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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	July 2010
0.2	Updated overview description	Oct 2010

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1. OVERVIEW

The 400FR is designed for those applications requiring high density distribution and processing of balanced analog and digital audio signals.

The 3RU multiframe chassis supports a wide variety of modules within a 3RU footprint. The frame offers dual hot swappable power supplies and provides sixteen slots for 400 series audio modules. Each 400 series processing module is also hot swappable and mates to the rear plane of the 400 frame which is completely passive. The design approach eliminates the need to de-cable the frame in the event of an electronics replacement. Each slot of the 400FR provides ten high-quality 3-pin terminal strip connectors that are used to interface to the processing module.

Features:

- Dual hot swappable power supplies with integrated cooling
- Houses up to sixteen 400 series processing modules
- Each processing slot provides individually configurable inputs and outputs
- Monitoring window for verifying module and power supply status
- No re-cabling required when hot swapping processing modules

Figure 1-1: 400FR Front View

Figure 1-2: 400FR Rear View

2. INSTALLATION

2.1. COOLING

The 400FR frame is designed to ensure adequate cooling for up to 120 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 400FR 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.

For proper cooling, the frame must contain either two 400PS power supplies, or one 400PS power supply and one 400PS-FM power supply blank panel with cooling fan.

2.1.1. Fan Exhaust

The cooling fans for the power supplies, 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, and 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.

2.2. MOUNTING

The 400FR Rack frame requires 3 rack units i.e. 5.25 inches (133 mm) of standard.19 inch (483 mm) wide rack space. To securely fasten the frame to the equipment rack, make sure that all four mounting screws are tightened securely.

2.3. POWER

The 400FR frame comes standard with one auto-ranging power supply that automatically senses the input voltage. An additional power supply (400PS) 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 400PS-FM fan module to ensure the thermal integrity of the frame cooling. 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.

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

CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE GROUND PIN OF THE MAINS PLUG MUST BE MAINTAINED

2.3.1. Turning the Power On and Off

Each 400PS power supply is fitted with its own power switch. When the switch is turned off, the remaining power supply will power the 400FR frame. To completely remove power from the frame, both power supplies must be turned off.

2.4. POWER SUPPLY STATUS INDICATORS

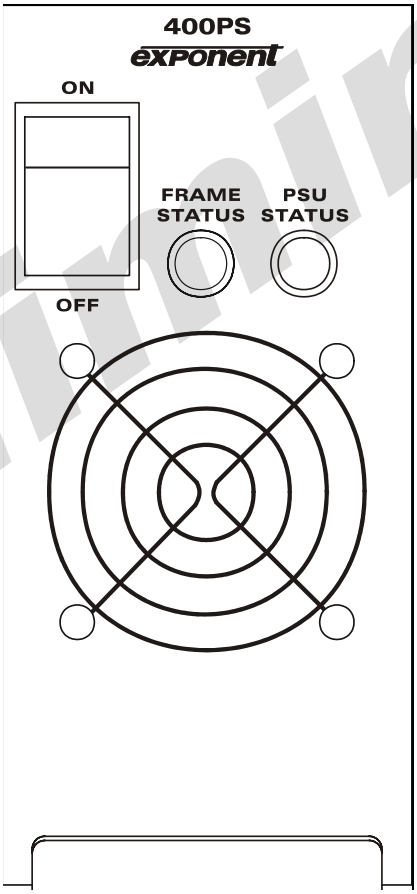

Figure 2-1: 400PS Status Indicators

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 buss of the frame. The FRAME STATUS LED will be Off under normal conditions and On when there are Frame Status Fault conditions. See section 4 for more information about 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. (If the power supplies are fitted with green FRAME STATUS LEDs they will turn Off) The PSU STATUS LED on the power supply that is functioning will remain On. If the frame is connected to *Vista*LINK® 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.

3. SPECIFICATIONS

3.1. ELECTRICAL

AC Mains Input: Auto ranging, 100 to 240V AC, 50/60 Hz
Maximum Operating Current: 2.6 A (@ 120V AC), 1.4 A (@ 240V AC)
Maximum Power Consumption: 200 W
Maximum Module Load: 160W (10W per slot)
Power Supply Configuration: Dual, redundant, separate AC inlets
Connector: IEC 60320 - 1 per power supply
Fuses: 4 amp, 250 volt time delay 5 x 20 mm. – 2 per power supply
Safety: CSA Listed to CSA C22.2 No.60065-03, UL 60065-03
IEC 60065-(2001-12) 7th Edition
Complies with CE Low voltage
Directive 93/68/EEC
EMC: Complies with FCC part 15, class A
Complies with EU EMC directive 89/336/EEC

3.2. PHYSICAL

Height: 5.25” (133 mm)
Width: 19” (483 mm)
Depth: 9.5” (368 mm)
Module Capacity: 16 slots
Weight: Approx 17lbs (7.7kg) with 2 power supplies, no slots occupied
Approx. 32lbs. (14.5kg) with 2 power supplies all slots occupied

3.3. CERTIFICATION

Safety: CSA Listed
Complies with CE Safety Directive

EMC: Complies with FCC part 15, Class A
EU EMC Directive

3.4. SIGNAL CONNECTIONS

3-pin removable terminal strips, balanced connection (10 per slot)

3.5. STATUS INDICATORS

PSU status LED
Local Error/Failure LED

3.6. TALLY OUTPUT CONNECTOR

4 pin terminal, relay N/O, N/C for status/fault alarm, 2A, 12.5VDC max

3.7. TEMPERATURE

0-40°C optimal performance
0-50°C operating

4. FRAME STATUS FAULT CONDITIONS

The Frame is fitted with a global Frame Status monitoring buss 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 buss. 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 criterion that determines 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 buss. On each module there is a jumper that disables sending local card fault information to the Frame Status Buss. 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 buss if the FRAME STATUS jumper on the module is set to the On position (default).

4.1. FRAME STATUS TALLY TERMINAL BLOCK

There is a green **FRAME STATUS** terminal block at the 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:

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 4-1: Frame Status Tally Terminal Block Pin Assignments

The relay contacts can sink up to 2A and operate up to 125 VDC.

5. INSTALLING AND REMOVING THE MODULES

5.1. OPENING AND CLOSING THE FRONT PANEL

In order to insert or remove modules you will have to open the front panel. Turn the two captive screws located on the front panel counter clockwise several turns until they release completely from the front extrusions. Carefully lower the front panel door so that the front edge of the door is lower than the rear of the door.

5.2. INSTALLING THE MODULES

Orient the module vertically such that the white card ejector is on the bottom. Align the card with the card guide corresponding to the slot number where you installed the rear panel plate. Carefully slide the module into the frame and press it completely into the rear panel connectors. Make sure that the connectors are fully seated in the rear panel.

5.3. REMOVING THE MODULES

Press the card ejector down to release the module. Grasp then the card using the card ejector and pull the module out from the frame. As the card ejector goes past the front extrusion, you will have to pull it with slightly more force. Carefully place the module in a safe place, free from static discharge.

6. 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.

6.1. CHANGING THE FUSES

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder 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. Use time delay 5 x 20 mm fuses rated for 250 Volts with a current rating of 4 amp. (T4AL250V) 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.

Check that the line fuse is rated for the correct value marked on the rear panel. Never replace with a fuse of greater value.

6.2. REPLACING THE POWER SUPPLY

Each 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.

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 400PS-FM power supply blank panel.

The 400FR 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, Evertz recommends running both power supplies for power redundancy and cooling.

On frames with only one power supply, a 400PS-FM blank power supply module with cooling fan **must be** inserted into the second power supply space. The 400PS-FM contains a module cooling fan and baffles to maintain proper airflow within the frame.

The power supply is secured into the frame by a machine screw through the rear panel (as shown in Figure 6-1). This screw must be removed before the power supply can be extracted from the front.

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

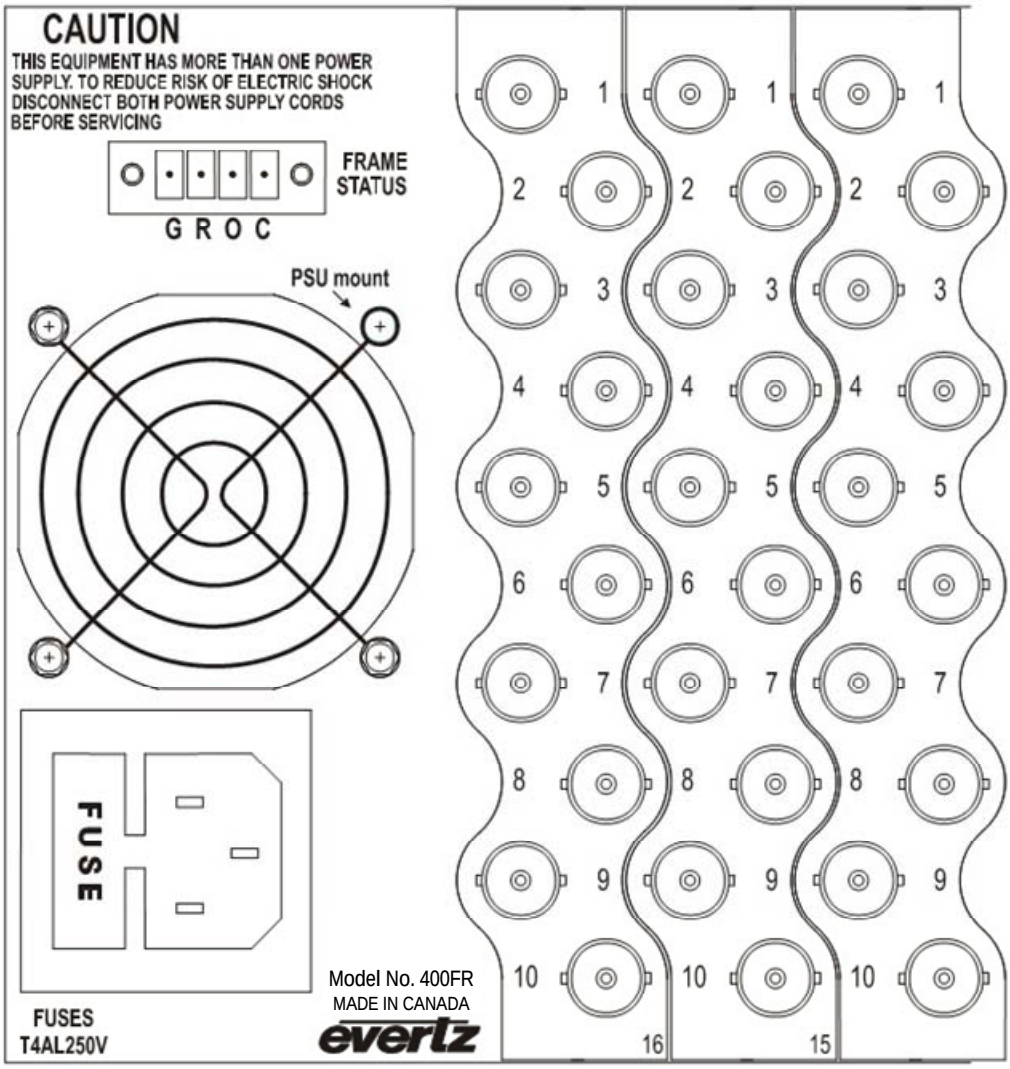

Figure 6-1: Locating the Power Supply Mounting Screw

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 screw. This screw is the top right screw holding the fan guard in place, and is indicated by the legend:

3. Remove the power supply mounting screw.
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 proper 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 screw 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.

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