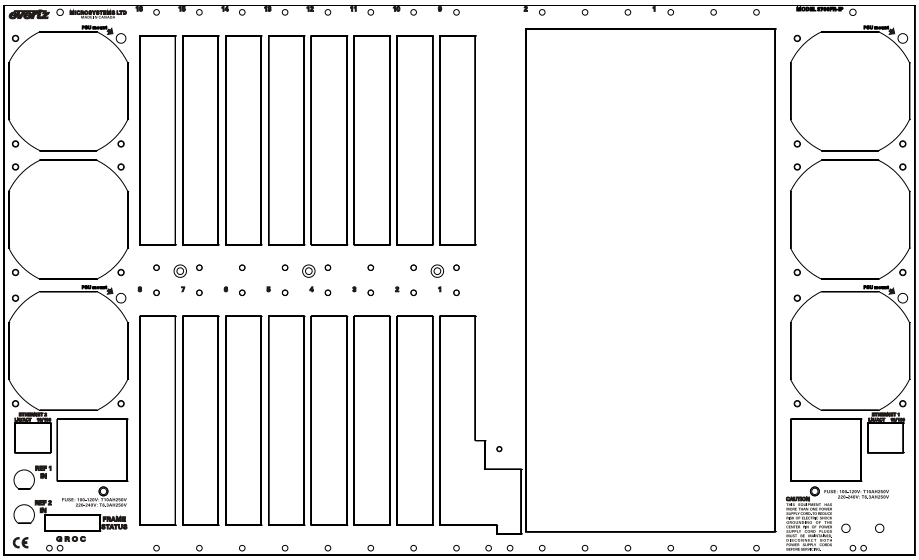

Figure 2-2: 3700FR IP version frame rear view

2.2.1. Installing the Module Rear Plate

In most cases, the 3700FR series frame will already have the module and rear plate installed within the frame. However, when modules and rear plates need re-positioning, or when additional modules are purchased, proper module/rear plate installation is required.

Each module is shipped with a matching rear panel plate that houses the appropriate connectors for that module.

To install the 6RU Rear Plates:

1. Locate the specific slot in the frame and remove any filler plates.
2. Install the rear plate over the open slot by first fitting the plate then tightening the two lock-screws.
3. Fasten the third screw in the middle of the rear plate.
4. Tighten the screws after the main module is installed.

To install the 77xx/78xx Series 3RU Rear Plates:

1. Locate the specific slot in the frame and remove any filler plates.
2. Install the rear plate over the open slot by first fitting the plate then tightening the two lock-screws.
3. Tighten the screws after the main module is installed.

CAUTION: If any of the screws for the rear plate are missing, please contact Evertz immediately for the specification and/or replacement. Using the incorrect screw can cause thread stripping.

2.2.2. Opening and Closing the Front Panel

In order to insert or remove modules you will have to open the front panel using the following procedure:

1. Turn the two captive screws located on the front panel counter clockwise several turns until they release completely from the front extrusions.

2. Carefully lower the front panel door so that the front edge of the door is lower than the rear of the door.

3. When closing the door, make sure that the thumbscrews are properly finger tightened. If the frame is operated in environments subject to excessive vibration such as mobile trucks, you may tighten the screws carefully with a screwdriver. Be careful not to over tighten as the thumbscrew head may twist off.

2.2.3. Installing a Module

1. Orient the module vertically such that the smaller white card ejector is on the bottom. For the 6RU modules, the larger black card ejector is on the top for the 3700FR.

2. Align the card with the card guide corresponding to the slot number where you installed the rear panel plate.

3. Carefully slide the module into the frame and press it completely into the rear panel connectors.

4. If installing the 6 RU modules, use the black card-ejector to latch the module into the slot.

5. Make sure that the connectors are fully seated in the rear panel.

6. When this is done, close the front panel and then tighten the screws that hold the rear panel in place.

2.2.4. Removing a Module

1. If removing the 6 RU modules, use the black card-ejector to unlatch the module. Then pull the white card ejector to release the module the module.

2. Grasp the card using the card ejector and pull the module out from the frame.

3. Carefully place the module in a safe place, free from static discharge.

To prevent any damage or degradation on components of the product caused by ESD, observe follow the precautions in section 2.1 when installing or removing modules from the frame.

2.3. INSTALLING THE 3700FR FRAME

CAUTION – INSTALLATION OF THIS EQUIPMENT SHOULD ONLY BE DONE BY QUALIFIED PERONNEL IN ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL.

2.3.1. Cooling

The 3700FR frame is designed to ensure adequate cooling for up to 650 watts of processing power per frame. Fans at the front and rear of each power supply module accomplish forced air-cooling. Adjacent equipment may be mounted immediately to the top and bottom of the 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.

CAUTION: For proper cooling, the frame must contain either two 3000PS power supplies, or one 3000PS power supply and one 3000PS-FM power supply blank panel with cooling fan.

2.3.2. Fan Exhaust

The cooling fans for the power supplies (3700FR and 7800FR), located at the front of the frame, draw air in the front and exhaust out the sides of the frame. The cooling fans for the modules, located at the rear of the frame, draw air in the front and the exhaust out the rear of the frame.

CAUTION: To ensure adequate cooling, care should be taken to ensure that the fan inlets and exhaust openings are free of obstructions. Normal operation of the frame requires the front door to be closed.

2.3.3. Mounting

The 3700FR frame is equipped with rack mounting rails and fits into a standard 19” x 10.5” x 14.5” rack space (483 mm x 260 mm x 368 mm). To securely fasten the frame to the equipment rack, make sure that all four mounting screws on each mounting rail are tightened securely.

After the unit has been installed in a rack, all cards in the frame should be checked to ensure they are fully seated within the frame. This is best accomplished by simply pushing (simultaneously, with moderate force) on each card’s top and bottom insertion/extraction levers (where applicable). See section 2.2.3 for further information. This step should be repeated any time the frame is shipped, or relocated within a facility.

2.3.4. Connecting the Power

2.3.4.1. Connecting the Power - AC Powered Frames

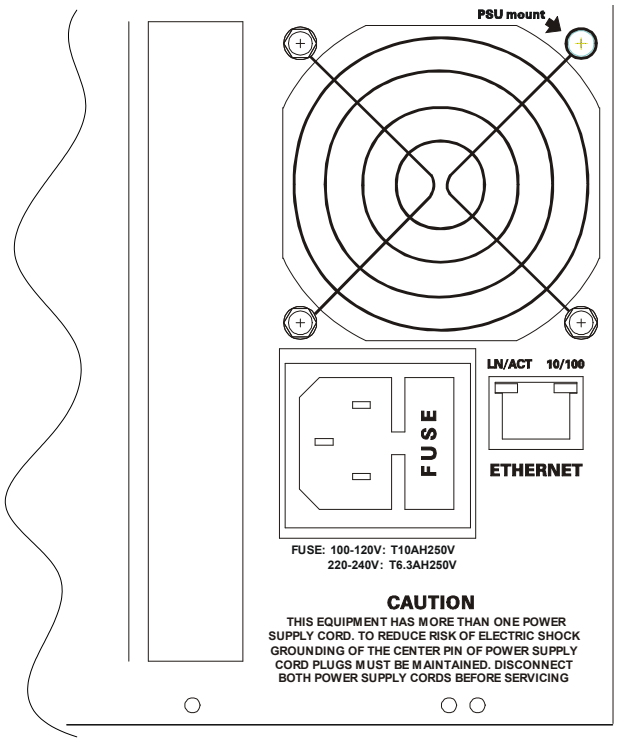

Figure 2-3: Connecting the Power to the 3700FR

The 3700FR AC [owered frames come standard with one auto-ranging power supply (3000PS) that automatically senses the input voltage over the range of 100 to 240 VAC. An additional power supply can be ordered to provide fully redundant powering of the frame. When only one power supply is fitted, the frame will be fitted with a 3000PS-FM fan module to ensure the thermal integrity of the frame cooling. In a frame that contains a redundant power supply module, each power supply may be powered from a different AC mains source, allowing complete AC supply redundancy.

Power should be applied by connecting a three-wire, grounding-type power supply cord to the power entry module on the rear panel of each power supply. For use in North America, the power cord should be a minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length. For use outside North America, use a power cord approved for the country of use with a minimum 1.00 mm^2 wire size.

CAUTION: To reduce the risk of electric shock, earthing of the earth pin of the main plug must be maintained.

When redundant power supplies are used. Make sure that they are powered from separate circuits, each capable of supplying the full load of the frame. This will ensure sufficient power to keep the frame running in the event of a power failure on one of the circuits.

The power entry modules contain a standard IEC power inlet connector, two 5 x 20 mm fuse holders, and an EMI line filter.

Fuse Rating:

100-120V Mains: 10 amps, 250 Volt ceramic time delay
220-240V Mains: 6.3 amps, 250 Volt ceramic time delay

See section 2.7.1 for information on changing the fuses.

CAUTION: The 3700FR frame is shipped with 10 Amp fuses rated for 100-120 VAC operation. If you are operating the 3700FR frame in a country with nominal 220-240 VAC operation, replace the fuses with 6.3 Amp fuses rated for 220-240 VAC operation. See section 2.7.1 for information on changing 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.

2.3.4.2. Connecting the Power - DC Powered Frames

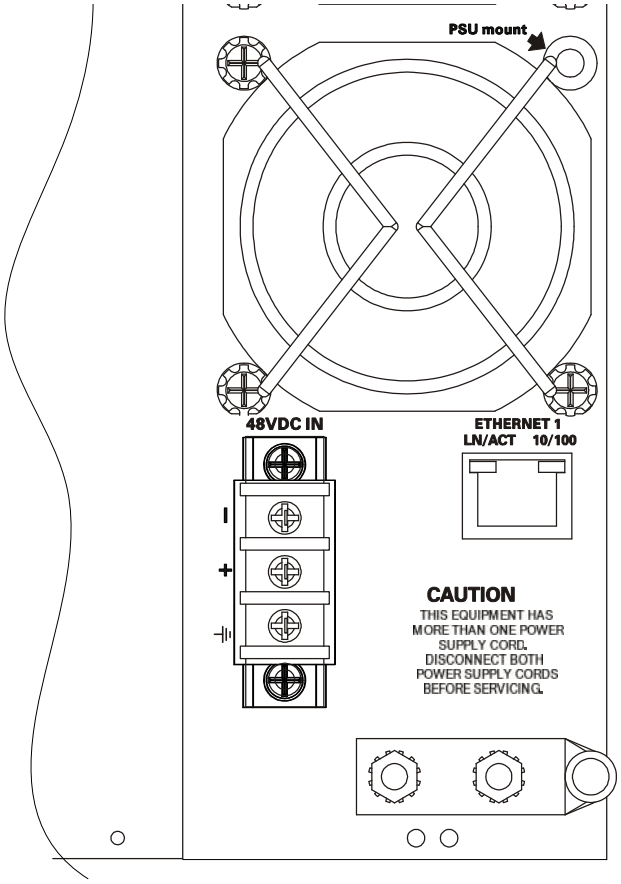

Figure 2-4: 3700FR-48VDC Rear Panel

The 3700FR-48VDC frames comes standard with one auto-ranging power supply that automatically senses the input voltage over the range of 36 to 60 VDC. An additional power supply (3000PS-48VDC) can be ordered to provide fully redundant powering of the frame. When only one power supply is fitted, the frame will be fitted with a 3000PS-48VDC-FM fan module to ensure the thermal integrity of the frame cooling.

The frame rear panel is fitted with a three terminal wiring block for each power supply. 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 and earthing connector should be minimum 16 AWG (1.3 mm^2) wire size rated VW-1; maximum 2.5 m in length.

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

The 3000PS-48VDC power supply is internally fused. There are no user serviceable 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.

When redundant power supplies are used. Make sure that they are powered from separate circuits, each capable of supplying the full load of the frame. This will ensure sufficient power to keep the frame running in the event of a power failure on one of the circuits.

2.4. POWER SUPPLY OPERATION

2.4.1. Turning the Power On and Off

Each power supply is fitted with its own power switch. When the switch is turned off, the remaining power supply will power the frame. To completely remove power from the frame, both power supplies must be turned off.

2.4.2. Power Supply Status Indicators

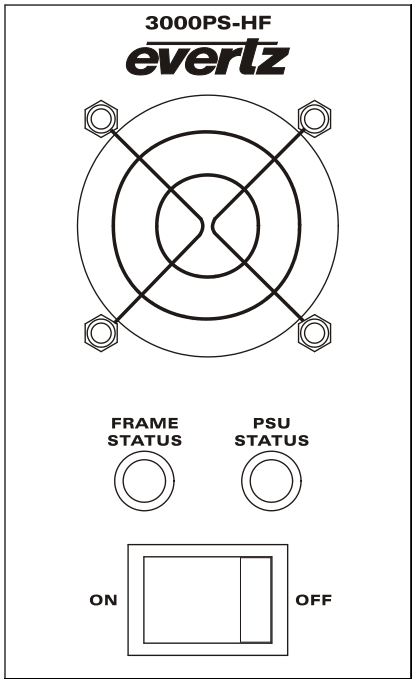

Figure 2-5: 3000PS Status Indicators

Each power supply has two status indicator LEDs. The green PSU STATUS LED indicates the health of the local power supply. The red FRAME STATUS LED indicates the health of the entire frame and is operated by the frame status bus of the frame. The FRAME STATUS LED will be Off under normal

conditions and On when there are Frame Status Fault conditions. See section 2.5 for more information about the frame status buss fault conditions.

If one of the power supplies malfunctions, (power cord disconnected, power switch is off, fuse is blown, rear fan is stopped, etc,) then its PSU STATUS LED will go Off, and the red FRAME STATUS LED on both power supplies will turn On. The PSU STATUS LED on the power supply that is functioning will remain On. If the frame is connected to VistaLINK® then the power supply fault will send a trap message from the frame.

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.

2.5. FRAME STATUS FAULT CONDITIONS

The Frame is fitted with a global Frame Status monitoring bus that is connected to each of the power supplies and to each of the modules. When a fault condition occurs on one of the power supplies, or one of the modules, a Frame Status Fault condition is active on the frame status bus. When this occurs, the red FRAME STATUS LED on the power supply will come on and the relay on the Frame Status Tally terminal block will activate.
Power supplies, will assert a frame status fault when their PSU STATUS LED is off.

Each module has a large red LOCAL FAULT LED and a large green MODULE OK LED at the top of the card edge. This green LED indicates good module health while the red LED indicates that there is a fault condition on the module. Each module has its own criteria that determine when the red fault LED comes on. When the red LOCAL FAULT LED is On the module can also assert a fault condition on the Frame Status bus. On each module there is a jumper that disables sending local card fault information to the Frame Status Bus. For more information about fault conditions on individual modules, and for the location of the Frame Status Jumper on the module consult the individual chapter for the module. For example, if a module requires video or audio for its functionality and the video or audio is not present, the red LOCAL FAULT LED on the module will be On and the fault will be reported on the frame status bus if the FRAME STATUS jumper on the module is set to the On position (default).

2.5.1. Frame Status Tally Terminal Block

There is a green **FRAME STATUS** terminal block at the left rear of the frame that has a normally open and normally closed relay contact that can be used to indicate frame status fault conditions to external equipment. There are 4 connections, as shown in Table 2-1 below.

Label	Pin #	Function
G	1	Chassis Ground (connect to cable shield)
R	2	Common (connect to Ground or your reference)
O	3	Open with respect to common when Frame Status fault exists
C	4	Closed with respect to common when Frame Status fault exists

Table 2-1: Frame Status Tally Terminal Block Pin Assignments

The relay contacts can sink up to 1A and operate up to 30 VDC.

2.6. CARE AND HANDLING OF OPTICAL FIBER

Some modules in the ATP™ system have fiber optic outputs. The following safety information applies to the optical outputs of these modules.

2.6.1. Laser Safety

CLASS 1 LASER PRODUCT

Background colour: yellow
Triangular band: black
Symbol: black

2.6.2. Assembly

Assembly or repair of the laser sub-module is done only at Evertz facility and performed only by qualified Evertz technical personnel.

2.6.3. Labeling

Certification and Identification labels are combined into one label. As there is not enough room on the product to place the label, it is reproduced here in the manual. See Figure 2-6 below.

Note: There is no date of manufacture on this label as it can be traced by the bar code label placed on the printed circuit board of each Evertz plug-in module.

Figure 2-6: Reproduction of Laser Certification and Identification Label

2.6.4. Handling and Connecting Fibers

CAUTION: 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.

Since the transmission characteristics of the fiber depend on the shape of the optical core, care must be taken to prevent fiber damage caused by heavy objects or abrupt fiber bending. Evertz recommends that you maintain a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable.

Dust particles on the ends of the optical fiber greatly increase the signal loss at interconnections, and large dust particles can even obscure light transmission altogether. To minimize the effects of dust contamination at the interconnections, the fiber should be cleaned each time it is mated or unmated. When using interconnection housings to mate two optical fibers, it is good practice to remove dust particles from the housing assembly with a blast of dry air. Alternatively, you can use the pre-moistened tissue that you should have received with the optical module. Remove this tissue from its package and wipe the end of the fiber connector before mating it to the module.

Whenever a fiber is unmated, it must be covered immediately. Most fiber manufacturers provide a plastic boot that fits over the ferrule body for this purpose.

Fiber interconnections must be made securely. The Evertz fiber optical transmitters and receivers come with SC interconnection housings built into the module. With this style of connector, the fiber assembly and the housing assembly can only be connected in one way and with very good repeatability. The rear fiber interconnect panel that is provided with each module can be ordered with optional SC/PC, ST/PC, or FC/PC connectors. The customer is required to provide the optical fiber with the correct connectors to connect the modules together. SC/PC, ST/PC, and FC/PC interconnection housing and connectors (as well as adapters) are industry standards with many available sources.

2.7. SERVICING INSTRUCTIONS

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

2.7.1. Changing the Fuses – AC Powered 3700FR Frames

CAUTION: For continued protection against risk of fire, replace only with the same type and rating of fuse.

ATTENTION: Pour éviter les risques d'incendie, remplacer le fusible avec un fusible de même calibre.

The fuse holder is located inside the power entry module. To change the fuses, pull the fuse holder out from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place.

For 100-120 VAC operation, use ceramic time delay 5 x 20 mm fuses rated for 250 Volts with a 10 amps current rating. For 220-240 VAC operation use ceramic time delay 5 x 20 mm fuses rated for 250 Volts with a 6.3 amps current rating.

For your convenience there are spare fuses located in the vinyl pouch in the front of this manual. Carefully reinsert the fuse holder into the power entry module.

2.7.2. Changing the Fuses – DC Powered 3700FR Frames

The Power supplies in the 3700FR-48VDC frame are internally fused. There are no user serviceable fuses.

2.7.3. Replacing the Power Supply

Each 3000PS or 3000PS-48VDC power supply is a complete assembly, and includes the power supply cooling fan and one frame-cooling fan. In the event that the power supply or one of the fans malfunctions, you will need to replace the power supply assembly with a spare one while the failed assembly is being repaired.

CAUTION: 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, or one power supply and a 3000PS-FM power supply blank panel.

The power supplies are hot swappable and can be easily replaced from the front without interrupting the signal integrity of the frame. Each power supply is capable of supplying full power to the frame by itself, however we recommend running with both supplies powered for power redundancy. On frames with only one power supply, a 3000PS-FM or 3000PS-48VDC-FM blank power supply module with cooling fan ***must*** be inserted into the second power supply space. The fan module contains a module-cooling fan and baffles to maintain proper airflow within the frame.

The power supply is secured into the frame by two machine screws through the rear panel (as shown in Figure 2-7). These screws must be removed before the power supply can be extracted from the front.

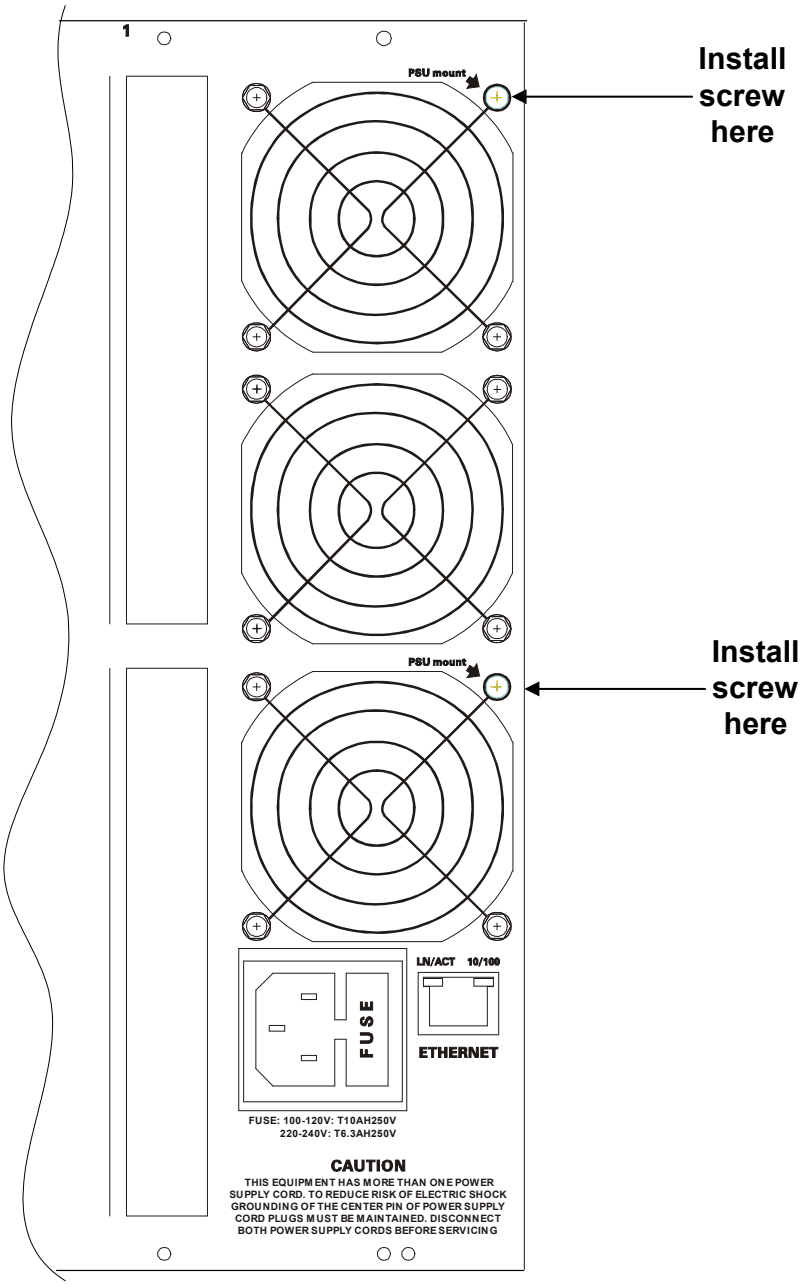

Figure 2-7: Locating the Power Supply Mounting Screw

CAUTION: To reduce the risk of electric shock, you must replace the mounting screw *after* replacing the power supply.

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

1. Turn off the power supply switch.
2. From the rear of the frame locate the power supply mounting screws. These screws are the top right screw holding the top and bottom fan guards in place, and is indicated by the legend

PSU mount ↓

3. Remove the power supply mounting screws.
4. Open the front door of the frame and pull the power supply out of the frame.
5. 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.
6. Reinstall the power supply mounting screws from the rear of the frame.
7. Turn on the power switch for the power supply. After a few seconds you should see the PSU STATUS LED come on indicating that the power supply is working correctly.

2.7.4. Replacing the Battery

Some modules, such as 7700FC Frame Controller are fitted with a 3V Lithium battery type CR2032. This battery is used to power non-volatile memory of some of the frame controller's parameters while power is removed from the frame. Before attempting to change the battery remove power from the card.

CAUTION
Danger of explosion if battery is incorrectly replaced
Replace only with the same or equivalent type

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

2.7.4.1. Safety Guidelines and Precautions concerning the Use of 3V Lithium Batteries

Please observe the following warnings strictly. If misused, the batteries may explode or leak, causing injury or damage to the equipment.

- The batteries must be inserted into the equipment with the correct polarity (+ and -)
- Do not attempt to revive used batteries by heating, charging or other means
- Do not dispose of batteries in fire. Do not dismantle batteries
- Do not short circuit batteries
- Do not expose batteries to high temperatures, moisture or direct sunlight
- Do not place batteries on a conductive surface (anti-static work mat, packaging bag or form trays) as it can cause the battery to short

3. SPECIFICATIONS

3.1. 3700FR FRAME SPECIFICATIONS

3.1.1. Genlock

Type:	NTSC (SMPTE 170M) and PAL (ITU624-4), colour black
Level:	1Vp-p
Connector:	2 BNC per IEC 61169-8 Annex A (1 each – NTSC and PAL)

3.1.2. Electrical – AC Powered Frames

AC Mains Input:	Auto ranging, 100 ⇔ 240 VAC, 50/60 Hz
Maximum Operating Current:	9.5 A (@ 115 VAC nominal), 4.0 A (@ 220 VAC nominal)
Maximum Power Consumption:	850 W
Maximum Module Load:	650 W (40W per 6RU slot, 24W per 3RU slot & 10 W for each 3000FCFrame Controller)
Power Supply Configuration:	1 supply standard, optional redundant supply requires separate inlet
Connector:	IEC 60320 - 1 per power supply
Fuses:	5 x 20 mm. ceramic – 2 per power supply
For 115 VAC operation:	10 amp, 250 Volt time delay
For 230 VAC operation:	6.3 amp, 250 Volt time delay
Status Indicators (each power supply):	PSU status LED Local Error/Failure LED
Tally Output Connector:	4 pin terminal, relay N/O, N/C for status/fault alarm, 1A, 30 VDC max
Temperature:	0-40 deg. C. (optimal performance) 0-50 deg. C. (operating)

3.1.3. Electrical – DC Powered Frames

DC Mains Input:	Auto ranging 42 ⇔ 60 VDC
Maximum Operating Current:	18 A (@ 48 VDC)
Maximum Power Consumption:	850 W
Maximum Module Load:	650 W (40W per 6RU slot, 24W per 3RU slot & 10 W for each 3000FCFrame Controller)
Power Supply Configuration:	1 supply standard, optional redundant supply requires separate inlet
Connector:	3 pin screw terminal strip – 1 per power supply
Fuses:	Internally fused in 3000PS-48VDC– no user serviceable fuses
Status Indicators (each power supply):	PSU status LED Local Error/Failure LED
Tally Output Connector:	4 pin terminal, relay N/O, N/C for status/fault alarm, 1A, 30 VDC max
Temperature:	0-40 deg. C. (optimal performance) 0-50 deg. C. (operating)

3.1.4. Compliance

Safety:	CSA Listed to CSA C22.2 No. 60065-03 incl Am 1, UL 60065-2007, IEC 60065-(2001-12) 7th Edition incl Am 1 Complies with CE Low voltage Directive 2006/95/EC
Laser Safety:	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, IEC 60825-1:2007 Edition 2
EMC:	Complies with FCC part 15, class A Complies with EU EMC directive 2004/108/EC
ROHS:	Complies with EU restriction on hazardous substances 2002/95/EC

3.1.5. Physical

Height:	10.5” (266 mm)
Width:	19” (483 mm)
Depth:	14.5” (368 mm)
Module Capacity:	16 single slot 7700 series modules 6 single slot 3000 series modules
Weight:	Approx. 17.4 lbs. (7.9 Kg) with 2 power supplies, no slots occupied Approx. 32 lbs. (14.5 Kg) with 2 power supplies all slots occupied

3.2. 3700FC FRAME CONTROLLER MODULE SPECIFICATIONS

The 3700FC Frame Controller module provides a single point of access to communicate with the 6RU modules. The 3700FC provides a 10Base-T/100Base-TX Ethernet port and handles all communications between the 6RU modules and the VistaLINK® software, and serves as a gateway to individual cards in the frame. The 3700FC also provides an RS-232 serial port at the card edge to set up the network addresses.

The 3700FC is housed in a narrow slot underneath the left side power supply in the 3000FR Frame. A redundant backup 3700FC is housed in a narrow slot underneath the right side power supply.

3.2.1. Ethernet

Network Type:	IEEE 802.3 (10 BaseT), IEEE 802.3u (100 BaseTX, IEEE 802.3ab) (1000BaseTX)
Connector:	RJ-45 (on rear panel of 3700FR Frame)

3.2.2. Serial Communications

Standard:	RS-232
Connector:	9-Pin Female D connector on upgrade breakout cable (provided with 3000FR)
Baud Rate:	57600
Format:	8 bits, no parity, 2 stop bits, no flow control

3.2.3. Electrical

Voltage:	+ 12VDC
Power:	7 Watts
Safety:	Complies with CAN/CSA 60065-03 incl. Am 1, UL 60065-2007, IEC 60065-(2001-12) 7th Edition incl. Am 1 Complies with CE Low voltage Directive 2004/108/EC
EMC:	Complies with FCC part 15, class A Complies with EU EMC directive 2006/95/EC

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4. MANAGEMENT CONNECTIONS

You will need one of your PC's running Windows in order to set up the 7700FC, and 3700FC, HyperTerminal program, and the provided Evertz serial cable with extension. You will need to connect the Evertz serial cable to the card to be configured and install it into the frame to provide it with power.

Set the IP on the Following Cards Only:

- 3700FC Frame controller for the 6RU cards
- 7700FC Frame controller for the 3RU cards

Open HyperTerminal from Windows:
START->PROGRAMS->ACCESSORIES->COMMUNICATIONS->HYPERTERMINAL

4.1. 7700FC SETUP

Start the terminal program and configure the port settings of the terminal program as follows:

Baud	**57600**
Data bits	**8**
Parity	**no**
Stop bits	**2**
Flow Control	**no**

Install the 7700FC card into the frame. After the card powers up and the boot-up messages are finished, a "login" prompt will appear in the terminal window. (For future reference the 7700FC software version information is displayed prior to the "login" prompt and should be quoted to Service staff when required.)

```
Tue Jul  6 08:53:51 PDT 2010

NetBSD/evertz (fc-default) (tty00)

login:
```

If the prompt does not appear, the following is a list of possible reasons for failed communications:

- Defective 7700 Serial Upgrade cable.
- Wrong communications port selected in the terminal program.
- Improper port settings in the terminal program. (Refer to step 2 for settings).

At the "login" prompt, enter:

- "**customer**" for user name <Enter>
- "**customer**" for password <Enter>

4.1.1. Configuring the Network Settings

From main menu, three selections are available - *Network Setup*, *SNMP Setup* and *FC Upgrade Setup*.

- *Network Setup* is used to set network IP addresses as well as broadcasting and routing instructions
- *SNMP Setup* is used to identify up to ten trap destination IP addresses.
- *FC Upgrade Setup* is used to allow or deny remote FC upgrades.

```
**** Main Menu ****

(1) Network Setup
(2) SNMP Setup
(3) FC Upgrade Setup

(X) Exit
(W) Exit without saving to flash
> _
```

To select one of the menu choices, enter the letter or number shown on the left and then press <Enter>. If you choose menu item 1 or 2 or 3 you will be presented with an additional menu. Choose menu items on these sub menus in the same way or press X to return to the main menu.

4.1.1.1. Network Setup

The *Network Setup* menu has six network parameters that need to be configured. If the network is using a **DHCP** server, set the ***DHCP*** parameter to *yes* before proceeding to change the other parameters. When the **DHCP** setting is set to *yes*, the *IP Address, Netmask, Gateway,* and *Broadcast* addresses are automatically assigned and their corresponding menu items are disabled.

If the network is not using a DHCP server, set the *DHCP* parameter to *No* before proceeding to change the *IP Address, Netmask, Gateway,* and *Broadcast* addresses.

The following screen displays the network settings on the 7700FC frame controller:

```
**** Network Setup ****

(1) Use DHCP [N]
(2) Hostname [fc-default]
(3) IP Address [192.168.0.12]
(4) Netmask [255.255.255.0]
(5) Gateway [192.168.0.1]
(6) Broadcast [192.168.0.255]

(X) Exit
> _
```

The chart below gives a brief description of each menu item and what the parameter does. To select one of the menu choices, enter the letter or number shown on the left and then press <Enter>. You will be prompted to enter the required parameter value. When you are done configuring the *Network Setup* menu items press X to return to the main menu. If you are unclear about how to configure your network, consult your network administrator.

Use DHCP	This setting allows the Frame Controller to **be** automatically **assigned an** IP address for the parameters **below** from a DHCP server during boot-up. If you are not running a DHCP server, set this parameter to "No" first before making any changes to other parameters.
Hostname	A user-configurable 7700FC identifier. This menu item can be used to name the specific frame, service or location of the 7700FC.
IP Address	This control sets the unique IP address of the 7700FC within the network. 192.168.1.XXX is an example of an IP address in a private (internal) network. If connecting multiple frames (each with its own frame controller), take care not to use the same IP address for each.
Netmask	This menu item defines the "subnet mask" of the network. Specifically, this parameter outlines all the IP addresses that can communicate with the 7700FC. This parameter can be set to 255.255.255.0 for a private network.
Gateway	This item identifies the IP address of the "gateway" (in previous versions of the software, "gateway" is referred to as "**route**"). Essentially, the gateway is a **device that routes packets to different networks. If configured, the IP address of the gateway must reside in the frame controller local subnet that was defined by the subnet mask**. In a private network, this gateway could be identified as 192.168.1.1. **Power cycle required after gateway change.**
Broadcast	This menu item sets the "broadcast" IP address. For example, in a private network **with a subnet mask configured as 255.255.255.0.** This parameter can be set to 192.168.1.255

Once the *Network Setup* parameters have been configured, exit the *Network Setup* by pressing `X` then `<Enter>`. Proceed to the *SNMP Setup* menu option by entering `2` then `<Enter>` at the Main Menu prompt.

4.1.1.2. SNMP Setup

In the *SNMP Setup* menu, three parameters are configured:

Read Community String	Factory default "public" (No changes required. However, if these settings are changed, the manager must have the identical settings. Otherwise no communication will occur between the 7700FC and manager.)
Read/Write Community String	Factory default "private" (No changes required. However, if these settings are changed, the manager must have the identical settings. Otherwise no communication will occur between the 7700FC and manager.)
Trap Setup	This menu item identifies the destination IP addresses (**SNMP Trap Handlers**) to which TRAPS are sent via SNMP. A maximum of ten IP addresses may be entered.

Once the *SNMP Setup* parameters have been configured, exit *SNMP Setup* by pressing `X` then `<Enter>`.

4.1.1.3. Community Strings

Community Strings are considered as “passwords” within SNMP, controlling the ability to read (“GET”) and/or read/write (“SET”) values to a specific destination. “GET” and “SET” messages include the community strings within their **PDU (protocol data units)**. By factory default, community strings are set to “public” and “private”, respectively. If these settings are changed, the SNMP manager’s community string must agree with the “SET” string. Otherwise no communication will occur between the 7700FC and manager.

```
**** SNMP Setup ****

(1) Read Community String [public]
(2) Read/Write Community String [private]
(3) Trap Setup

(X) Exit
>
```

4.1.1.4. Trap Setup

“Trap Setup” allows the user to **define** IP addresses **of the trap listeners for when the asynchronous fault messages are sent**. A maximum of ten IP addresses can be stored in the Frame Controller. After selecting “Add…” or “Remove…” IP addresses are entered one at a time.

Add Trap Destinations	Add a SNMP **trap server** IP address to the TRAP distribution list.
Remove Trap Destinations	Remove a SNMP **trap server** IP address from the TRAP distribution list. For example, selecting this option reveals the list of IP addresses with the prompt to remove one from the list: Trap #1: 192.168.1.76 Trap #2: 192.168.8.140 Remove trap # > 2
Show All Trap Destinations	Displays a list of all entered SNMP **trap server** IP addresses. For example: Trap #1: 192.168.1.76 Trap #2: 192.168.8.140 Trap #3: 192.168.8.112

Once the *SNMP Setup* parameters have been configured, exit the *SNMP Setup* by pressing `X` then `<Enter>`. Proceed to the *FC Upgrade Setup* menu option by entering `3` then `<Enter>` at the Main Menu prompt.

4.2. 3700FC SETUP

Start the terminal program and configure the port settings of the terminal program as follows:

Baud	**115200**
Data bits	**8**
Parity	**no**
Stop bits	**2**
Flow Control	**no**

Install the 3700FC card into the frame. After the card powers up and the boot-up messages are finished, a 'cmd' prompt will appear. Type 'menu' to reveal the 3700FC Main Configuration menu.

```
<<<3700-FC Menu Engine V1.00 build 8>>>
1-      Controller Network Settings
2-      Controller Settings
3-      Controller Reboot
4-      Quit Menu
-
```

If the prompt does not appear, the following is a list of possible reasons for failed communications:

- Defective 3700 Serial Upgrade cable.
- Wrong communications port selected in the terminal program.
- Improper port settings in the terminal program. (Refer to step 2 for settings).

4.2.1. Configuring the 3700FC Settings

From the main menu, three selections are available – Controller *Network Settings*, *Controller Reboot,* and *Quit Menu*:

- *Controller Network Settings* is used to set network IP addresses as well as broadcasting and routing instructions
- *Controller Settings* is used to set the redundancy scheme of the 3700FC which operate in tandem in the 3700FR frame. This menu is also used for setting up the SNMP trap destinations
- *Controller Reboot* is used to reboot the 3700FC

To choose one of the menu choices, enter the letter or number shown on the left and then press <Enter>. If you choose menu item 1 or 2 or 3 you will be presented with an additional menu. Choose menu items on these sub menus in the same way or press X to return to the main menu.

4.2.1.1. Controller Network Settings

The *Network Setup* menu (selection 1) has six network parameters that need to be configured. If the network is using a **DHCP** server, set the ***DHCP*** parameter to *enable (selection 6)* before proceeding to change the other parameters. When the **DHCP** setting is set to *enable*, the *IP Address, Netmask, Gateway,* and *Broadcast* addresses are automatically assigned and their corresponding menu items are disabled.

If the network is not using a DHCP server, set the *DHCP* parameter to *disable* before proceeding to change the *IP Address, Netmask, Gateway,* and *Broadcast* addresses.

The following screen displays the network settings menu on the 3700FC frame controller:

```
<<<3700-FC Menu Engine V1.00 build 8>>>
1-      View Network Settings
2-      Change IP Address
3-      Change Subnet Mask
4-      Change Gateway Address
5-      Change Broadcast Address
6-      Enable/Disable DHCP Client
7-      Change IP Address 2
8-      Change Subnet Mask 2
9-      Save Network Settings
B-      Back
-
```

The chart below gives a brief description of each menu item and what the parameter does. To choose one of the menu options, enter the letter or number shown on the left and then press <Enter>. You will be prompted to enter the required parameter value. When you are done configuring the *Network Setup* menu items press X to return to the main menu. If you are unclear about how to configure your network, consult your network administrator.

View Network Settings	This will show the current network settings saved on the 3700FC card.
Change IP Address	This control sets the unique main IP address of the 3700FC within the network. 192.168.1.XXX is an example of an IP address in a private (internal) network. If connecting multiple frames (each with its own frame controller), take care not to use the same IP address for each. This IP address must be unique from the other 3700FC in the same 3700FR frame.
Change Subnet Mask	This menu item defines the "subnet mask" of the network. Specifically, this parameter outlines all the IP addresses that can communicate with the 3700FC. This parameter can be set to 255.255.255.0 for a private network.
Change Gateway Address	This item identifies the IP address of the "gateway" (in previous versions of the software, "gateway" is referred to as "**route**"). Essentially, the gateway is a **device that routes packets to different networks. If configured, the IP address of the gateway must reside in the frame controller local subnet that was defined by the subnet mask**. In a private network, this gateway could be identified as 192.168.1.1. **Power cycle required after gateway change.**
Change Broadcast Address	This menu item sets the "broadcast" IP address. For example, in a private network **with a subnet mask configured as 255.255.255.0.** This parameter can be set to 192.168.1.255
DHCP Enable/ Disable Client	Enable or Disable DHCP
Change IP Address 2	This is the redundant IP address that will reside on a different subnet from the main IP address. This address must also reside on the same subnet as the redundant IP address, but still unique.
Change Subnet Mask 2	Defines the subnet mask of the network the 3700FC is connecting to. This parameter can be set to 255.255.255.0 for a private network.
Save Network Settings	Save the network settings before exiting.

Please Note: Total number of IP addresses for a dual 3700FC setup for the 3700FR is 4 (2 IP addresses each), and must be formatted as follows:

3700FC Main and Backup Controller Example Setup:

- IP address 1 main controller: 192.168.0.2
- IP address 2 main controller: 192.168.1.2
- IP address 1 backup controller: 192.168.0.3
- IP address 2 backup controller: 192.168.1.3

4.2.2. Controller Settings

Selection 2 from the main menu will take you to the 3700FC Settings Menu. These settings are changed to reflect the redundancy operation and SNMP trap destinations. Selection 3 will force a failover of card operation from the master to the slave. Please note: The master and slave settings will need to be setup first as described in sections 4.2.2.1 and 4.2.2.2.

```
<<<3700-FC Menu Engine V1.00 build 8>>>
1-      Control MDIX Mode
2-      Master FC Enable
3-      Revertive Fail Over (Slave)
4-      Set Trap Destination
5-      Show Trap Destinations
B-      Back
-
```

4.2.2.1. Setting up the Master and Slave 3700FC

As a general rule of thumb the left most 3700FC (looking at the front of the frame) will be the master module and the right 3700FC will be the slave. On the Card Setup menu illustrated above, select 2.

```
Current Master Mode Enable : Enabled
To Enable Master Mode, (Y)Yes or (N)No:
Any key to leave unchanged
```

This menu shows if the card is enabled for master mode. A frame can have only one master and one slave. To enable master mode, select yes. To disable master mode select no. Perform this operation for both units, making sure the left is the master and the right is the slave.

4.2.2.2. Setting up the SNMP Trap Destinations

At the above card setup menu. Select 4 to enter the SNMP trap destination. There is the ability to enter 5 SNMP trap destinations.

To show the currently assigned SNMP trap destinations, select 5 from the menu above.

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