

TABLE OF CONTENTS

1.	OVERVIEW	1
2.	INSTALLATION.....	3
2.1.	VIDEO CONNECTIONS.....	3
2.2.	AES OUTPUT AUDIO CONNECTIONS.....	4
2.3.	GPIO CONNECTIONS.....	5
2.4.	METADATA CONNECTIONS (NOT CURRENTLY IMPLEMENTED)	5
3.	SPECIFICATIONS.....	7
3.1.	SERIAL VIDEO INPUT	7
3.2.	RETURN LOSS.....	7
3.3.	SERIAL VIDEO OUTPUTS	7
3.4.	AES AUDIO OUTPUTS.....	7
3.5.	METADATA OUTPUT (NOT AVAILABLE ON -B MODEL).....	8
3.6.	LTC OUTPUT (ONLY AVAILABLE ON -LTC MODEL)	8
3.7.	ELECTRICAL.....	8
3.8.	PHYSICAL (NUMBER OF SLOTS).....	8
4.	STATUS INDICATORS.....	9
4.1.	DOT-MATRIX DISPLAY.....	9
5.	CARD EDGE MODULE CONTROL.....	10
5.1.	CARD-EDGE CONTROL	10
5.1.1.	Navigating the Card-Edge.....	10
5.2.	CARD-EDGE MENU STRUCTURE.....	11
5.2.1.	Setting the Display Orientation.....	11
5.2.2.	Video Parameters	11
5.2.3.	Viewing the Input Video Standard.....	11
6.	VISTALINK® REMOTE MONITORING/CONTROL.....	12

6.1. WHAT IS VISTALINK®?	12
6.2. GENERAL	13
6.3. DE-EMBEDDER MONITOR	14
6.4. VIDEO CONTROL	14
6.4.1. Input Video Standard	15
6.4.2. Output Video Standard	15
6.4.3. HANC Control Mode	15
6.4.4. Video Locking Mode	15
6.4.5. LTC Presence.....	16
6.4.6. LTC Loss Mode	16
6.5. MIXER CONTROL	17
6.5.1. Source X/Y	18
6.5.2. Gain Adjust X.....	18
6.5.3. Invert Enable X	19
6.6. GPI/PRESET CONTROL	19
6.6.1. Saving Presets	20
6.6.2. Loading Presets.....	20
6.6.3. GPI Trigger Control	20
6.7. FAULTS	20
7. JUMPERS	21
7.1. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES	21
7.2. SLOT BLOCKER INSTALLATION	22

Figures

Figure 1-1: 7821AD8-3G Block Diagram (I/O of 7821AD8-3G shown).....	2
Figure 2-1: 7821AD8-3G, 7821AD8-3G-AESD, 7821AD8-B-3G & 7821AD8-LTC-3G Rear Panels...	3
Figure 2-2: GPIO Pin Out.....	5
Figure 2-3: GPI Input Circuitry	5
Figure 2-4: Connecting to a Dolby DP570.....	6
Figure 4-1: Status LED Locations	9
Figure 6-1: General Tab.....	13
Figure 6-2: De-Embedder Monitor Tab	14
Figure 6-3: Video Control Tab.....	14
Figure 6-4: Video Control Tab with LTC option	15
Figure 6-5: Mixer Control Tab	17
Figure 6-6: Source Select Drop Down Menu	18
Figure 6-7: GPI/Preset Control Tab	19
Figure 6-8: GPI/Preset Control Tab on the 7821AD8-LTC-3G	19
Figure 6-9: Faults tab.....	20
Figure 7-1: Location of Jumpers	21
Figure 7-2: Slot Blocker	22

Tables

Table 2-1: AES OUTPUT Audio Connector Pin Out.....	4
Table 2-2: AES Audio Breakout Cable (Evertz Part # WPAES8-BNCM-6F).....	4

REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
0.1	Preliminary version	Apr 2010
1.0	First Release	June 2011
1.1	Added GPI Information	July 2011
1.2	Updated 'Video Locking Mode' section	July 2012
1.3	Added –B and –LTC versions	July 2013
1.4	Updated VL screenshots	Aug 2013

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

1. OVERVIEW

The 7821AD8-3G Audio De-Embedder de-embeds up to 8 AES audio signals, on up to 4 groups, from a SMPTE 424M (3Gb/s), ST 292-1 (1.5 Gb/s HD-SDI) or SMPTE ST 259 (270Mb/s SD-SDI) video signal as specified in ST 299-1 or 272M respectively. The companion 7821AE8-3G Audio Embedder facilitates audio re-embedding at the destination.

The 7821AD8-3G come equipped with a full 16x16 audio channel router for audio channel mixing and/or shuffling. With the -AESD suffix applied (7821AD8-3G-AESD), the rear plate comes equipped DIN connectors for direct AES connections eliminating the use of a break out cable. The module is designed to properly handle the de-embedding of all Dolby audio streams including extraction of any preset Dolby Metadata encoded in the upstream video signal. The 7821AD8-LTC-3G will de-embed Ancillary Time Code (ATC) in 3Gb/s / HD, or DVITC in SD to generate Linear Time Code (LTC).

VistaLINK[®] enables control and configuration capabilities via Simple Network Management Protocol (SNMP). This offers the flexibility to manage the module status monitoring and configuration locally or remotely.

Features:

- Audio De-embedding from a 3G/HD/SD-SDI video signal
- Automatic detection of input video standard
- Four serial video outputs (same standard as input)
- Bypass relay protection from main program output
- Flexible 16x16 audio channel routing for channel shuffling and mixing
- Dolby Metadata extraction via serial interface (not available on 7821AD8-B-3G)
- Card edge LEDs indicate video and audio signal presence and module fault
- LTC de-embedding (7821AD8-LTC-3G only)
- VistaLINK[®] capable for remote monitoring, control and configuration capabilities via SNMP; using VistaLINK[®] PRO, CP-2116E or CP-2232E Control Panels. VistaLINK[®] is available when modules are used with the 3RU 7800FR frame and a 7700FC VistaLINK[®] Frame Controller module in slot 1 of the frame

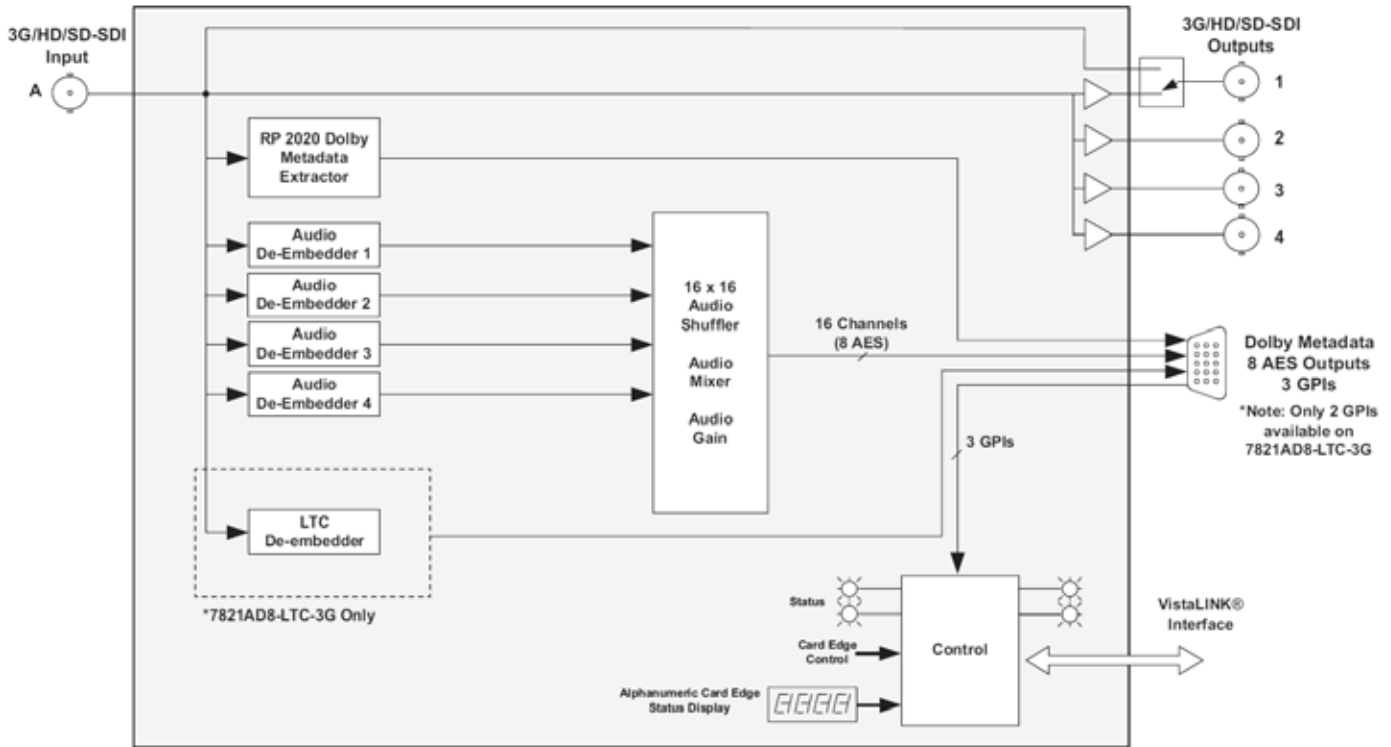


Figure 1-1: 7821AD8-3G Block Diagram (I/O of 7821AD8-3G shown)

2. INSTALLATION

The 7821AD8-3G comes with a companion rear plate that occupies one slot in a 7800 frame. When installed in a 7700 series frame, the module will occupy two slots as it must be installed with a “Slot Blocker” (see Section 7.2). For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7800FR chapter.

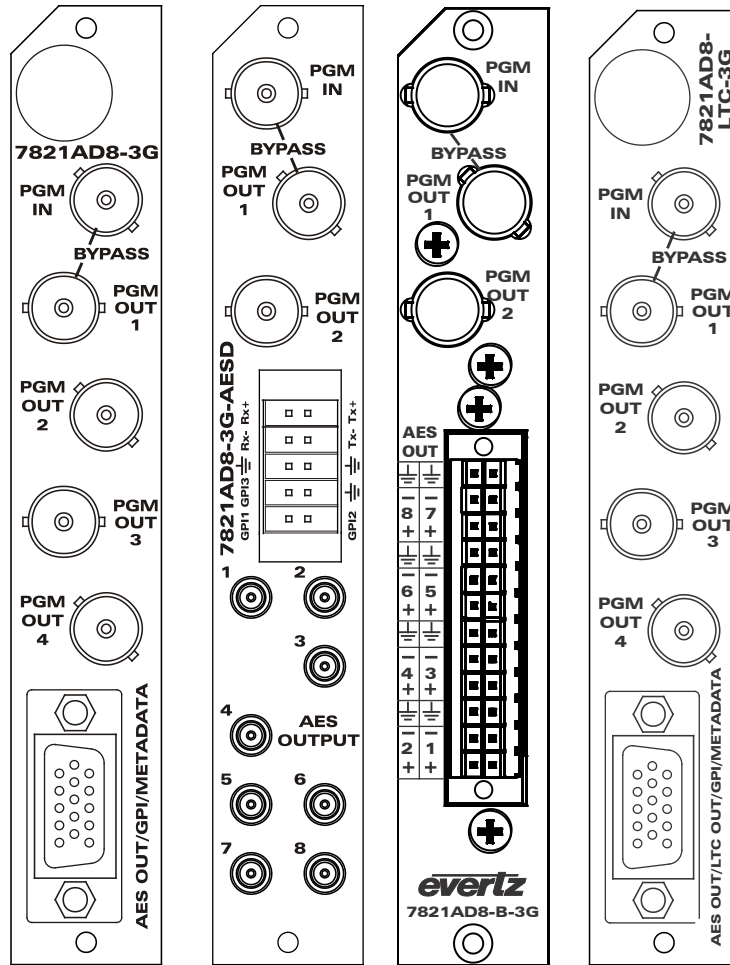


Figure 2-1: 7821AD8-3G, 7821AD8-3G-AESD, 7821AD8-B-3G & 7821AD8-LTC-3G Rear Panels

2.1. VIDEO CONNECTIONS

PGM IN: The input BNC connector for 10-bit serial digital video signals is compatible with the 3Gb/s SMPTE 424M, 1.5Gb/sec SMPTE 292M, and 270Mb/s SMPTE 259M-C (525i/59.94 or 625i/50) standard.

PGM OUT 1-4: There are four BNC connectors with reclocked serial component video outputs, in the same video standard as the input. The PGM OUT 1 SDI output is protected by a bypass relay, which will activate in the event of power loss to the module. The remaining output is not bypass protected.

2.2. AES OUTPUT AUDIO CONNECTIONS

AES Output: Eight unbalanced AES outputs conforming to SMPTE 276M are provided on this DB-15 connector. The breakout cable provided will bring these signals conveniently to BNC connectors. Table 2-1 shows the DB-15 connector pin out. For the 7821AD8-LTC-3G the pin used for GPI 3 is used as an LTC output instead. For the AESD version, there are eight DIN 1.0/2.3 connectors for unbalanced AES outputs conforming to SMPTE 276M.

Name	Description	DB-15 Pin
	Reserved for Future Use	1
	Reserved for Future Use	2
	Reserved for Future Use	3
	Reserved for Future Use	4
GPI 3 / LTC Out	General Purpose Input 3 or LTC Output	5
GPI 1	General Purpose Input 1	6
AES Out 2	AES Output 2 - Unbalanced	7
GPI 2	General Purpose Input 2	8
AES Out 6	AES Output 6 - Unbalanced	9
AES Out 5	AES Output 5 - Unbalanced	10
AES Out 1	AES Output 1 - Unbalanced	11
AES Out 8	AES Output 8 - Unbalanced	12
AES Out 7	AES Output 7 - Unbalanced	13
AES Out 4	AES Output 4 - Unbalanced	14
AES Out 3	AES Output 3 - Unbalanced	15
GND	Ground	Shell

Table 2-1: AES OUTPUT Audio Connector Pin Out

The 7821AD8-3G is shipped with a breakout cable for the DB-15 connector (Evertz Part # WPAES8-BNCF-6F), which can be used to facilitate wiring the AES audio and Metadata connections. The pin out of the cable is shown in Table 2-2. For the 7821AD8-LTC-3G the pin used for GPI 3 is used as an LTC output instead.

DB-15 PIN	Wire	Ground/Shield Connection	Label Name	Connector Type	FUNCTION
1	Red		W1 RED	WIRE	X
2	Green		W2 GRN	WIRE	X
3	Blue		W3 BLU	WIRE	X
4	Purple		W6 PUR	WIRE	X
5	Orange		W7 ORG	WIRE	GPI 3 or LTC Out
6	White		W4 WHI	WIRE	GPI 1
7	Coax	DB15 Shell	AES A2	BNC MALE	AES Out 2
8	Yellow		W5 YEL	WIRE	GPI 2
9	Coax	DB15 Shell	AES B2	BNC MALE	AES Out 6
10	Coax	DB15 Shell	AES B1	BNC MALE	AES Out 5
11	Coax	DB15 Shell	AES A1	BNC MALE	AES Out 1
12	Coax	DB15 Shell	AES B4	BNC MALE	AES Out 8
13	Coax	DB15 Shell	AES B3	BNC MALE	AES Out 7
14	Coax	DB15 Shell	AES A4	BNC MALE	AES Out 4
15	Coax	DB15 Shell	AES A3	BNC MALE	AES Out 3
Shell	Black		GND	WIRE	GND

Table 2-2: AES Audio Breakout Cable (Evertz Part # WPAES8-BNCF-6F)

2.3. GPIO CONNECTIONS

The 7821AD-3G has three (only two are available on the 7821AD8-LTC-3G) GPI's available via terminal block (-AESD) or DB15. The terminal block pin out is shown in Figure 2-2. Connections are made by putting a force on the inner square (a push-pin or small flat screw drier work well), inserting the wire in the adjacent circular opening, and then releasing the force on the inner square.

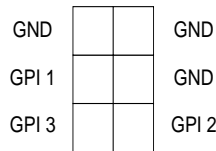


Figure 2-2: GPIO Pin Out

The GPI's are active low with internal pull up resistors (2k Ohms) to +5V. To make an input active, lower the signal to near ground potential (i.e. connect to shell or chassis ground). This can be done with a switch, relay, TTL drive, GPO output or other similar method. Figure 2-3 shows the input circuit for the general purpose inputs.

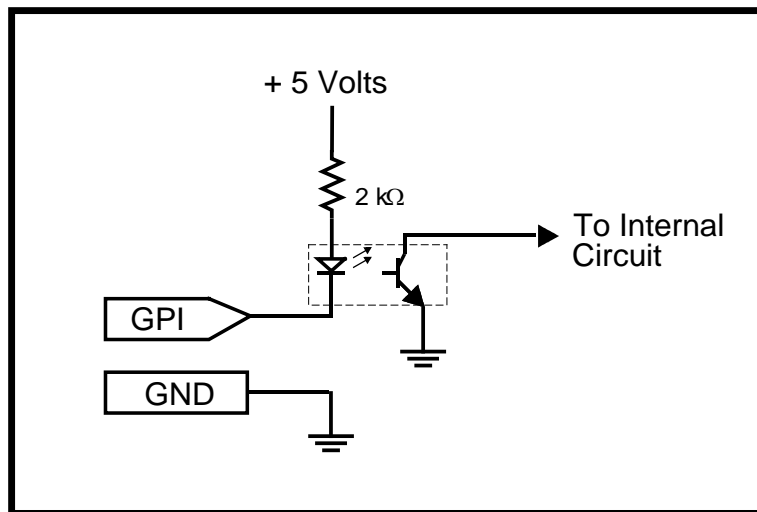


Figure 2-3: GPI Input Circuitry

2.4. METADATA CONNECTIONS (NOT CURRENTLY IMPLEMENTED)

The 7821AD8-3G provides the ability to receive Metadata from a Dolby device (such as the DP570) and embed it into the VANC area of the video. There are two wires (META+ and META-) available on the breakout cable that can be used to connect to the Dolby device. Figure 2-4 shows how to wire the META+ and META- wires to a DP570.

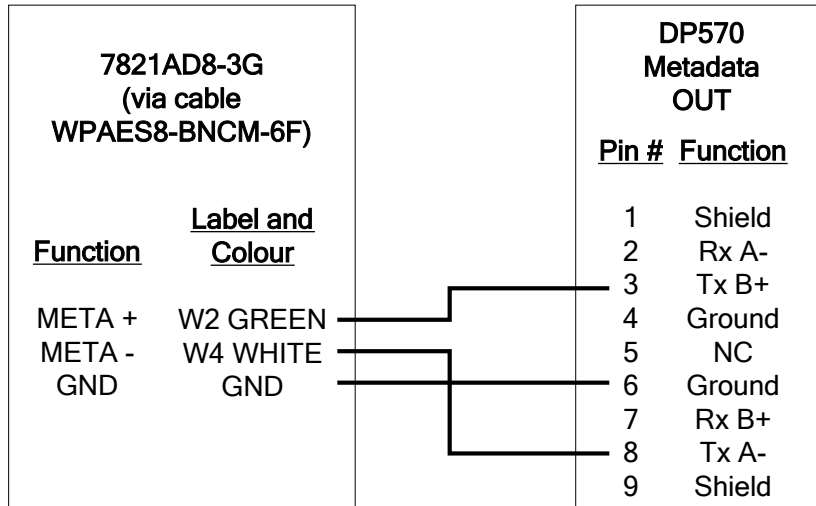


Figure 2-4: Connecting to a Dolby DP570

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Number of Inputs:	1
Standard:	SMPTE 424M (3Gb/s) 1080p ST 292-1 (1.5Gb/s), 1080i, 1035i, 720p SMPTE ST 259 (270Mb/s) 525i, 625i
Connector:	BNC per IEC 61169-8 Annex A
Input Equalization:	
3G:	Automatic to 80m @ 3Gb/s with Belden 1694A or equivalent cable
HD-SDI:	Automatic to 100m @ 1.5Gb/s with Belden 1694A or equivalent cable
SD-SDI:	Automatic to 300m @ 270Mb/s with Belden 1694A or equivalent cable

3.2. RETURN LOSS

3G:	> 10dB up to 3.0GHz
HD:	>13dB up to 1.5GHz
SD:	> 15dB up to 270MHz

3.3. SERIAL VIDEO OUTPUTS

Number of Outputs:	4 (1 output bypass relay protected) 2 (1 output bypass relay protected on -AESD model & -B model)
Standard:	Same as input
Connectors:	BNC per IEC 61169-8 Annex A
Wideband Jitter:	< 0.20 UI HD < 0.30 UI 3G

3.4. AES AUDIO OUTPUTS

Number of Inputs:	8 AES outputs
Standard:	SMPTE 276M, single-ended AES
Connector:	BNC per IEC 61169-8 Annex A (with DB15 to BNC 6ft Breakout cable) DIN 1.0/2.3 connectors (-AESD model) Terminal blocks (-B model)
Resolution:	up to 24 bits
Sampling Rate:	48kHz
Impedance:	75Ω unbalanced 110Ω balanced (-B model)
Signal Level:	1V p-p ±0.1V @ termination load

3.5. METADATA OUTPUT (NOT AVAILABLE ON -B MODEL)

Type: Dolby-E Metadata
Standard: RS-422
Baud Rate: 115,200 baud
Connector: DB15 breakout connector
Terminal block (-AESD model)

3.6. LTC OUTPUT (ONLY AVAILABLE ON -LTC MODEL)

Standard: SMPTE ST 12 LTC
Connector: DB15 breakout connector
Termination: 75Ω unbalanced
Output Level: 1v p-p nominal unbalanced

3.7. ELECTRICAL

Voltage: +12V DC
Power: 15W
EMI/RFI: Complies with FCC Part 15, Class A
EU EMC Directive

3.8. PHYSICAL (NUMBER OF SLOTS)

350FR: 2
7700FR-C: 2
7800FR: 1

4. STATUS INDICATORS

The 7821AD8-3G has 10 LED Status indicators on the front card edge to show operational status of the card at a glance. Figure 4-1 shows the location of the LEDs and card edge controls.

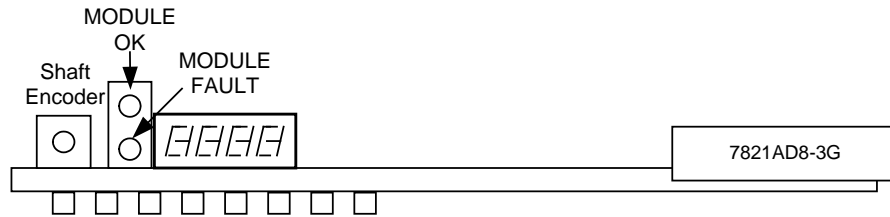


Figure 4-1: Status LED Locations

Two large LEDs on the front of the main board indicate the general health of the module:

LOCAL FAULT: This Red LED indicates poor module health or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication 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 the board power is good.

The remaining LEDs have no functionality at this time.

4.1. DOT-MATRIX DISPLAY

Additional signal status monitoring of the card's parameters is provided via the 4-character alphanumeric display located on the card edge. What is displayed is determined by where you are in the menu system. See section 5 for information on operating the menu system.

5. CARD EDGE MODULE CONTROL

5.1. CARD-EDGE CONTROL

The 7821AD8-3G is equipped with a push-button shaft encoder and a four character dot matrix display to control various functions on the card. The push-button shaft encoder is used to navigate through a menu system to set and monitor various parameters for the module. When not in the menu system the four character dot matrix display rotates through the module name and firmware version.

5.1.1. Navigating the Card-Edge

You can use the push-button shaft encoder to move up and down the list of available parameters to adjust. To adjust any parameter, use the shaft encoder to move up or down to the desired parameter and then press the shaft encoder in. If the parameter is a numerical value, the number will increase if you rotate the shaft encoder clockwise and decrease if you rotate the shaft encoder counter-clockwise. If the parameter contains a list of options, you can cycle through the list by rotating the shaft encoder in either direction. The parameter values are changed as you cycle through the list.

When you have stopped at the desired value, depress the shaft encoder. This will return you to the parameter, select the menu item that you are setting (the display shows the parameter name you were setting). To change another parameter, rotate the shaft encoder to select other parameters. If neither the toggle switch nor pushbutton is operated for several seconds the card edge control will exit the menu system and return to an idle state.

Throughout the descriptions of the Menu items, default values are shown with bolded text.



All control for the module is done through SNMP (VistaLINK).

5.2. CARD-EDGE MENU STRUCTURE

The following is a brief description of the top level of the menu tree that appears when you enter the ON screen menu. Selecting one of these items will take you down into the next menu level to set the value of that parameter.

DPSL	Sets the orientation of the four-digit LED display
VID	Displays operating video standard
QUIT	Exits the menu

5.2.1. Setting the Display Orientation

The **DSPL** parameter controls the display orientation of the four digit LED display.

HORZ	The display will be shown horizontally (ideal when installed in a 1RU or standalone frame).
VERT	The display will be shown vertically (ideal when installed in a 3RU frame).

5.2.2. Video Parameters

The **VID** menu option enters into a selection menu to view the current video standard.

DETV	Menu option to view the current detected video standard
-------------	---

5.2.3. Viewing the Input Video Standard

The **DETV** parameter will display the currently detected input video standard. It will display one of the standards if present, otherwise it will display NONE.

6. VISTALINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS VISTALINK®?

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

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.
2. Managed devices (such as 7821AD8-3G), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.
3. A virtual database, known as the Management Information Base (MIB), lists all the variables being monitored, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK® network, see the 7700FC Frame Controller chapter.

6.2. GENERAL

The **General** tab shows miscellaneous parameters of the module. These parameters are listed below:

Card Name:	Indicates the product model number of the card (including installed options).
Firmware Version:	Indicates the currently installed firmware version.
Creation Date:	Indicates the build date of the firmware version.
Board Name:	Indicates the product hardware version of the module.
Board Revision:	Indicates the hardware version of the module.
Board Serial Number:	Indicates the physical serial number of the module.

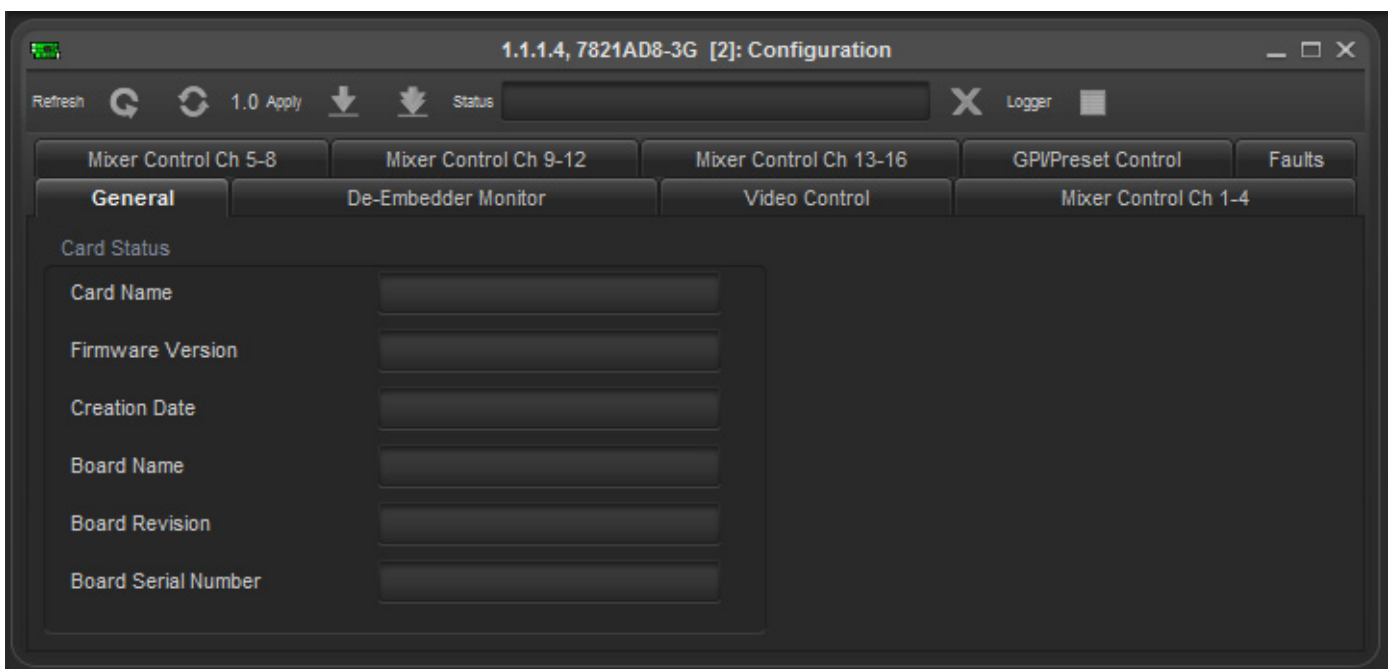


Figure 6-1: General Tab

6.3. DE-EMBEDDER MONITOR

The *De-Embedder Monitor* tab shows the status of audio inputs on the module.

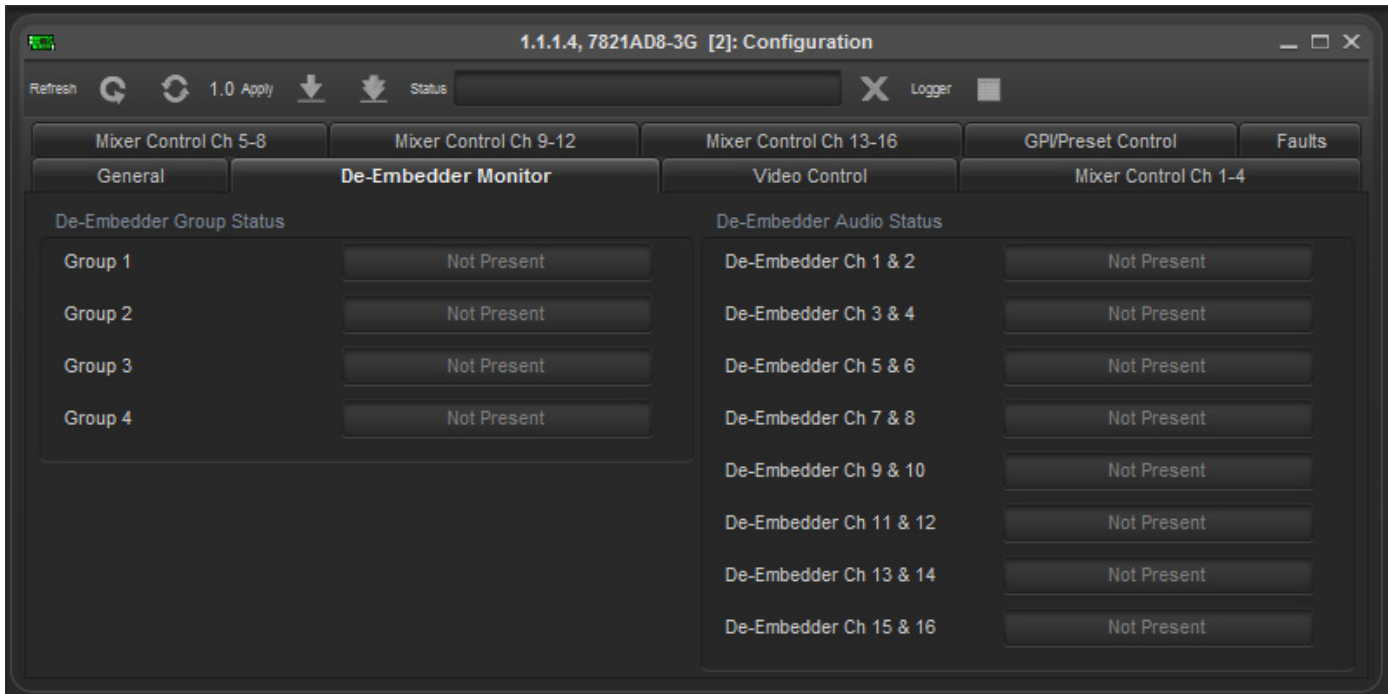


Figure 6-2: De-Embedder Monitor Tab

6.4. VIDEO CONTROL

The *Video Control* tab controls how the signal is processed through the module. The same tab for the 7821AD8-LTC-3G is slightly different and is also shown.

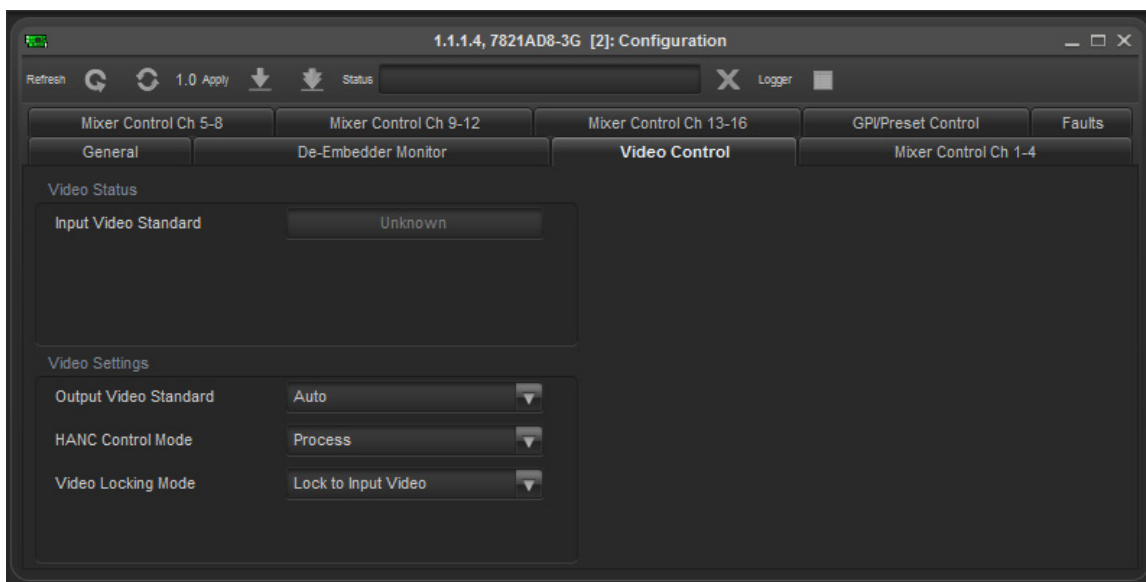


Figure 6-3: Video Control Tab

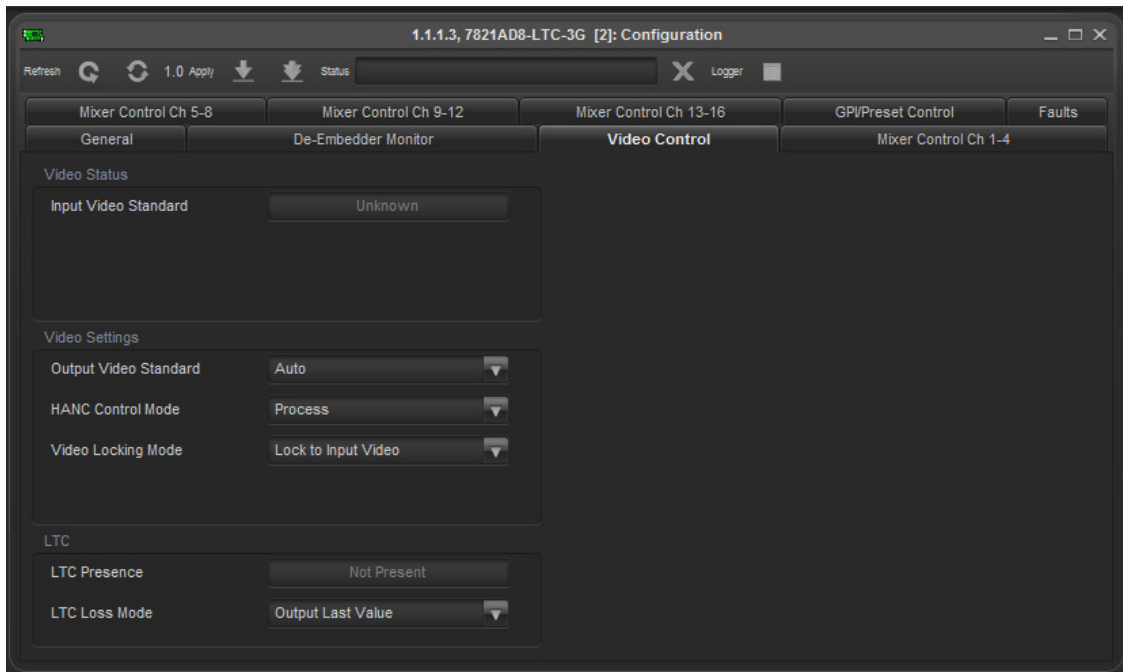


Figure 6-4: Video Control Tab with LTC option

6.4.1. Input Video Standard

The **Input Video Standard** parameter displays the currently detected video standard.

6.4.2. Output Video Standard

The **Output Video Standard** drop-down menu sets the modules operating video standard.

6.4.3. HANC Control Mode

The **HANC Control Mode** drop-down menu sets the HANC processing mode for the module. The options are:

- **Process:** Embedded audio will be processed and available.
- **Clean Only:** Embedded audio will be cleaned out, but the module will maintain the same delay as the Process mode.
- **Clean Only, Minimum Delay:** Embedded audio will be cleaned out with minimum delay.

6.4.4. Video Locking Mode

The **Video Locking Mode** drop-down menu sets the timing for the output video. The options are:

- **Lock to Input Video**
- **Lock to Genlock Reference 1 – *Currently not implemented***
- **Lock to Genlock Reference 2 – *Currently not implemented***

6.4.5. LTC Presence

The **LTC Presence** parameter displays the status of ancillary timecode on the video input.

6.4.6. LTC Loss Mode

The **LTC Loss Mode** drop-down menu sets the behavior when LTC is lost. The options are:

- **Output Last Value:** Outputs the last value de-embedded from ancillary timecode.
- **Disables Output:** Disables the output so that nothing is output.

6.5. MIXER CONTROL

The **Mixer Control** tabs control the output audio. There are 16 individual channel mixers to control. These output channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 16 output audio channels. Using the X and Y inputs of each Output Channel Mixer an additional level of mono-mixing is also available for each channel of output audio.

For the sake of brevity, only the *Mixer Control Ch 1-4* control tab will be discussed in this manual. Control tabs for *Mixer Control Ch 5-8*, *Mixer Control Ch 9-12* and *Mixer Control Ch 13-16* are identical in their operation. Furthermore, the controls for Channel 1 will be described in detail, as the controls for Channel 2, Channel 3 and Channel 4 operate in an identical fashion.

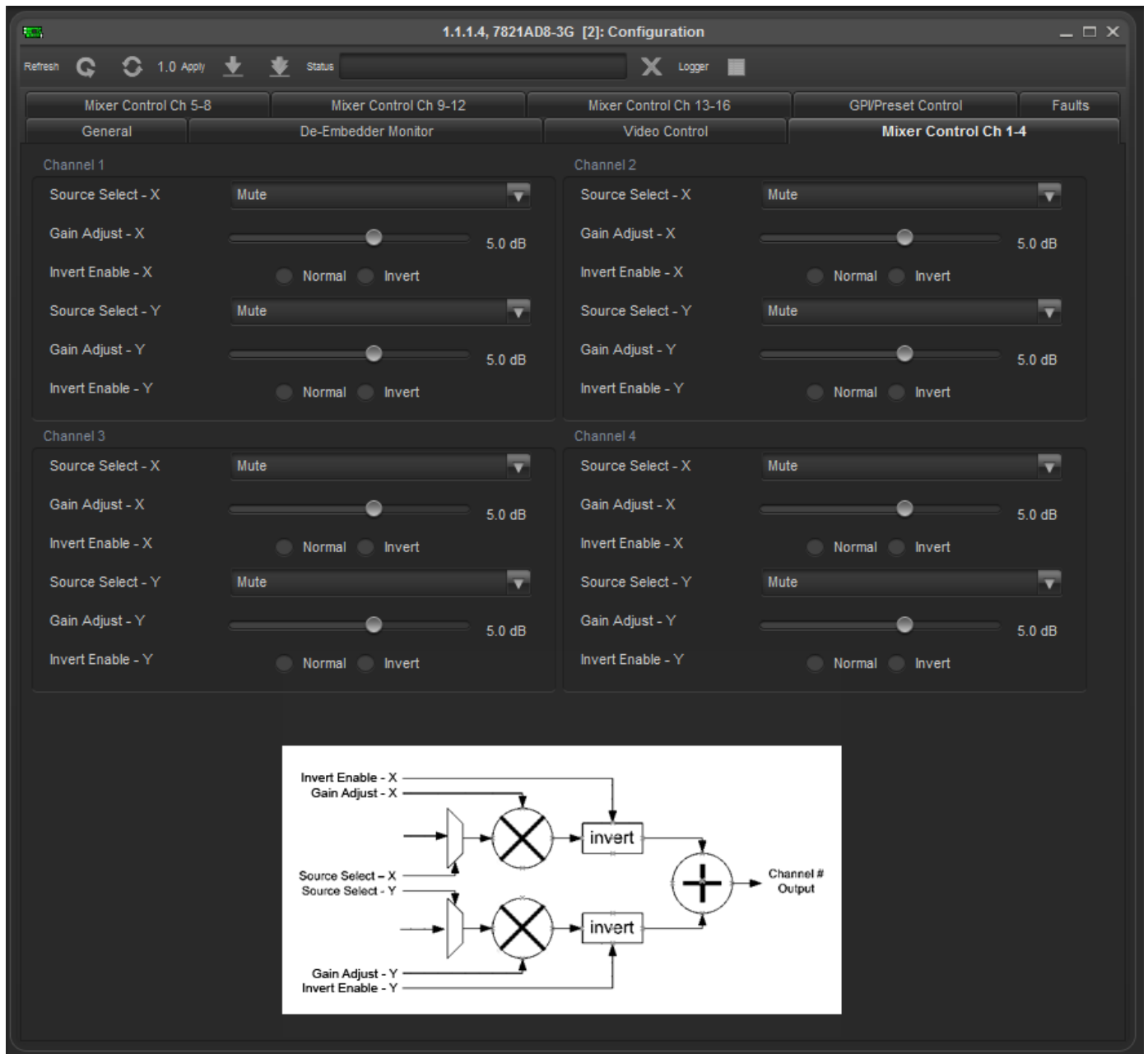


Figure 6-5: Mixer Control Tab

6.5.1. Source X/Y

The **Source X/Y** control enables the user to route one of the 16 internally processed input audio channels to the X/Y input of the Channel 1 mixer. The user can select the channel source by selecting the desired channel from the *Source X/Y* drop down menu as shown in Figure 6-6.

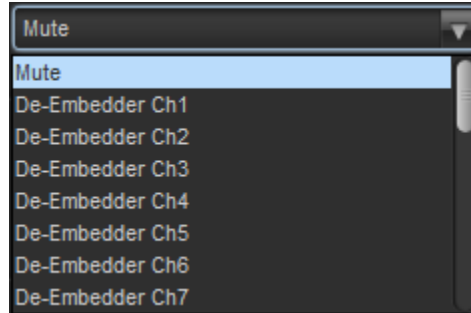


Figure 6-6: Source Select Drop Down Menu

The full set of available channels is listed below:

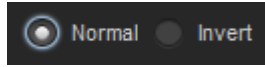
Source X/Y Input	
	Deembedded Ch 1
	Deembedded Ch 2
	Deembedded Ch 3
	Deembedded Ch 4
	Deembedded Ch 5
	Deembedded Ch 6
	Deembedded Ch 7
	Deembedded Ch 8
	Deembedded Ch 9
	Deembedded Ch 10
	Deembedded Ch 11
	Deembedded Ch 12
	Deembedded Ch 13
	Deembedded Ch 14
	Deembedded Ch 15
	Deembedded Ch 16
	Monomix Deembedded Ch 1 and 2
	Monomix Deembedded Ch 3 and 4
	Monomix Deembedded Ch 5 and 6
	Monomix Deembedded Ch 7 and 8
	Monomix Deembedded Ch 9 and 10
	Monomix Deembedded Ch 11 and 12
	Monomix Deembedded Ch 13 and 14
	Monomix Deembedded Ch 15 and 16
	Mute

6.5.2. Gain Adjust X

The **Gain Adjust X/Y** control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associate slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is incremented or decremented in 0.1 dB steps.

6.5.3. Invert Enable X

The **Invert Enable X** enables the user to invert the phase or pass the selected audio channel. The *Invert Enable X/Y* radio buttons appears as follows:



Normal	Passes the audio channel through with no processing.
Invert	Inverts the phase of the audio channel.

6.6. GPI/PRESET CONTROL

The **Preset Control** tab allows the user to save and recall presets. For the 7821AD8-LTC-3G, GPI 3 is replaced by the LTC output and is therefore unavailable.

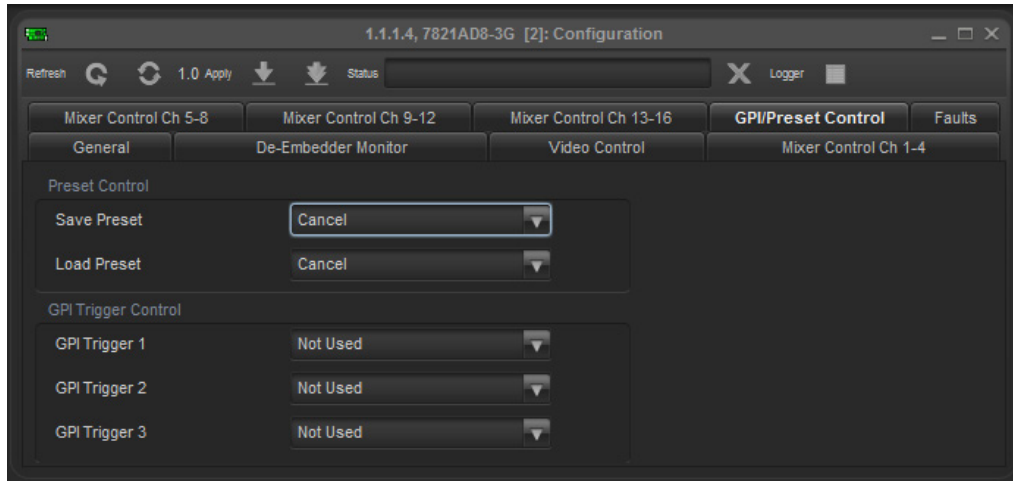


Figure 6-7: GPI/Preset Control Tab



Figure 6-8: GPI/Preset Control Tab on the 7821AD8-LTC-3G

6.6.1. Saving Presets

The **Save Preset** drop down menu will save the current module settings to a selected preset number. The user can save the settings by assigning a preset number (i.e. Preset 02), which can later be recalled using the *load* parameter.

01-10	Selects the preset to save the current module settings to.
CANCEL	Cancels the selection.

6.6.2. Loading Presets

The **Load Preset** drop down menu will load the settings saved in the preset to the current module settings. The user can recall and load a saved preset by selecting the desired preset number (i.e. Preset 02).

FACT	Loads the factory default settings into the module.
01-10	Selects the preset from which to load settings from.
Cancel	Cancels the selection.

6.6.3. GPI Trigger Control

The **GPI Trigger Control** drop down menus will load the settings saved in a preset to the current module settings. The settings will become active when the GPI is active.

FACT	Loads the factory default settings into the module.
01-10	Selects the preset from which to load settings from.
Cancel	Cancels the selection.

6.7. FAULTS

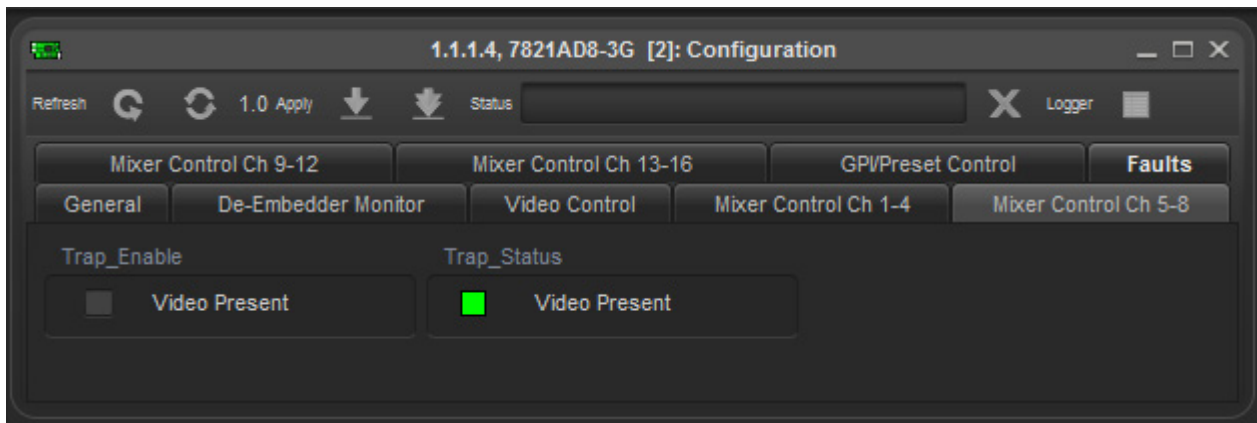


Figure 6-9: Faults tab

7. JUMPERS

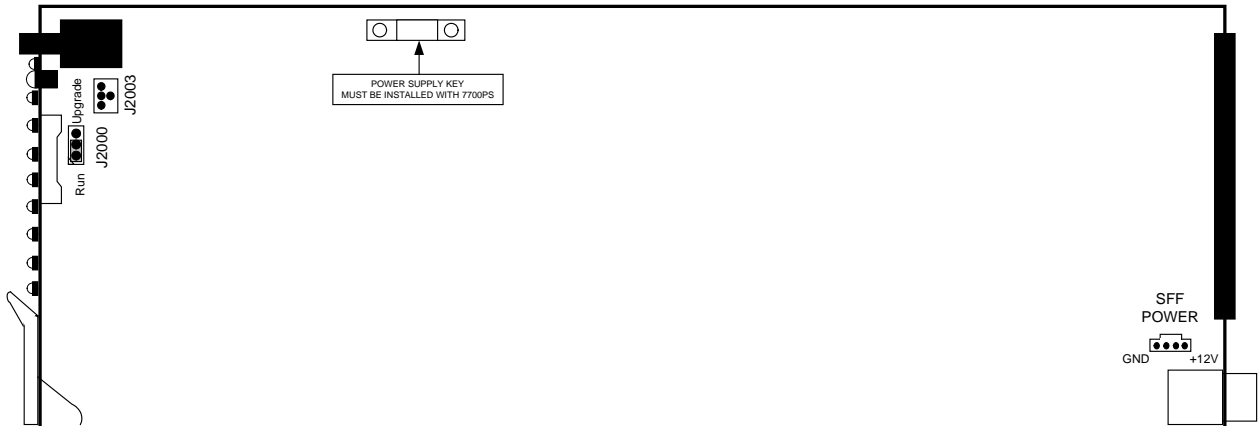


Figure 7-1: Location of Jumpers

7.1. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE switch is located at J2000 jumper on the front side of the main module and is used when firmware upgrades are being done to the module. For normal operation it should be switched to the *RUN* position as shown in the diagram above. See the *Upgrading Firmware* chapter in the front of the binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move Jumper J2000 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J2003 at the card edge near the card extractor. Re-install the module into the frame. Run the upgrade as described in *Upgrading Firmware* chapter. Once the upgrade is complete, remove the module from the frame, move J2000 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.



The Upgrade baud rate for the 7821AD8-3G module is 115,200 baud.

7.2. SLOT BLOCKER INSTALLATION

The 7821AD8-3G can be installed in either the 7700FR-C or the 7800FR frames. These modules are designed to take one slot in the Evertz 7800FR frame and two slots in the 7700FR-C.

Modules can fit into one slot in a 7800FR frame because the 7800FR allows modules to consume more power on a per slot basis than the Evertz 7700FR-C. When a 7821AE8-3G module is installed in the 7700FR-C, the module must occupy 2 slots to ensure that the frame power is managed properly. This is accomplished by installing a “Slot Blocker” on the bottom side of the board. If the “Slot Blocker” is not installed on the card and the card is inserted into the 7700FR, the card will not power-up. When installing the card in a 7800FR, the “Slot Blocker” may be removed and it will power-up and operate normally. If the “Slot Blocker” remains installed and the card is inserted into the 7800FR, the card will also power-up and operate normally.

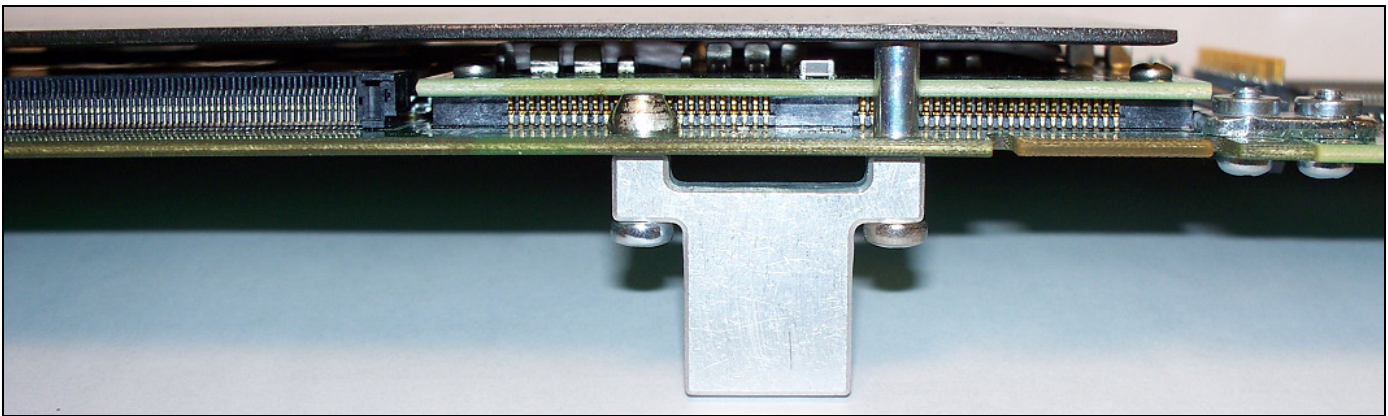


Figure 7-2: Slot Blocker