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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Nov 2010
1.1	Added ESD precautions	Dec 2010
1.2	Updated physical specifications	August 2012

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1. OVERVIEW

The 7801FR is a 1 rack unit high frame for the 7800 and 7700 series modular system. This advanced rack frame design can house up to 4 single slot or dual slot modules of any combination of the 7800 and 7700 series distribution, conversion, processing and synchronization modules. Special care was taken during the design process to ensure that the 7801FR meets the demanding needs of television studios today and has the sufficient flexibility to satisfy the emerging demands of the future.

The 7801FR is designed with a high density capacity to conserve on precious equipment rack space. Care has been taken to ensure sufficient thermal relief for up to 100 watts of processing power per frame, to meet the increasing power demands of future high speed processing cards.

Hot swappable redundant switching power supplies and cooling fans allow power supply or fan replacement without compromising the integrity of critical signal paths. The 7801FR is available with auto ranging 100-240 VAC power supplies.

The front loading design permits extraction of the power supplies and active modules from the front without compromising performance even at 3.0Gb/s. Thus, there is no need for time consuming re-cabling nor is there need to have access to the rear of the frame to replace or exchange modules.

Features:

- Houses up to 4 single slot or 2 dual slot processing modules.
- Uses standard '3RU' rear plates mounted horizontally so modules may be interchanged between the 3RU 7800 series frames and this 1RU frame
- Each slot has individually configurable inputs and outputs.
- Front monitoring window for verifying module and power supply status.
- Frame status contact closure alarm signals power supply or fan failures and user selectable module alarms.
- Front extractable modules, power supplies and fans.
- Auto-ranging power supply that operates from 100-240VAC at 50/60 Hz.
- Power supply and frame cooling fans are fully redundant and hot-swappable.
- High-speed busing and control system provided for modular applications.
- Dedicated slot for 7801FC VistaLINK® Frame Controller for SNMP control and monitoring.
- 150W power supplies and cooling to support 7700 and 7800 series modules drawing up to 24 watts per slot. Frame is compatible with all single and dual slot 7700 series modules.
- Two BNCs for connecting two separate genlock references for modules equipped to take a frame reference input.

1.1. SPECIFICATIONS

1.1.1. Electrical

AC Mains Input:	Auto ranging, 100 - 240 VAC, 50/60 Hz
Maximum Operating Current:	1.3 A (@ 100 V/60Hz), 0.55A (@ 240 V/50Hz)
Maximum Power Consumption:	125 W
Maximum Module Load:	96 W (24 W per slot)
Power Supply Configuration:	Dual, redundant, separate inlets
Connector:	IEC 60320 - 1 per power supply

Fuses:	2 amps, 250 Volt time delay 5 x 20 mm. – 1 per power supply (Internal)
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°C

1.1.2. 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
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

1.1.3. Physical

Height:	1.75” (45 mm)
Width:	19” (483 mm)
Depth:	16” (406 mm)
Module Capacity:	4 slots (accommodates 4 single slot or 2 double slot modules)
Weight:	Approx. 9.3 lbs. (4.2 Kg) with 2 power supplies, no slots occupied
	Approx. 12.1 lbs. (5.5 Kg) with 2 power supplies all slots occupied
Cooling:	Six side mounted main module cooling fans draw air in the front and exhaust at the left and right sides. Fans may be serviced by removing the power supply trays.

1.2. COOLING

The 7801FR frame is designed to ensure adequate cooling for up to 96 watts of processing power per frame. Three fans at the side of each power supply module accomplish forced air cooling. Adjacent equipment may be mounted immediately to the top and bottom of the 7801FR frame. Additional module cooling is provided by interior cooling channels to ensure that even fully loaded frames mounted vertically adjacent to each other will operate within the normal temperature range.

For proper cooling, the frame must contain either two 7801PS power supplies, or one 7801PS power supply and one 7801PS-FM power supply blank panel with cooling fan.

1.2.1. Fan Exhaust

The cooling fans for the modules, located at the sides of the frame, draw air in the front and the exhaust out the left and right sides 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.

1.3. MOUNTING

The 7801FR Rack frame requires 1 rack unit i.e. 1.75 inches (45 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.

When locating the frame within the rack, make sure that there is ample room at the sides so that the fan exhausts are not obstructed.

1.4. POWER

1.4.1. Connecting the Power

The frames come standard with one auto-ranging power supply 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 the appropriate fan module (7801PS-FM) 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.

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

The power entry modules contain a standard IEC power inlet connector and an EMI line filter.

Fuse Rating: 2 amps, 250 Volt time delay 5 x 20 mm

See section 5.2 for information on 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.

1.4.2. 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 7801FR frame. To completely remove power from the frame, both power supplies must be turned off.

1.4.3. Power Supply Status Indicators

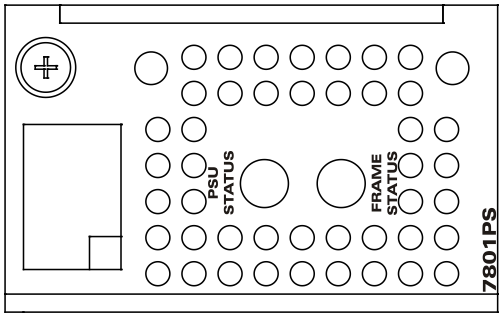

Figure 1-1: 7801PS Status Indicators

Each power supply has two status indicator LEDs. The green PSU STATUS LED indicates the health of the local power supply and its fans. The green PSU STATUS LED will be On under normal conditions. The FRAME STATUS LED indicates the health of the entire frame and is operated by the frame status bus of the frame. The red FRAME STATUS LED will be Off under normal conditions and On when there are Frame Status Fault conditions. See section 2 for more information about frame status bus fault conditions.

If one of the power supplies malfunctions, (power cord disconnected, power switch is off, fuse is blown, one of the fans is stopped, etc,) then its green PSU STATUS LED will go Off, and the red FRAME STATUS LED on both power supplies will turn On and the Frame Status fault will be signaled to the Frame status buss. (See section 2) 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.

2. 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 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 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).

2.1. FRAME STATUS TALLY TERMINAL BLOCK

There is a 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 2-1: Frame Status Tally Terminal Block Pin Assignments

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

3. INSTALLING AND REMOVING THE MODULES

3.1. 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.

3.2. INSTALLING THE MODULE REAR PLATES

Each module is shipped with a matching rear panel plate which houses the connectors appropriate for the module. When installing a rear plate, locate the desired slot position where you wish to install the rear plate. Make a note of the slot number where you are installing the rear plate. Orient the plate so that the slot number labeling is visible when the plate is installed. Loosely fasten the plate to the extrusions using the mounting screws provided. You will tighten the screws after the main module is installed.

The 7801FR uses the standard '3RU' rear plates mounted horizontally. When you are ordering modules for the 7801FR, order the +3RU option, in spite of the fact that this is a 1RU frame.

3.3. 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 remove the front panel door and place it in a safe place.

When closing the door, carefully insert the door into the front panel opening and press all the way in. Make sure that you have it right side up otherwise it will interfere with the card ejectors. Also 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.

3.4. INSTALLING THE MODULES

Orient the module horizontally such that the white card ejector is on the right side. 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. When this is done, close the front panel and then tighten the screws that hold the rear panel in place.

3.4.1. Slot Blocker

Some 7800 series cards may include a “slot blocker” (E7700FR-SLOT-BLOCK) which only applies to 7800 modules being used in 7700FR, 7701FR or 350FR frames, and therefore the slot blocker can be removed when the module is in a 7800FR. Please refer to the individual module chapter for full details about the slot blocker.

3.5. REMOVING THE MODULES

Press the card ejector down to release the module. Grasp the card using the card ejector and pull the module out from the frame. Make sure that you support the module so it does not fall on the module underneath it, as you remove the module. Carefully place the module in a safe place, free from static discharge.

4. CONNECTING THE FRAME GENLOCK REFERENCE

The 7801FR frame has two input BNCs that can be used to deliver reference signals to cards that are housed in the frame. These are labeled **REF 1** and **REF 2** and are located on the rear of the frame in the bottom, right hand side (as facing the rear of the frame) on the opposite side to the GROC connector. See Figure 4-1.

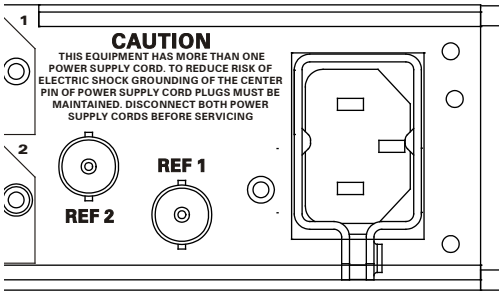

Figure 4-1: 7801FR Rear Panel

The **REF 1** and **REF 2** inputs provide an analog connection to the modules in the frame and can carry a wide variety of signals depending on the modules inserted into the frame. For example, NTSC, PAL-B, Tri-level sync, bi-level sync, DARS, etc. is supported. Each card that supports a Frame reference will have a control for selecting which of the references to use. See the specific module chapter for information on the reference input operation and control. Because there are two frame reference inputs, you can supply the frame with two completely different signals or two different time bases of the same type of signal. It is up to the system designer/installer/operator to supply appropriate signals and configure modules to use the correct reference input.

Both reference inputs are isolated from the frame and provide a balanced analog signal connection along the module interconnect printed circuit board to all modules. The balanced signal is terminated at the far end of the module interconnect bus with a 75 Ohm termination. Each installed module that supports the use of these reference inputs will slightly degrade the return loss of the frame reference inputs (approx. 1dB per card). For this reason, it is important that the reference input signal comes directly from a dedicated distribution source like a distribution amplifier without passing through any reference loops or high impedance “T”’ connections.

5. 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.

5.1. REPLACING THE POWER SUPPLY

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 or with the door open. Proper cooling of the frame requires both power supplies to be inserted into the frame, or one power supply and a power supply fan module.

The 7801FR 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 blank power supply fan module with cooling fans (7801PS-FM) **must be** inserted into the second power supply space. The blank power supply fan module contains three module cooling fans sufficient to cool the maximum power dissipation of the frame and baffles to maintain proper airflow within the frame. The left and right power supplies are identical. In order to install the power supply in the opposite side of the frame merely turn it upside down. The fans should be facing the outside of the frame.

The power supply is secured into the frame by a retaining screw on the front panel (as shown in Figure 5-1). This screw must be loosened before the power supply can be extracted from the front.

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

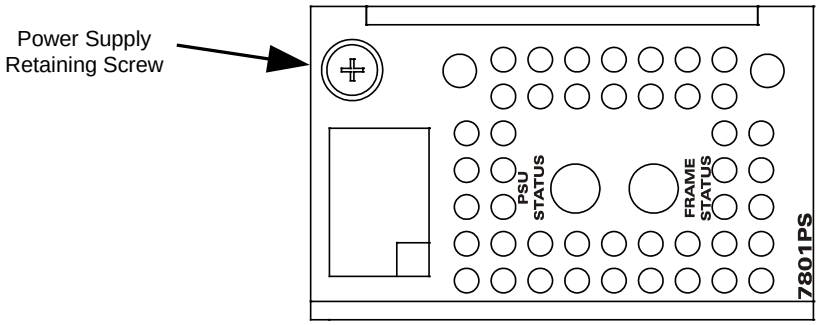

Figure 5-1: Power Supply Retaining Screw

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

1. Open the front door of the frame and turn off the power supply switch.
2. Locate the power supply retaining screw.
3. Loosen the power supply mounting screw.
4. 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. Tighten the power supply retaining screw.
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.

5.2. CHANGING THE FUSES

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

The fuse holders are located inside the power supplies. To change the fuse for one of the supplies, follow the procedure outlined in section 5.1 for removing the power supply. The fuse holder is located near the rear of the power supply and contains one fuse for the line side of the mains connection. The neutral side of the mains is not fused. Remove the blown fuse using a small screwdriver and place a fuse of the correct value in its place. The correct fuse rating is shown below.

Fuse Rating: 2 amps, 250 Volt time delay, 5 x 20 mm

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.

Replace the power supply according to the instructions in section 5.1.