7700/7800 MultiFrame

User Manual

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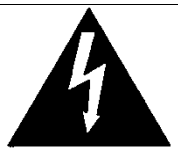
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “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 these instructions
- 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 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 provided plug 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.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as 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

INFORMATION TO USERS IN EUROPE

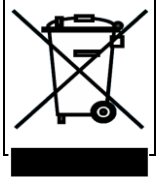
NOTE

CISPR 22 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 the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

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



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

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Released Version	Oct 2009
1.1	Corrections made to specifications, updated product options	Mar 2011
1.2	Updated Fault information and screenshots	Oct 2014
1.3	Added 7800FC to overview and formatting changes throughout	Oct 2024

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1. OVERVIEW

The 7800IDA8-3G reclocking distribution amplifier provides high quality distribution of facility 3G/HD/SD-SDI signals. This module features an autosensing equalized input that generates eight reclocked outputs and is especially useful in projects where long cables runs are encountered.

Unlike other traditional DA's on the market, this module has been designed to support additional broadcast functionality such as loudness control, lipsync control, audio up and down mixing. These features can be optionally ordered providing more value to an already high-performance distribution amplifier.

The 7800IDA8-3G is VistaLINK® capable, offering remote monitoring, control, and configuration capabilities via Simple Network Management Protocol (SNMP) giving the flexibility to manage operations, including signal monitoring and module configuration from SNMP capable control systems (Manager or NMS).

This device:

- Provides eight reclocked outputs from the 3G/HD/SD-SDI input
- Provides enhanced signal reclocking and conditioning
- Provides monitoring and fault detection for video loss, black and freeze
- Provides monitoring and fault detection for audio loss, over and under
- Offers embedded mono audio channel shuffling (+UMX, +DMX, or +IG)
- Offers 2-channel stereo to 5.1 surround sound upmixing (+UMX)
- Offers 5.1 2-channel stereo downmix (+DMX)
- Offers award winning IntelliGain™ Loudness control (+IG)
- Offers award winning IntelliTrak™ Lipsync control (+IT)
- SNMP configuration via Evertz® frame controller

The 7800IDA8-3G occupies one card slot and can be housed in the 3RU 7700FR-C, 7800FR and 7800FR-QT frames that have a 15-slot capacity. The 7700FC or the 7800FC frame controller is required for configuration.

Features and Benefits:

- 3G/HD/SD-SDI input with eight reclocked outputs
- Long reach cable performance
- Standardized video and audio monitoring
- Optional embedded audio channel shuffling
- Optional upmixing, downmixing, loudness control and lipsync control
- Input signal presence detection
- Real time VistaLINK® monitoring and trending
- High density approach offers 14 modules within 3RU

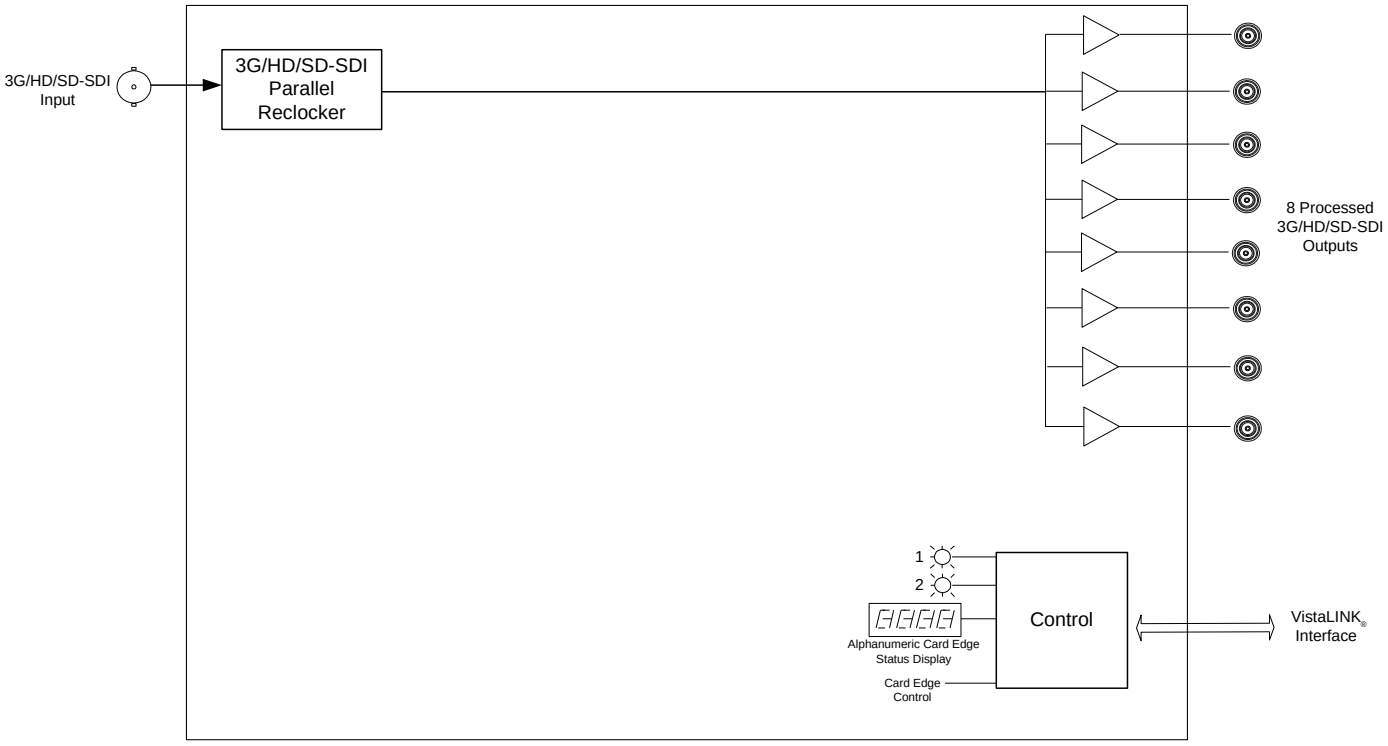

Figure 1-1: 7800IDA8-3G Block Diagram

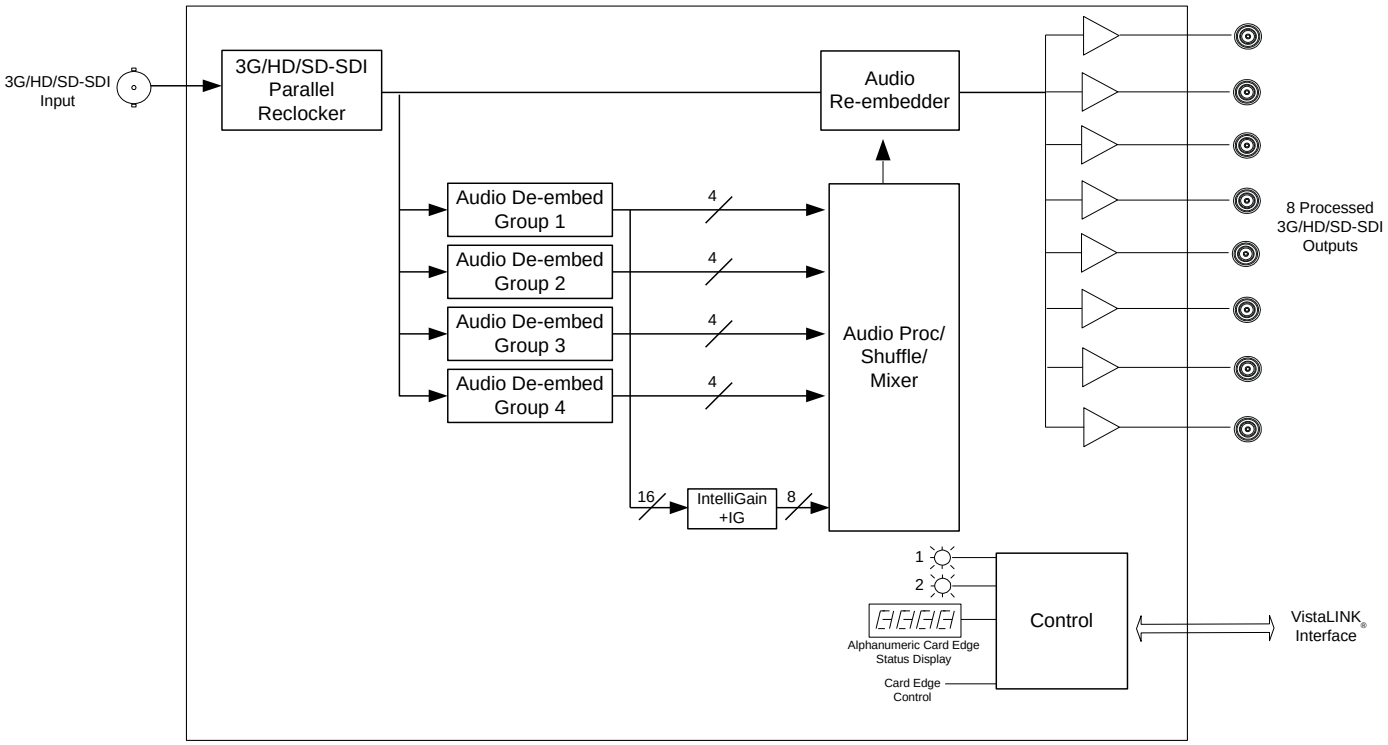

Figure 1-2: 7800IDA8-3G+IG Block Diagram

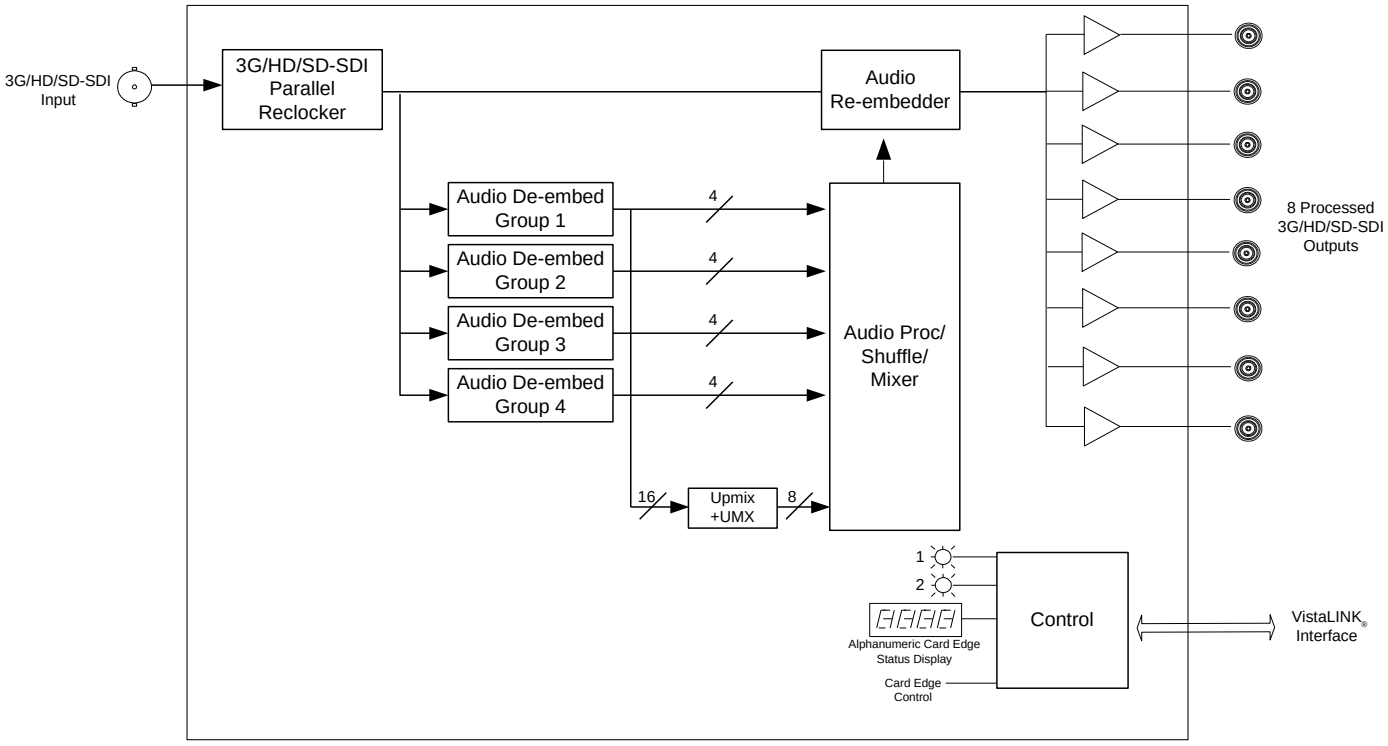

Figure 1-3: 7800IDA8-3G+UMX Block Diagram

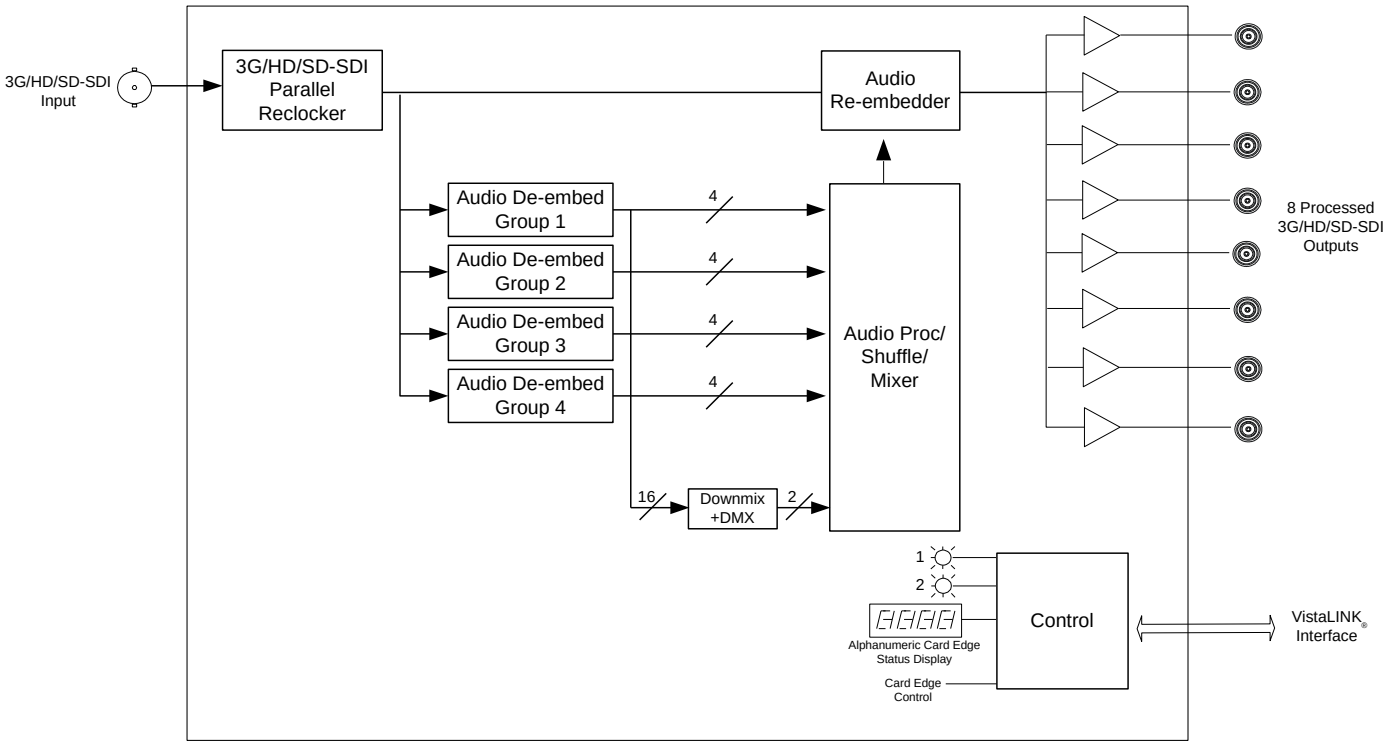

Figure 1-4: 7800IDA8-3G+DMX Block Diagram

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2. INSTALLATION

The 7800IDA8-3G comes with a companion rear plate that occupies one slot in the frame. For information on inserting the module into the frame see section 3 of the 7800FR chapter.

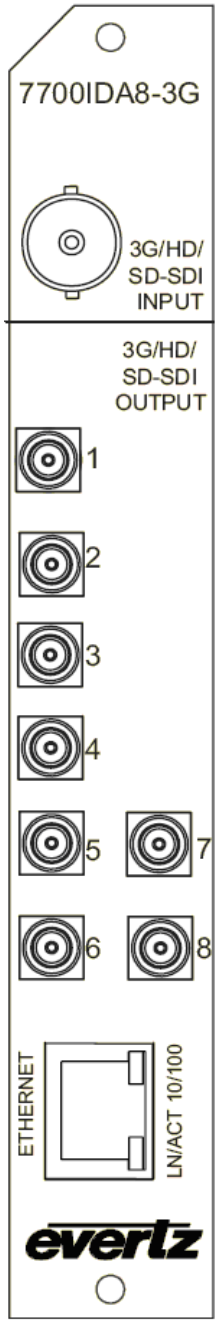

Figure 2-1: 7800IDA8-3G Rear I/O Module

3G/HD/SD-SDI INPUT: Input BNC connector for 10-bit serial digital video signals 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.

3G/HD/SD-SDI OUTPUT: There are eight DIN 1.0/2.3 connectors with reclocked serial component video outputs, 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.

ETHERNET: The Ethernet port has no functionality at this time.

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Standard: Auto-detects standard 3Gb/s SMPTE 424M, 1.5Gb/sec SMPTE 292M, 270Mb/s SMPTE 259M-C (525i/59.94 or 625i/50)

Connector: 1 BNC per IEC 61169-8 Annex A

Input Equalization: Automatic to 100m @ 3Gb/s, 140m @ 1.5Gb/s & 400m @ 270Mb/s (Belden 1694A cable)

Return Loss: > 20dB up to 270 Mb/s

> 15dB up to 1.5Gb/s

> 10dB up to 3Gb/s

3.2. SERIAL VIDEO OUTPUTS

Standard: Auto-detects standard 3Gb/s SMPTE 424M, 1.5Gb/sec SMPTE 292M, 270Mb/s SMPTE 259M-C (525i/59.94 or 625i/50)

Number of Outputs: 8

Connector: DIN 1.0/2.3 connector

Signal Level: 800mV nominal

DC Offset: 0V ±0.5V

Rise and Fall Time: 200ps nominal for 3G/HD-SDI

900ps nominal for SD-SDI

Overshoot: < 10% of amplitude

Return Loss: > 20dB up to 1.5Gb/s

> 10dB for 1.5 - 3Gb/s

Alignment Jitter: < 0.20 UI for SMPTE 259M and 292M
< 0.3 UI for SMPTE 424M

3.3. ELECTRICAL

Voltage: + 12VDC

Power: 9 Watts

EMI/RFI: Complies with FCC regulations for class A devices
Complies with EU EMC directive

3.4. PHYSICAL

Number of slots: 1

4. STATUS LEDS

The 7800IDA8-3G has eight LED Status indicators on the front card edge to show operational status of the card at a glance. Figure 7-1 shows the location of the LEDs.

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

LOCAL FAULT: This Red LED indicates poor module health and will be On during the absence of a valid input signal 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 a valid input signal is present, and board power is good.

There are 18 small LEDs that indicate additional status of the module. Figure 4-1 identifies the function of some of the status LEDs present on the board.

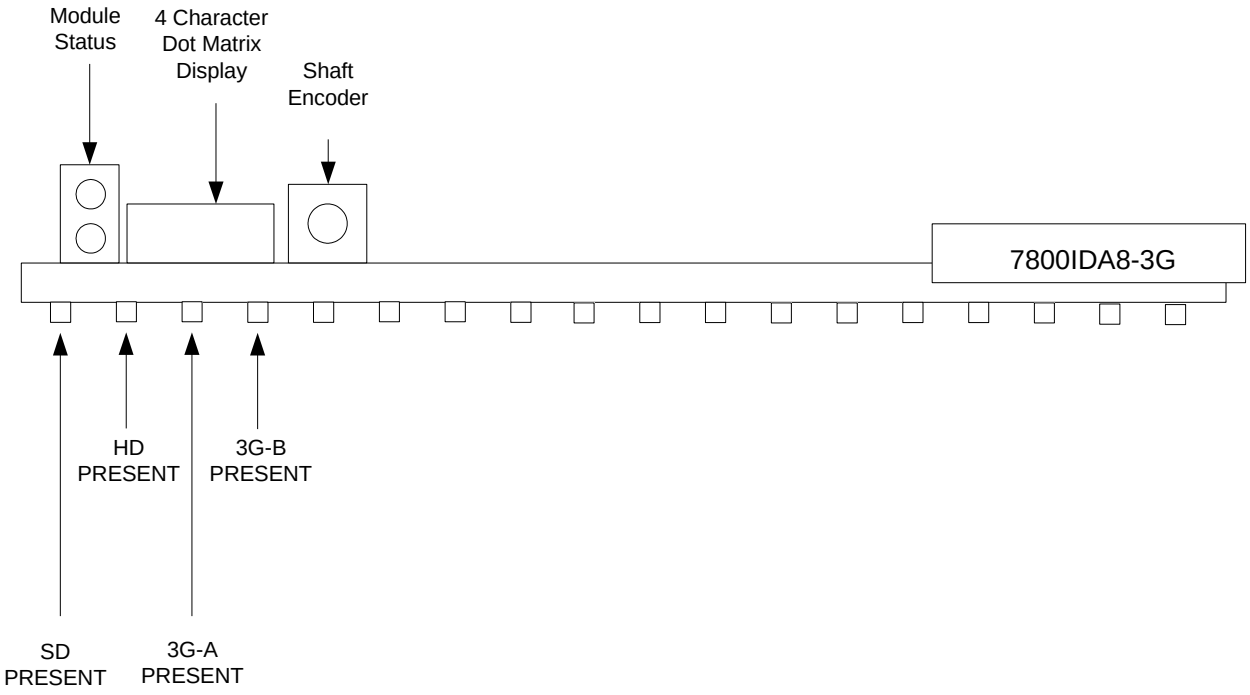

Figure 4-1: Status LEDs

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5. CARD EDGE MODULE CONTROL

5.1. CARD-EDGE CONTROL

The 7800IDA8-3G 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, firmware version, and IP address.

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 counterclockwise. 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.

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
PRST	Allows the saving or recalling of presets
VID	Displays or sets the operating video standard
QUIT	Exits the menu

5.3. 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).

5.4. PRESET PARAMETERS

The ***PRST*** menu option enters into a selection menu to either recall or save a preset.

SAVE	Menu option to save current module state to a selected preset.
LOAD	Menu option to load to the module a selected preset.

5.4.1. Saving Presets

The ***SAVE*** parameter 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.

5.4.2. Loading Presets

The ***LOAD*** parameter 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.

5.5. VIDEO PARAMETERS

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

SELV	Menu option to select a forced video standard.
DETV	Menu option to view the current detected video standard.

5.5.1. Forcing a Video Standard

The ***SELV*** parameter will force the module into operating with a specific video standard. It is recommended to leave this setting in AUTO mode.

AUTO
270M
1.5G
3G A
3G B

5.5.2. Viewing the Input Video Standard

The ***DETV*** parameter will display the currently detected input video standard. It will display one of the standards listed in section 5.5.1 if present, otherwise it will display NONE.

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6. VISTALINK® MODULE CONTROL

This section describes the VistaLINK® control and monitoring available on the 7800IDA8-3G. For illustration purposes, the +UMX+IG option is shown. Special mention will be noted in the title if that section applies only to specific option versions of the module (i.e. +UMX only).

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 *Vista*LINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz *Vista*LINK® enabled products.

2. Managed devices, each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700/7800 series modules reside in the 3RU 7800FR 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 *Vista*LINK® 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.

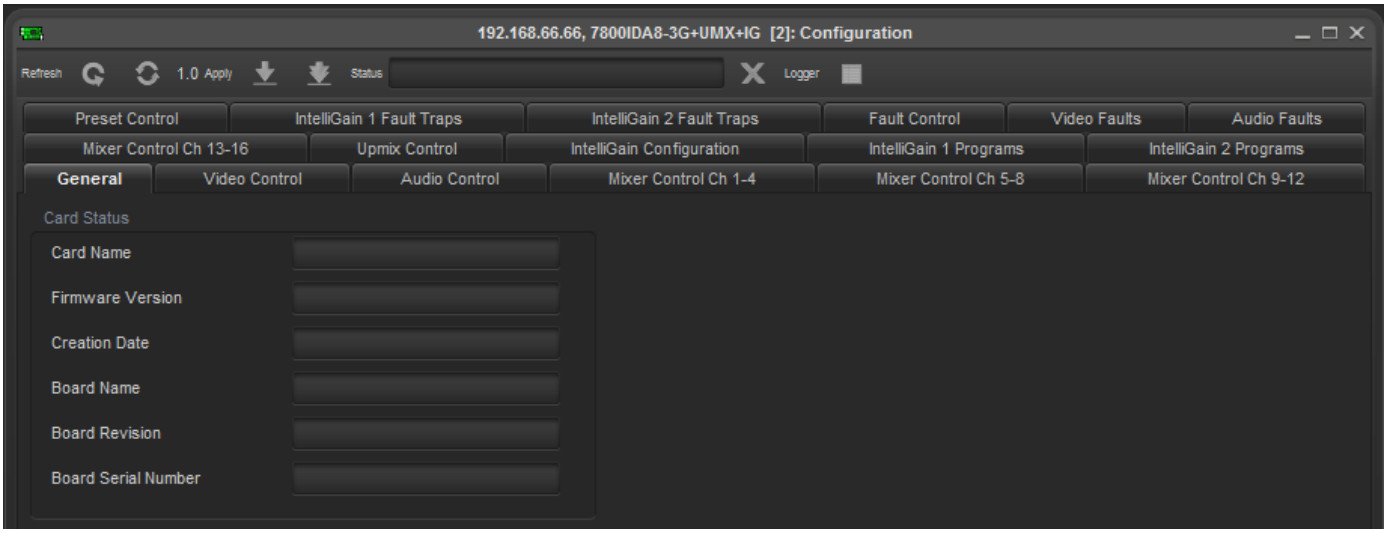

Figure 6-1: General Tab

6.3. VIDEO CONTROL

The ***Video Control*** tab is used to force a video standard and read back the currently detected video standard on the input.

6.3.1. Viewing the Detected Video Standard

The ***Detected Video Standard*** field displays the currently detected input video standard.

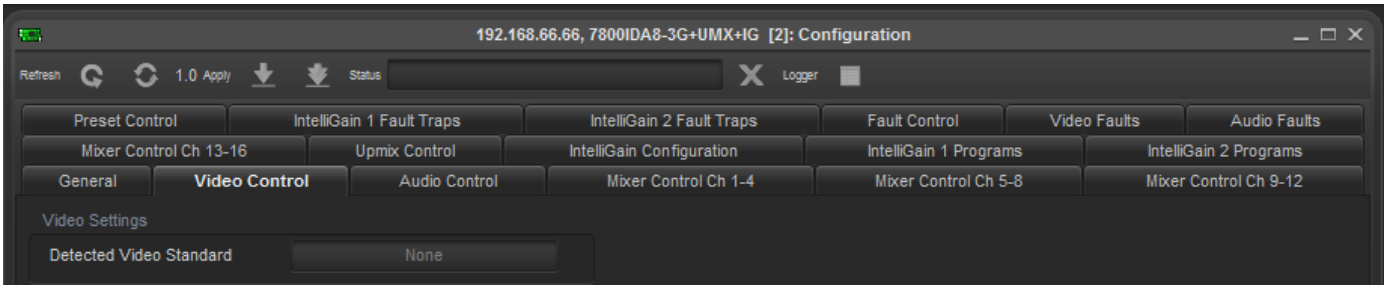

Figure 6-2: Video Control Tab

6.4. AUDIO CONTROL (+UMX, +IG AND +DMX ONLY)

The ***Audio Control*** tab is used to set the C-bit state in the output video's embedded audio.

6.4.1. C-bit Control

The ***C-bit Control*** drop down menu provides the following two options:

- **Preserve**, which will pass through the state of the bit.
- **Replace**, which will set the state of the bit to Active.

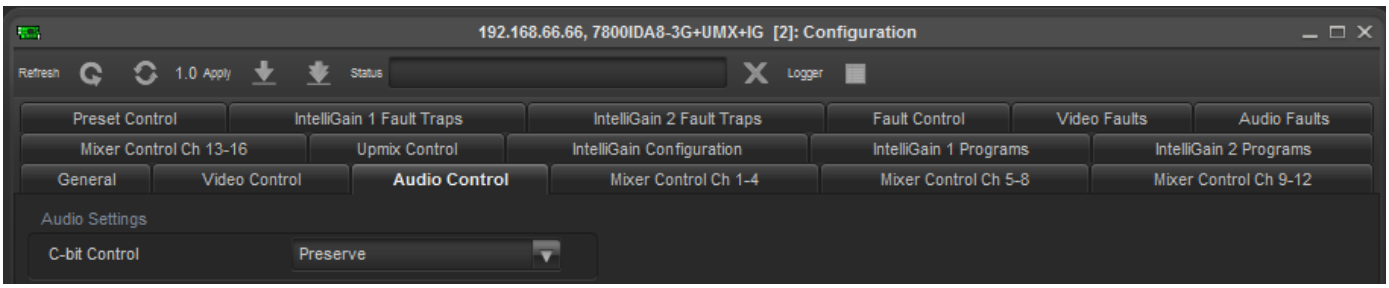

Figure 6-3: Audio Control Tab

6.5. MIXER CONTROL (+UMX, +IG AND +DMX VERSIONS ONLY)

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 Ch1-4* control tab will be discussed in this manual. Control tabs for *Mixer Control Ch5-8*, *Mixer Control Ch9-12* and *Mixer Control Ch13-16* 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.

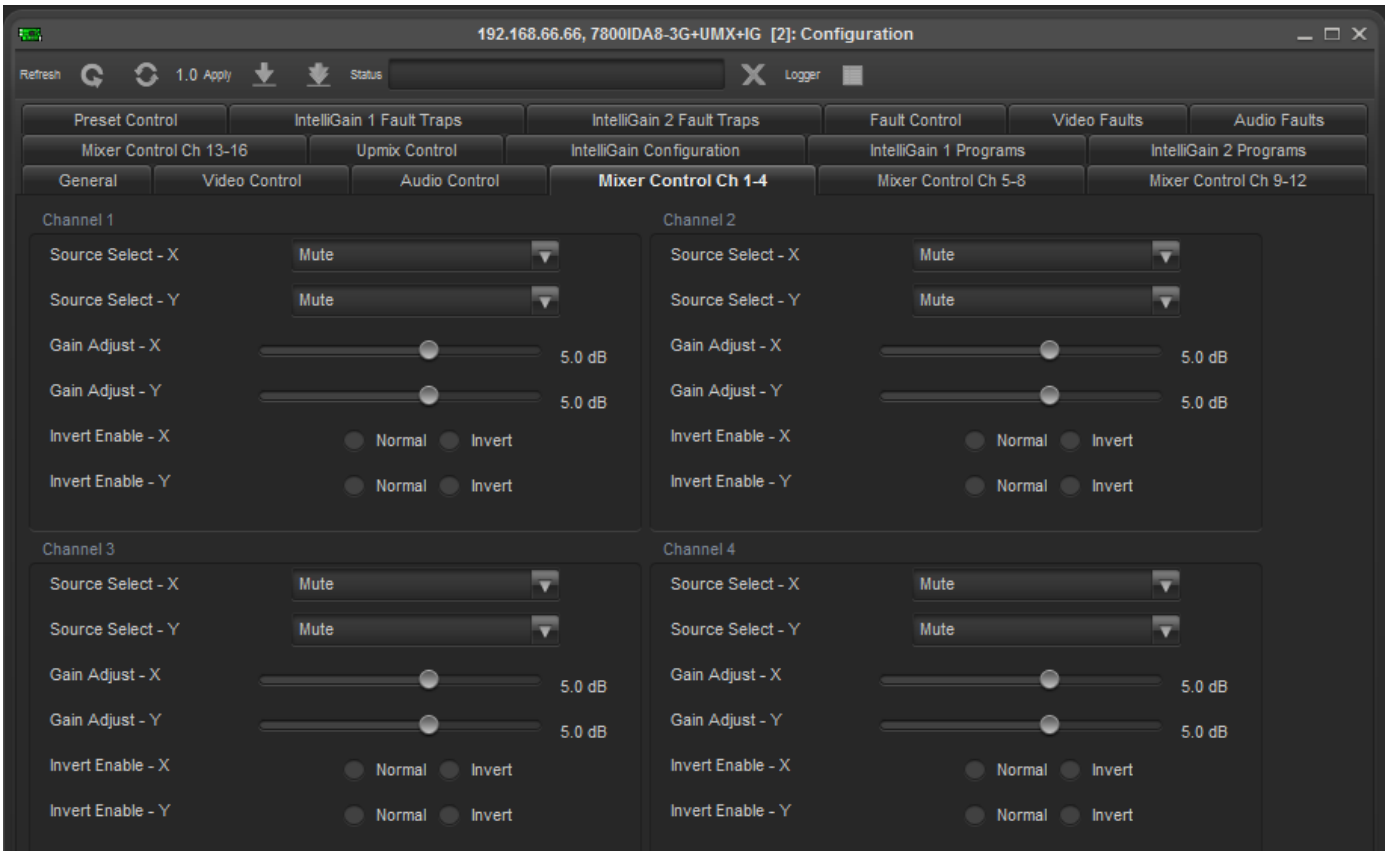

Figure 6-4: Mixer Control 1-4 Tab

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 6-5.

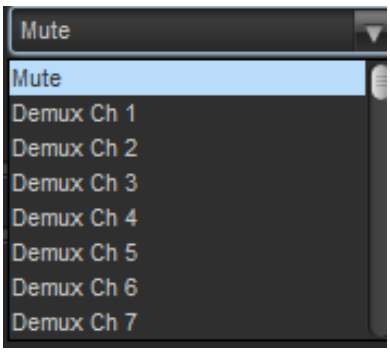

Figure 6-5: Source Select Drop Down Menu

The full set of available channels is listed below.

Source X/Y Input	Demux Ch 1	All
	Demux Ch 2	
	Demux Ch 3	
	Demux Ch 4	
	Demux Ch 5	
	Demux Ch 6	
	Demux Ch 7	
	Demux Ch 8	
	Demux Ch 9	
	Demux Ch 10	
	Demux Ch 11	
	Demux Ch 12	
	Demux Ch 13	
	Demux Ch 14	
	Demux Ch 15	
	Demux Ch 16	
	Demux Mono Mix Ch 1 and 2	
	Demux Mono Mix Ch 3 and 4	
	Demux Mono Mix Ch 5 and 6	
	Demux Mono Mix Ch 7 and 8	
	Demux Mono Mix Ch 9 and 10	
	Demux Mono Mix Ch 11 and 12	
	Demux Mono Mix Ch 13 and 14	
	Demux Mono Mix Ch 15 and 16	
	IntelliGain Ch 1	+IG
	IntelliGain Ch 2	
	IntelliGain Ch 3	
	IntelliGain Ch 4	
	IntelliGain Ch 5	
	IntelliGain Ch 6	
	IntelliGain Ch 7	
	IntelliGain Ch 8	
	Down Mix Ch L	+DMX
	Down Mix Ch R	
	Up Mix Ch L	+UMX
	Up Mix Ch R	
	Up Mix Ch C	
	Up Mix Ch LFE	
	Up Mix Ch Ls	
	Up Mix Ch Rs	
	Up Mix Stereo Pass L	
	Up Mix Stereo Pass R	
	Mute	All

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 associated 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.

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

6.6. PRESET CONTROL

The ***Preset Control*** tab allows the saving and recalling of presets.

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.

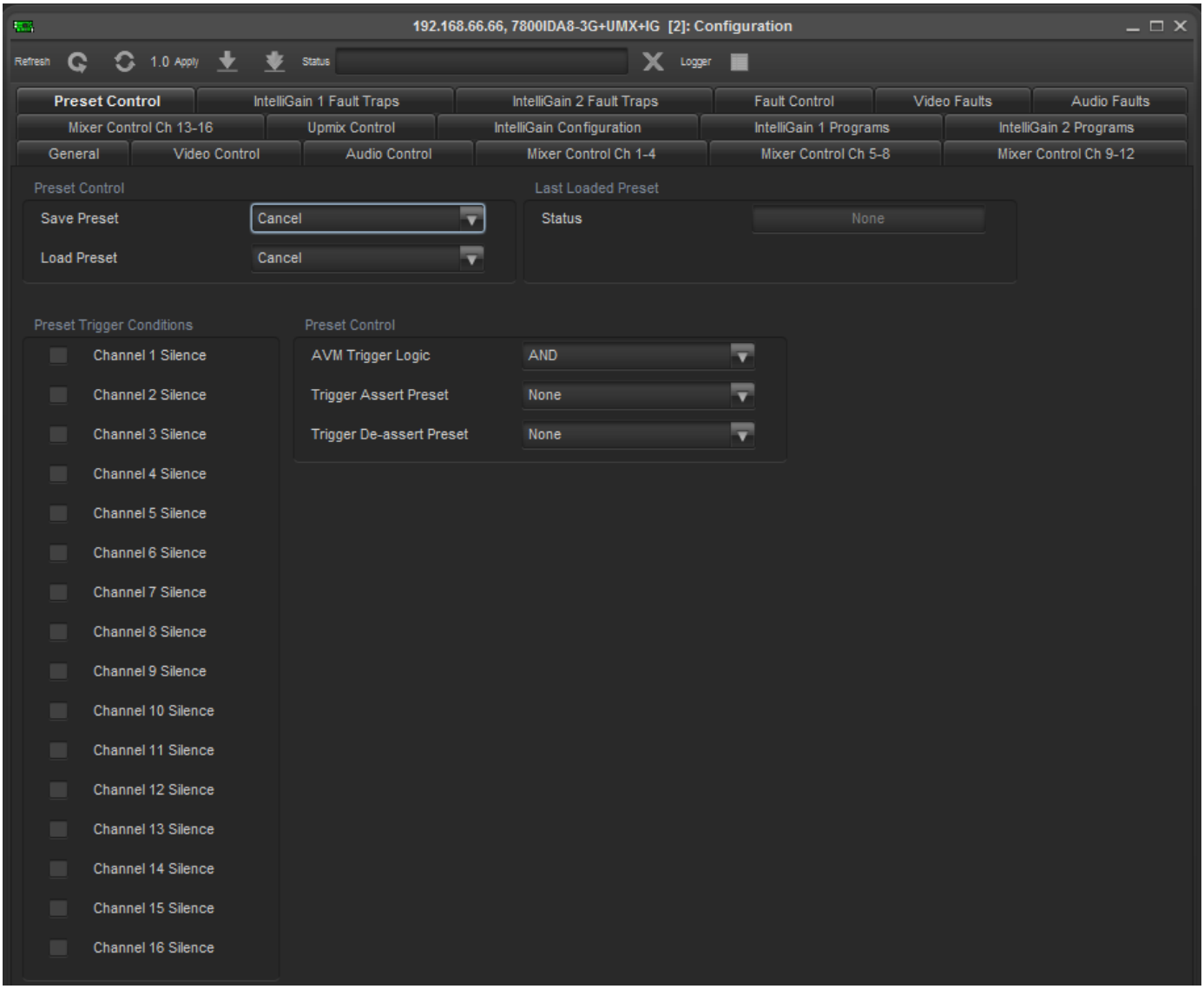

Figure 6-6: Preset Control Tab

6.6.3. Preset Control

6.6.3.1. AVM Trigger Logic

The ***AVM Trigger Logic*** control sets the logic to be used when combining the AVM preset trigger conditions to determine if the overall AVM preset trigger either condition if True or False.

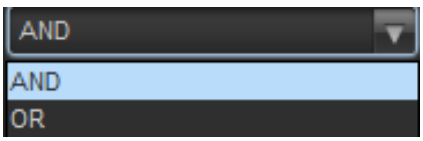

Figure 6-7: AVM Trigger Logic

AND	A value of TRUE will only happen when all trigger conditions have been met.
OR	A value of TRUE will happen when any of the trigger conditions have been met.

6.6.3.2. Trigger Assert Preset

The ***Trigger Assert Preset*** control sets the preset to be recalled when the overall AVM preset trigger condition is asserted (transitions from FALSE → TRUE).

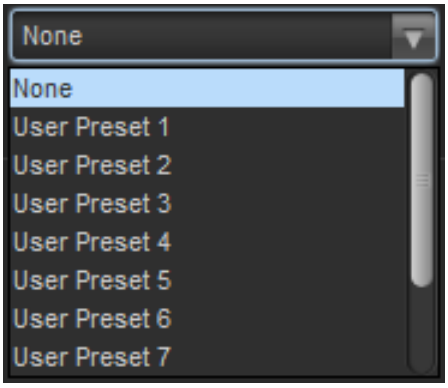

Figure 6-8: Trigger Asset Preset

None	When set to none, If trigger conditions are met the module will take no action.
User Preset 1	When set to user preset 1, If trigger conditions are met the module will recall User Preset 1
User Preset 2	When set to user preset 2, If trigger conditions are met the module will recall User Preset 2
User Preset 3	When set to user preset 3, If trigger conditions are met the module will recall User Preset 3
User Preset 4	When set to user preset 4, If trigger conditions are met the module will recall User Preset 4
User Preset 5	When set to user preset 5, If trigger conditions are met the module will recall User Preset 5
User Preset 6	When set to user preset 6, If trigger conditions are met the module will recall User Preset 6
User Preset 7	When set to user preset 7, If trigger conditions are met the module will recall User Preset 7
User Preset 8	When set to user preset 8, If trigger conditions are met the module will recall User Preset 8
User Preset 9	When set to user preset 9, If trigger conditions are met the module will recall User Preset 9
User Preset 10	When set to user preset 10, If trigger conditions are met the module will recall User Preset 10

6.6.3.3. Trigger De-Assert Preset

The ***Trigger De-Assert Preset*** sets the preset to be recalled when the overall AVM preset trigger condition is asserted (transitions from TRUE → FALSE).

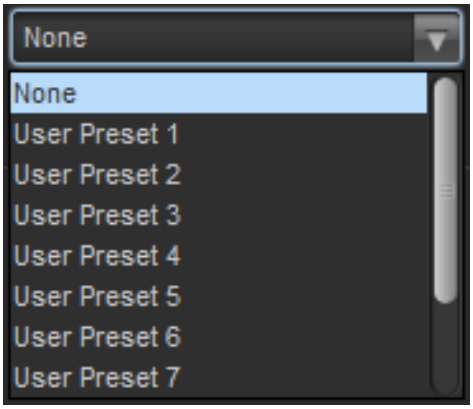

Figure 6-9: Trigger De-Asset Preset

None	When set to none, If trigger conditions are met the module will take no action.
User Preset 1	When set to user preset 1, If trigger conditions are not met the module will recall User Preset 1
User Preset 2	When set to user preset 2, If trigger conditions are not met the module will recall User Preset 2
User Preset 3	When set to user preset 3, If trigger conditions are not met the module will recall User Preset 3
User Preset 4	When set to user preset 4, If trigger conditions are not met the module will recall User Preset 4
User Preset 5	When set to user preset 5, If trigger conditions are not met the module will recall User Preset 5
User Preset 6	When set to user preset 6, If trigger conditions are not met the module will recall User Preset 6
User Preset 7	When set to user preset 7, If trigger conditions are not met the module will recall User Preset 7
User Preset 8	When set to user preset 8, If trigger conditions are not met the module will recall User Preset 8
User Preset 9	When set to user preset 9, If trigger conditions are not met the module will recall User Preset 9
User Preset 10	When set to user preset 10, If trigger conditions are not met the module will recall User Preset 10

6.7. DOWN MIX CONTROL (+DMX ONLY)

The ***Down Mix*** Control tab is used to perform a 5.1 PCM to stereo (LtRt, LoRo or custom) down mix.

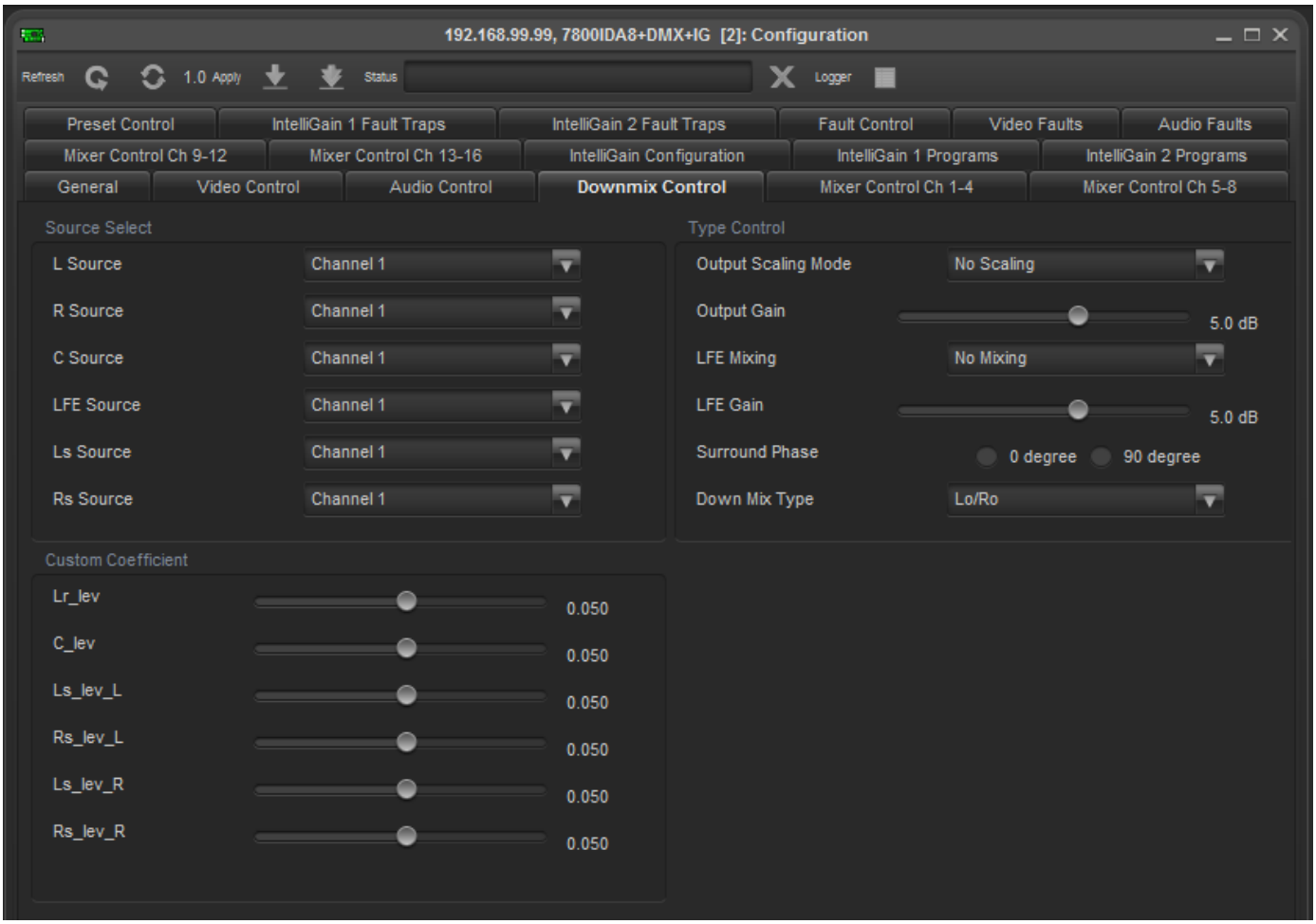

Figure 6-10: Downmix Control Tab

6.7.1. Setting the Source Select Controls

The ***Source Select*** section enables the user to assign a particular channel to be used as a particular audio source in the down mix. There are five sources of audio that feed the down-mixing process: L Source, R Source, C Source, LFE Source, Ls Source, and Rs Source. Each of these sources can be assigned a specific channel of audio using the appropriate drop-down menu. For sake of brevity, only the L Source selection process is shown.

To assign a channel to *L Source*, navigate to the source and select a channel from the adjacent drop-down menu. The following sources of audio are available:

Channel 1	Select Channel 1 for the L Source
Channel 2	Select Channel 2 for the L Source
Channel 3	Select Channel 3 for the L Source
Channel 4	Select Channel 4 for the L Source
Channel 5	Select Channel 5 for the L Source
Channel 6	Select Channel 6 for the L Source
Channel 7	Select Channel 7 for the L Source
Channel 8	Select Channel 8 for the L Source
Channel 9	Select Channel 9 for the L Source
Channel 10	Select Channel 10 for the L Source
Channel 11	Select Channel 11 for the L Source
Channel 12	Select Channel 12 for the L Source
Channel 13	Select Channel 13 for the L Source
Channel 14	Select Channel 14 for the L Source
Channel 15	Select Channel 15 for the L Source
Channel 16	Select Channel 16 for the L Source

6.7.2. Setting the Down Mix Type Controls

6.7.2.1. Setting the Output Scaling Mode

The ***Output Scaling Mode*** controls whether the down mix matrix is normalized or not. Select *Overflow Scaling* from the drop-down menu to normalize the matrix coefficients. Normalization of matrix coefficients will avoid any possibility of overflow, but it tends to lower the loudness level when compared against the original 5.1 input. If no normalization is applied, the stereo down-mix usually sounds at similar levels as the 5.1 audio input, but clipping may occur when the input sound level is close to 0dB FS. The *Output Scaling Mode* drop down provides the following options:

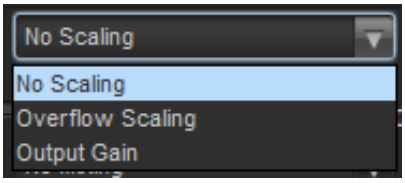

Figure 6-11: Output Scaling Mode

No Scaling	If no normalization is applied, the stereo down-mix usually sounds at the similar levels as the 5.1 audio input, but clipping may occur when input sound level is close to 0dB FS.
Overflow Scaling	Select *Overflow Scaling* to normalize the matrix coefficients. Normalization of matrix coefficients will avoid any possibility of overflow, but it tends to lower the loudness level when compared against the original 5.1 input.

6.7.2.2. Setting the Output Gain

The ***Output Gain*** control enables the user to configure the output gain. To adjust the output gain control, drag the slider right to increase the gain value or drag the slider left to decrease the gain control. The output gain ranges from -20 dB to +20 dB in 0.1 dB increments.

6.7.2.3. Setting the LFE Mixing Control

The ***LFE Mixing*** control enables the user to control whether the LFE channel is included or not in the audio down-mixing. Note that the LFE Gain control is in effect only when LFE Gain is selected. The LFE Mixing Control drop down menu provides the following options:

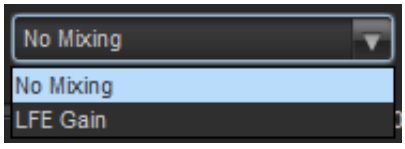

Figure 6-12: LFE Mixing Control

No Mixing	The LFE channel will not be included in the down-mix.
LFE Gain	The LFE channel will be included in the down-mix with gain for the LFE channel defined by the LFE Gain control.

6.7.2.4. Setting the Surround Phase Control

The ***Surround Phase*** control manages whether or not a 90-degree phase shift is applied to the surround channels before being passed to a down-mix matrix. Select 0 degree if no 90-degree phase shift is needed. It is required that surround channels are 90-degree phase shifted for Dolby Prologic I decoding, but if surround channels in the 5.1 audio input are already 90-degree phase shifted, then the user should select 0 degree to avoid double 90-degree phase shifting. Normally, the 90 degrees phase shift is applied. The *Surround Phase* radio button menu appears as follows:

Figure 6-13: Surround Phase Control

0 degrees	No phase shift is applied to the surround channels before being passed to down.
90 degrees	A 90-degree phase shift is applied to the surround channels before being passed to down.

6.7.2.5. Setting the Down Mix Type Control

The ***Down Mix Type*** control enables the user to set the type of audio downmixing that will be performed. The user may select from LoRo (Left Only and Right Only), LtRt (Left Total and Right Total) Prologic I and LtRt (Left Total and Right Total) Prologic II OR may choose to perform a Custom down-mix.

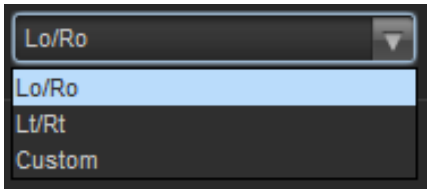

Figure 6-14: Down Mix Type Control

LoRo	When set to *LoRo*, the down-mixer will generate Left Only and Right Only (LoRo) stereo audio.
LtRt (Prologic I)	When set to *LtRt (Prologic I)*, the down-mixer will generate Left Total and Right Total (LtRt) Prologic I compatible stereo audio.
LtRt (Prologic II)	When set to *LtRt (Prologic II),* the down-mixer will generate Left Total and Right Total (LtRt) Prologic II compatible stereo audio.
Custom	When set to *custom*, the down-mixer will generate Left and Right channels of audio using the custom down-mixing equations.

6.7.2.5.1. Custom Down Mix Type Control Settings

When the ***Down Mix Type*** is set to *Custom,* the following equation will be used to generate the down-mixed audio.

L = (LR_lev * L + C_lev * C + Ls_lev_L * Ls{0°/90°} + Rs_lev_L * Rs{0°/90°} + lfe_gain * LFE) * gain / norm

R = (LR_lev * R + C_lev * C + Ls_lev_R * Ls{0°/90°} + Rs_lev_R * Rs{0°/90°} + lfe_gain * LFE) * gain / norm

Where **lfe_gain** is controlled by LFE Mixing and LFE Gain, **gain** is controlled by Output Gain, **norm** is controlled by Output Scaling Mode and where **LR_lev, C_lev, Ls_lev_L, Rs_lev_L, Ls_lev_R and Rs_lev_R** are custom specified user coefficients. These custom down-mixing coefficients are controlled using the appropriate slider bars in the *Down Mix Type* control section as shown below.

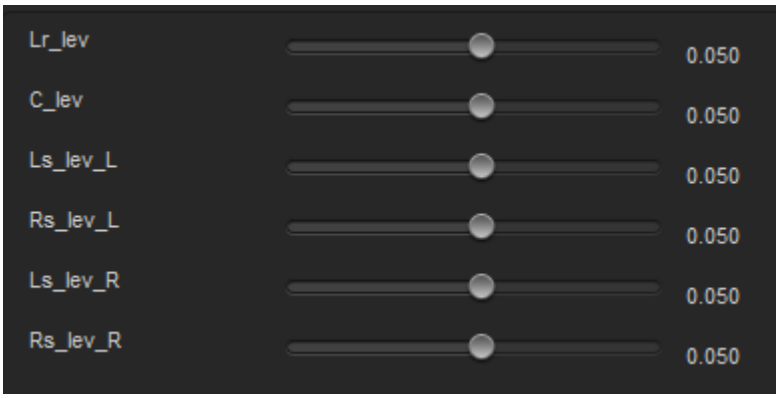

Figure 6-15: Down Mix Type Control Settings

LR_lev: Ranges from 1.000 to –1.000 in increments of .001 increments.

C_lev: Ranges from 1.000 to –1.000 in increments of .001 increments.

Ls_lev_L: Ranges from 1.000 to –1.000 in increments of .001 increments.

Rs_lev_L: Ranges from 1.000 to –1.000 in increments of .001 increments.

Ls_lev_R: Ranges from 1.000 to –1.000 in increments of .001 increments.

Rs_lev_R: Ranges from 1.000 to –1.000 in increments of .001 increments.

6.8. UPMIX CONTROL (+UMX ONLY)

The ***Upmix*** Control tab is used to perform a stereo to 5.1 PCM audio up mix. The module has the capability to detect between stereo and 5.1 incoming content to ensure there is a constant 5.1 output.

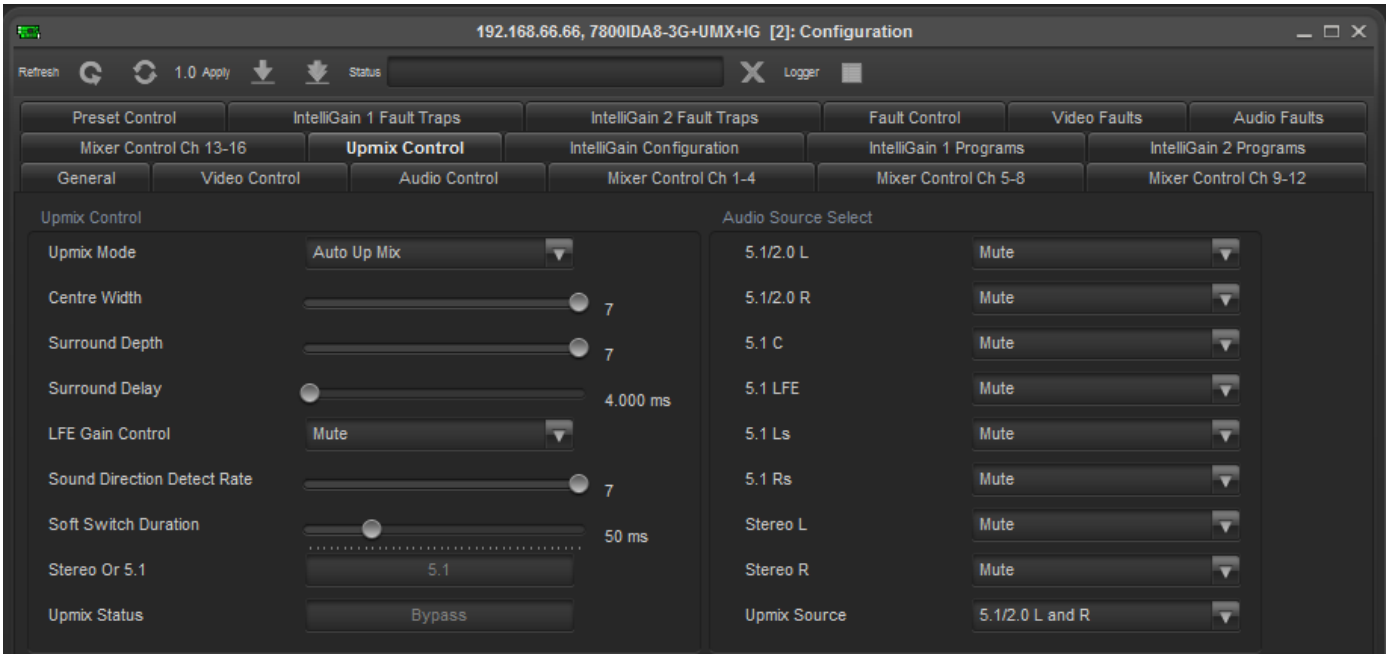

Figure 6-16: Upmix Control Tab

6.8.1. Setting the Upmix Mode

The ***Upmix Mode*** control sets the operating mode of the upmixing engine. It has the following options:

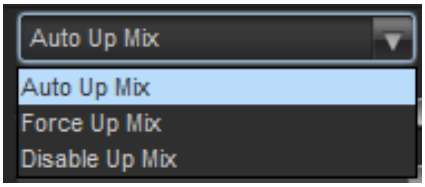

Figure 6-17: Upmix Mode

Auto Up Mix	When set to *Auto Up Mix*, the upmix processor will pass-through 5.1 content if present otherwise it will upmix the audio pair chosen from the *Upmix Source* option.
Force Up Mix	When set to *Force Up Mix*, it will upmix the audio pair chosen from the *Upmix Source* option and use the upmix channels on the output.
Disable Up Mix	When set to *Disable Up Mix*, the upmix processor will pass-through 5.1 content.

6.8.2. Setting the Centre Width

The ***Centre Width*** controls the width of front centre sound in the perceived sound image when listening to up-mixed audio. It mainly affects the perception of speech and dialog. Narrower centre width will cause the front centre sound primarily coming from the centre speaker. Wider centre width causes the front centre sound coming from the centre, left and right speakers. To adjust the centre width of the up mix control, drag the slider right to increase the value of the centre width or drag the slider left to decrease the value of the centre width. The value range is 0 to 7 in increments of 1. The default value is 3.

6.8.3. Setting the Surround Depth

The ***Surround Depth*** controls the depth of surround sound in the perceived sound image when listening to up-mixed audio. More sound will be directed to the front speakers (centre, left and right speakers) if a shallower surround depth is selected. If a deeper surround depth is selected, more sound will be shifted to the surround speakers. To adjust the depth of the surround, drag the slider right to increase the depth or drag it left to decrease the depth. The value range is 0 to 7 in increments of 1. The default value is 3.

6.8.4. Setting the Up Mix Surround Delay

This ***Up Mix Surround Delay*** controls the amount of time that the surround sound will be delayed against other channels. The proper amount of surround delay will provide a good perception of surround sound. To adjust the delay of the up mix surround, drag the slider to the right to increase the delay or drag it to the left to decrease the delay in milliseconds.

The value range is 4 ms to 20ms in increments of .021 ms. The default value is 10 ms.

6.8.5. Setting the LFE Gain

The ***LFE Gain*** controls the LFE channel gain after audio is up-mixed. Use the drop-down menu to select the appropriate source.

Mute	Mute the LFE channel in the up-mixed audio.
+ 0 dB	Apply 0 dB gain to the generated LFE channel.
-1.5 dB	Apply –1.5 dB gain to the generated LFE channel.
-3.0 dB	Apply –3.0 dB gain to the generated LFE channel.
-4.5 dB	Apply –4.5 dB gain to the generated LFE channel.
-6.0 dB	Apply –6.0 dB gain to the generated LFE channel.
-7.5 dB	Apply –7.5 dB gain to the generated LFE channel.
-9.0 dB	Apply –9.0 dB gain to the generated LFE channel.

6.8.6. Setting the Sound Direction Detect Rate

The **Sound Direction Detect Rate** controls the detection rate of sound direction. The up-mixer constantly calculates the sound image that would be perceived from the stereo audio input. If the sound direction shifts in the sound image, the up-mixer changes the output sound direction accordingly by switching the amount of sound going to different speakers. If a faster detection rate is selected, the sound direction switching may sound more dramatic, but may also be felt as unnatural. On the other hand, slower detection rate would sound dull and uninteresting. To adjust the detection rate of the sound direction, drag the slider to the right to increase the rate or drag it to the left to decrease the rate.

The value range is 0 to 7 in increments of 1. The default is level 4.

6.8.7. Setting the Soft Switch Duration

The Soft Switch Duration controls the muting interval between a transition from incoming 5.1 to upmixed 5.1 and vice versa. The SoftSwitch™ does a cross-fade mute to reduce audio switching artifacts ('popping'). A longer duration will give a greater chance of having no artifacts but cause a more noticeable mute in the transition.

The value range is 5 ms to 200 ms in increments of 1 ms. The default is 20 ms.

6.8.8. Audio Source Select

The ***Audio Source Select*** section enables the user to assign a specific channel to be used as a particular audio source for either the 5.1 pass-through or stereo to be put through the upmix. In addition, it controls the audio channels to be used for detection of 5.1 content.

6.8.8.1.Audio Channel Source Selections

There are six sources of audio that comprise a 5.1 audio pass-through: 5.1/2.0L, 5.1/2.0R, 5.1 C, 5.1 LFE, 5.1 Ls, and 5.1 Rs. There are two channels which can be assigned as the stereo pair: Stereo L and Stereo R. Each of these sources can be assigned a specific channel of audio using the appropriate drop-down menu. For sake of brevity, only the *5.1/2.0L Source* selection process is shown.

To assign a channel to *5.1/2.0L Source*, navigate to the source and select a channel from the adjacent drop-down menu. The following sources of audio are available:

Demux Ch 1
Demux Ch 2
Demux Ch 3
Demux Ch 4
Demux Ch 5
Demux Ch 6
Demux Ch 7
Demux Ch 8
Demux Ch 9
Demux Ch 10
Demux Ch 11
Demux Ch 12
Demux Ch 13
Demux Ch 14
Demux Ch 15
Demux Ch 16
Demux Mono Ch 1 and 2
Demux Mono Ch 3 and 4
Demux Mono Ch 5 and 6
Demux Mono Ch 7 and 8
Demux Mono Ch 9 and 10
Demux Mono Ch 11 and 12
Demux Mono Ch 13 and 14
Demux Mono Ch 15 and 16

6.8.8.2.Upmix Source Select

The ***Upmix Source*** controls the mode of operation for detecting 5.1 audio presence.

Figure 6-18: Upmix Source Select

5.1/2.0 L and R	When set to *5.1/2.0 L and R*, if all of the 5.1 C, Lfe, Ls and Rs channels are mute, then it will use the 5.1/2.0 L and R channels for the upmix.
Stereo L and R	When set to *Stereo L and R*, if all of the 5.1 C, Lfe, Ls and Rs channels are mute, then it will use the Stereo L and R channels for the upmix.

6.9. INTELLIGAIN® CONFIGURATION (+IG ONLY)

Please refer to the IntelliGain® User Manual for instructions on configuring IntelliGain®.

6.10. INTELLITRAK® CONFIGURATION (+IT ONLY)

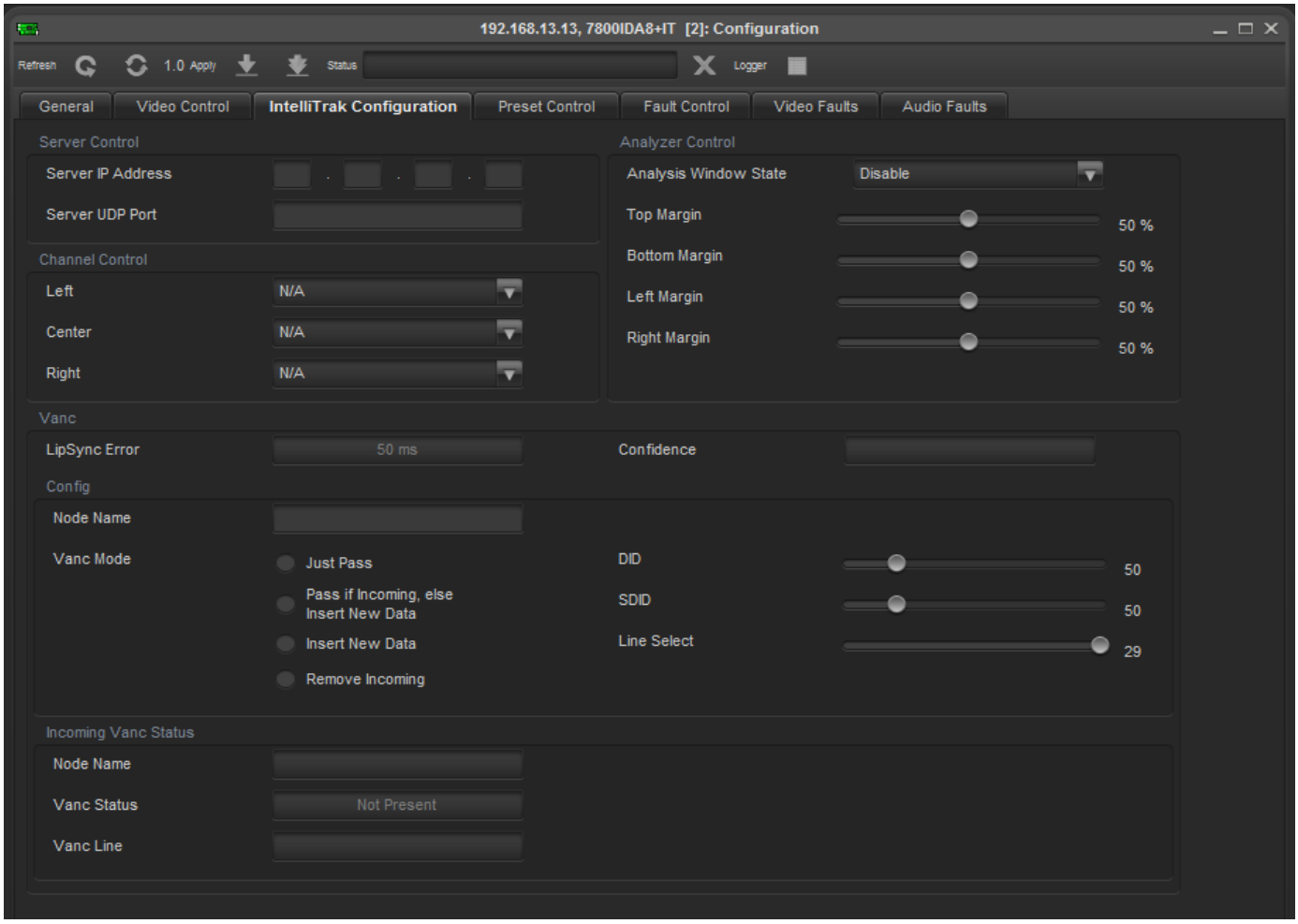

Figure 6-19: IntelliTrak® Tab

Please refer to the IntelliTrak® User Manual for instructions on configuring IntelliTrak®.

6.11. FAULT CONTROL

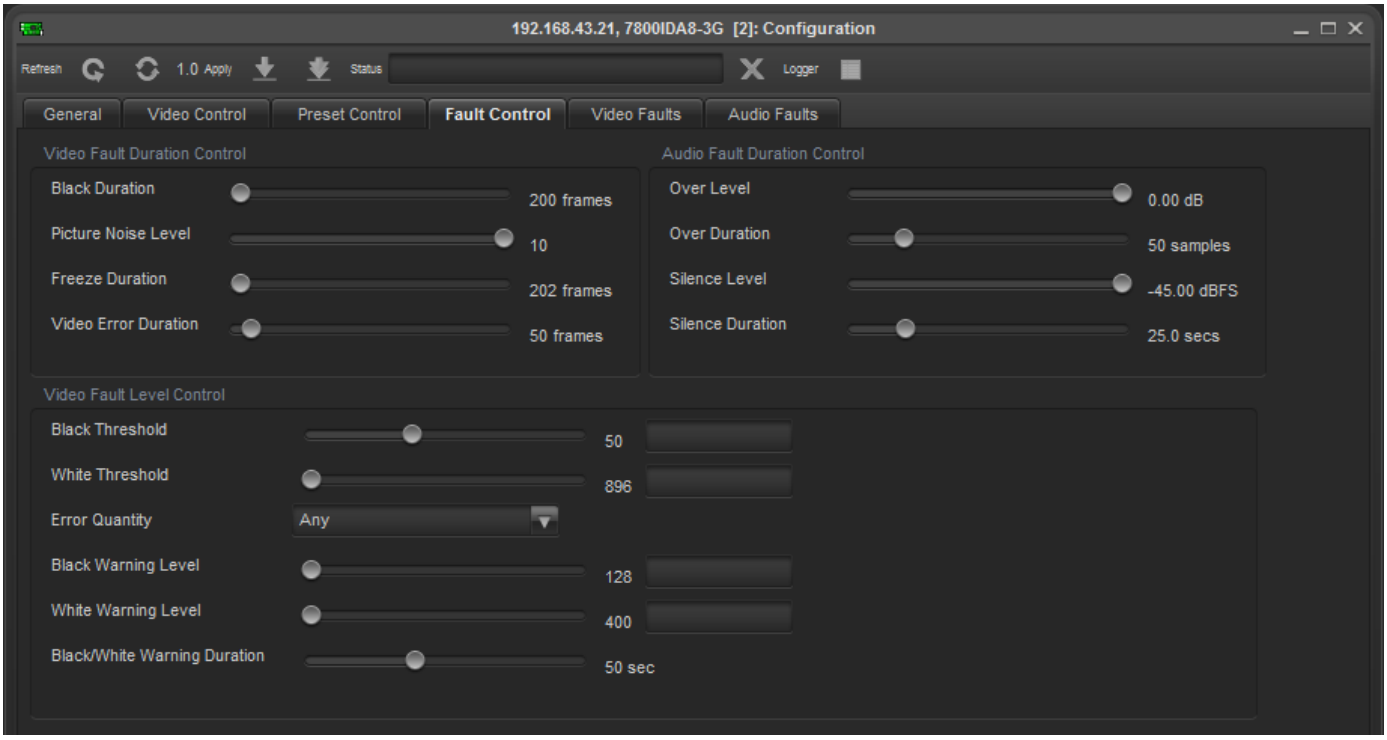

Figure 6-20: Fault Control Tab

6.11.1. Black Duration

The ***Black Duration*** control sets the duration, in frames, of active picture content below 7 IRE that is considered a fault. A fault is generated when the video level within the active picture area falls below the preset black level (7 IRE) and remains for the specified duration. The value range is 4 to 9996 frames in increments of 1.

6.11.2. Detecting Picture Freeze

The *Picture Noise Level* and *Picture Freeze Duration* controls are used to detect when a video picture is considered frozen. The *Picture Noise Level* control sets the threshold that decides whether activity in the picture is considered to be noise. The picture activity must be greater than this amount for the duration set by the *Picture Freeze Duration* control before the fault condition exists.

6.11.2.1. Picture Noise Level

The ***Picture Noise Level*** control sets the approximate level of noise expected in the video signal feed. It is used by the freeze detect feature to distinguish motion from background noise on top of a video feed. The value range is 1 to 10.

As a guide, here are some signal to noise ratio comparisons:

1 = digital freeze (no noise on top of frozen picture)

10 = 40 dB SNR

6.11.2.2. Picture Freeze Duration

The ***Picture Freeze Duration*** control sets the duration, in number of frames, of video activity under the picture noise level that is considered a fault. The value range is 6 to 9998 frames in four-frame increments.

When increasing the *Picture Noise Level*, it is recommended that the *Picture Freeze Duration* is increased as well. This is because the higher the picture noise level, the lower the equipment's motion sensitivity. Thus, long periods without significant on-screen movement are more likely to trigger a "false" freeze alarm.

6.11.2.3. Optimizing the Picture Noise Level and Picture Freeze Duration Parameters

Setting up the optimum *Picture Noise Level* and *Picture Freeze Duration* parameters will depend on the amount of noise in the video path from the first equipment with freeze-frame capability to the monitoring point. The system designer should determine the maximum amount of time permissible between the moment of freeze and the alarm.

Setting this time as high as tolerable has two benefits:

- It lowers the frequency of "false" freeze alarms generated when a perfectly valid content contains long motionless periods
- It allows raising the picture noise level parameter, without increasing frequency of "false" freeze alarms.

It is suggested that the *Picture Noise Level* should be set after setting the *Picture Freeze Duration*.

If the video path is fully digital, then set the *Picture Noise Level* depending on the bit-error rate of the link as follows:

- For bit-error rates less than 1 in 10^{E-12}, set the value in the range of 1 to 5
- For bit-error rates greater than 1 in 10^{E-12}, set value in the range of 6 to 10

Failing to accomplish optimal adjustment of the *Picture Noise Level* will result in either:

- A large number of false alarms, or
- Lack of alarm condition when the video is frozen

The *Picture Noise Level* and *Picture Freeze Duration* controls have been designed to detect short-term "digital" freezes such as MPEG or motion JPEG server artifacts. When these devices have significant problems with the content that they are de-compressing, they will typically start to produce a "blocky" effect. If the problem is severe enough, they will freeze a frame of video and play it out for a number of frames. When the *Picture Noise Level* is set to 1 (i.e., only detect exact, or nearly exact pictures) and the *Picture Freeze Duration* is set to *minimum*, the unit can detect quick "digital freezes". However, you cannot detect both this type of freeze and a freeze from a link that has added noise to the picture.

6.11.3. Video Error Duration

The ***Video Error Duration*** control sets the duration, in number of frames, of video errors that is considered a fault. This is used to determine when there is a video loss. The value range is 0 to 900 frames in increments of 1.

6.11.4. Detecting Audio Over Level Faults

The *Over Level* and *Over Duration* controls are used to detect when audio amplitude is close to a dangerous level (i.e., clipping a downstream device or saturating the digital word length). The *Over Level* control sets the audio level over which there is considered to be a fault. The audio must be over this level for the duration set by the *Over Duration* control before the fault condition exists. A fault will be generated when any channel has generated an over condition.

6.11.4.1. Audio Over Level

The ***Over Level*** control sets the audio level over which there is considered to be over level. This value is expressed in dB full scale (FS) and can even be used to detect digital clipping. If set to 0 dB FS, then if 3 or more consecutive samples (set with the *Over Duration* control) are at digital saturation (max or min), then the digital word length has been exceeded. The value range is -30.00 to 0.00 dB in increments of 0.25 dB.

6.11.4.2. Audio Over Duration

The ***Over Duration*** control sets the duration, in number of consecutive samples that are at or above the *Audio Over level* before a fault condition exists. The value range is 3 to 255 samples in one-sample increments.

Note that as longer durations are configured, you are eliminating the detection of higher frequency content over the set *Over level*.

6.11.5. Detecting Audio Silence Faults

The *Silence Level* and *Silence Duration* controls are used to detect when the audio is considered silent. The *Silence Level* control sets the audio level under which the audio is considered to be silent. The audio must be under the *Silence Level* for the duration set by the *Silence Duration* control before the fault condition exists. When the fault condition exists, the audio must be over the *Silence Level* for one second before the fault condition will be removed.

6.11.5.1. Audio Silence Level

The ***Silence Level*** control sets the audio level under which it is considered to be silent. This value is expressed in dB full scale (FS). The value range is -80.00 to -45.00 dB in 0.25 dB increments.

6.11.5.2. Audio Silence Duration

The ***Silence Duration*** control sets the length of audio silence, in seconds, before a fault occurs. The value range is 0.5 to 127.0 seconds in 0.5 second increments.

6.11.6. Detecting Video Level Problems

The active video picture is analyzed for content that is whiter than it should be and/or blacker than it should be. Faults can be configured to fire when these conditions exist.

The active video picture is also analyzed for content that does indeed vary between low levels (near black) and gray levels (below white). If the video does not reach near black or does not go towards white for some defined period, the video content and/or upstream processing may be in error. Faults can be configured to capture these conditions.

6.11.6.1. Black Threshold

The ***Black Threshold*** control sets the amplitude, in decimal video numbers, of active picture content below which is considered too black. The value range is 4 to 127 in increments of 1.

0 IRE = 64

-2.5 IRE = 42

-6.8 IRE = 4

The center section of active picture of a field of video is analyzed and a total number of samples below this level is calculated. A fault is generated when the video level is below this level for at least a specific number of samples defined by the *Error Quantity* control.

6.11.6.2. White Threshold

The ***White Threshold*** control sets the amplitude, in decimal video numbers, of active picture content above which is considered too white. The value range is 896 to 1019 in increments of 1.

109 % = 1019

102.5 % = 962

100 % = 940

95 % = 896

The center section of active picture of a field of video is analyzed and a total number of samples above this level is calculated. A fault is generated when the video level is above this level for at least a specific number of samples defined by the *Error Quantity* control.

6.11.6.3. Error Quantity

The ***Error Quantity*** control sets the quantity, in percentage, of active picture content too white (over) or too black (under) which is considered an error. The center section of active picture of a field of video is analyzed and a total number of samples in error is calculated. A fault is generated when the error quantity is above this level. The following options are available: Any, 0.01%, 0.1%, 1%, 10% and 20%. A selection of *Any* will cause a fault if any video sample is over/under the set threshold.

6.11.6.4. Black Warning Level

The ***Black Warning Level*** control sets the amplitude, in decimal video numbers, of active picture content below which is considered to be a normal black level that is present on all input video sources. The value range is 128 to 399 in increments of 1.

7.3 IRE = 128

15 IRE = 195

The center section of active picture of a field of video is analyzed and a total number of samples below this level is calculated. A Fault is generated when the video level is NOT below this level for at least a specific number of samples (*Error Quantity*) and for a duration (*Black/White Warning Duration*).

6.11.6.5. White Warning Level

The ***White Warning Level*** control sets the amplitude, in decimal video numbers, of active picture content above which is considered to be a normal white level that is present on all input video sources. The value range is 400 to 895 in increments of 1.

50 % = 502

60 % = 525

95 % = 896

The center section of active picture of a field of video is analyzed and a total number of samples above this level is calculated. A Fault is generated when the video level is NOT above this level for at least a specific number of samples (*Error Quantity*) and for a duration (*Black/White Warning Duration*).

6.11.6.6. Black/White Warning Duration

The ***Black/White Warning Duration*** control sets the duration, in seconds, to wait when the video is constantly above the *Black Warning Level* or below the *White Warning Level* before generating a fault condition. The value range is 1 to 127 seconds in increments of 1 second.

Note, this duration does not apply to the *Black level error* or *White level error* conditions.

6.12. VIDEO FAULTS

The *Video Fault Traps* tab enables the user to set video traps and monitor the video trap status as illustrated in Figure 6-21. To enable a particular trap, simply click the box located beside each trap so that a checkmark appears. When a checkmark is present, the trap is enabled. When a checkmark is not present, the trap is disabled.

The *Trap Status* section defines whether a trap is a normal condition or a fault condition. Green indicates a normal condition and red indicates a fault condition.

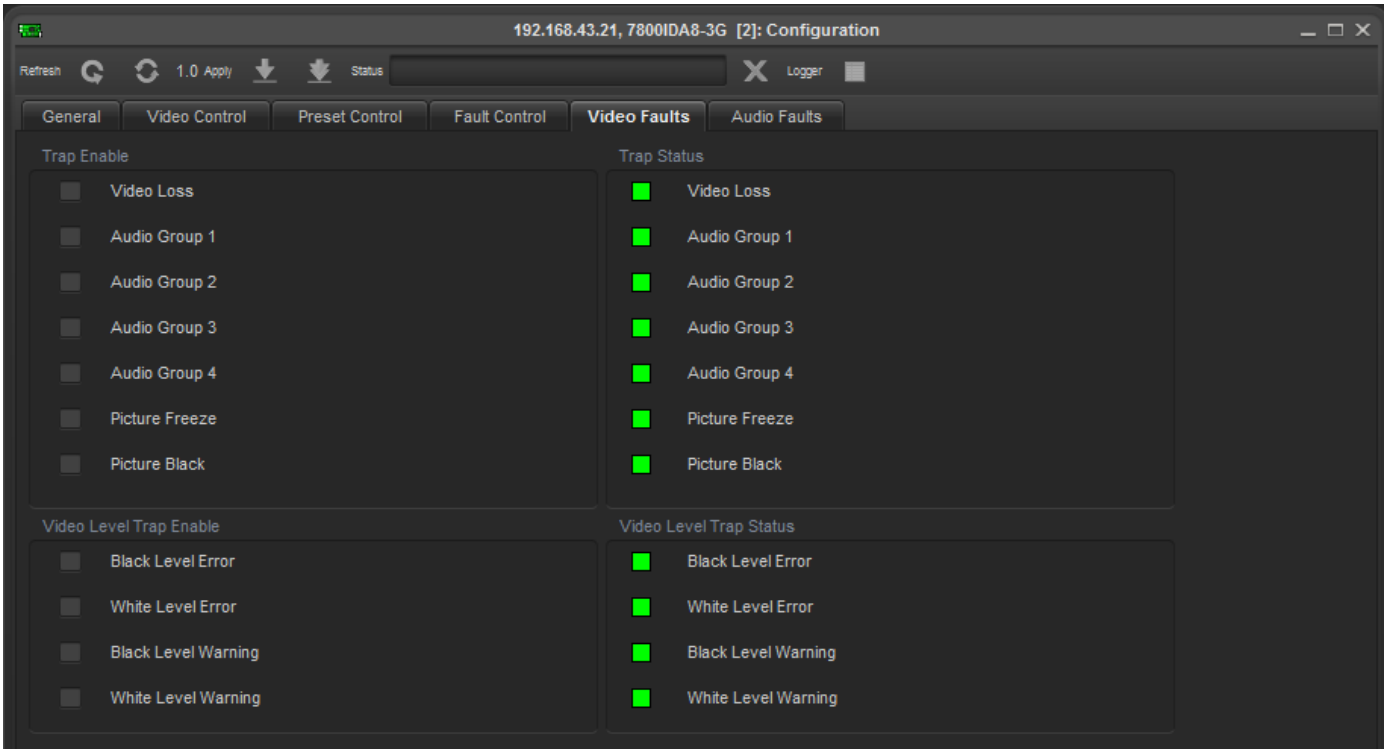

Figure 6-21: Video Faults Tab

6.13. AUDIO FAULTS

The *Audio Fault Traps* tabs enable the user to set audio traps and monitor audio trap statuses as illustrated in Figure 6-22. An alarm will be sent to the user if any of the traps (user enabled) are triggered. These parameters are applicable to both *Audio Fault Traps – Input 1* and *Audio Fault Traps – Input 2.* For the sake of brevity, only *Audio Fault Traps – Input 1* will be discussed in the manual. To enable a particular trap, simply click the box located beside each trap so that a checkmark appears. When a checkmark is present, the trap is enabled. When a checkmark is not present, the trap is disabled. The *Trap Status* section defines whether a trap is a normal condition or a fault condition. Green indicates a normal condition and red indicates a fault condition.

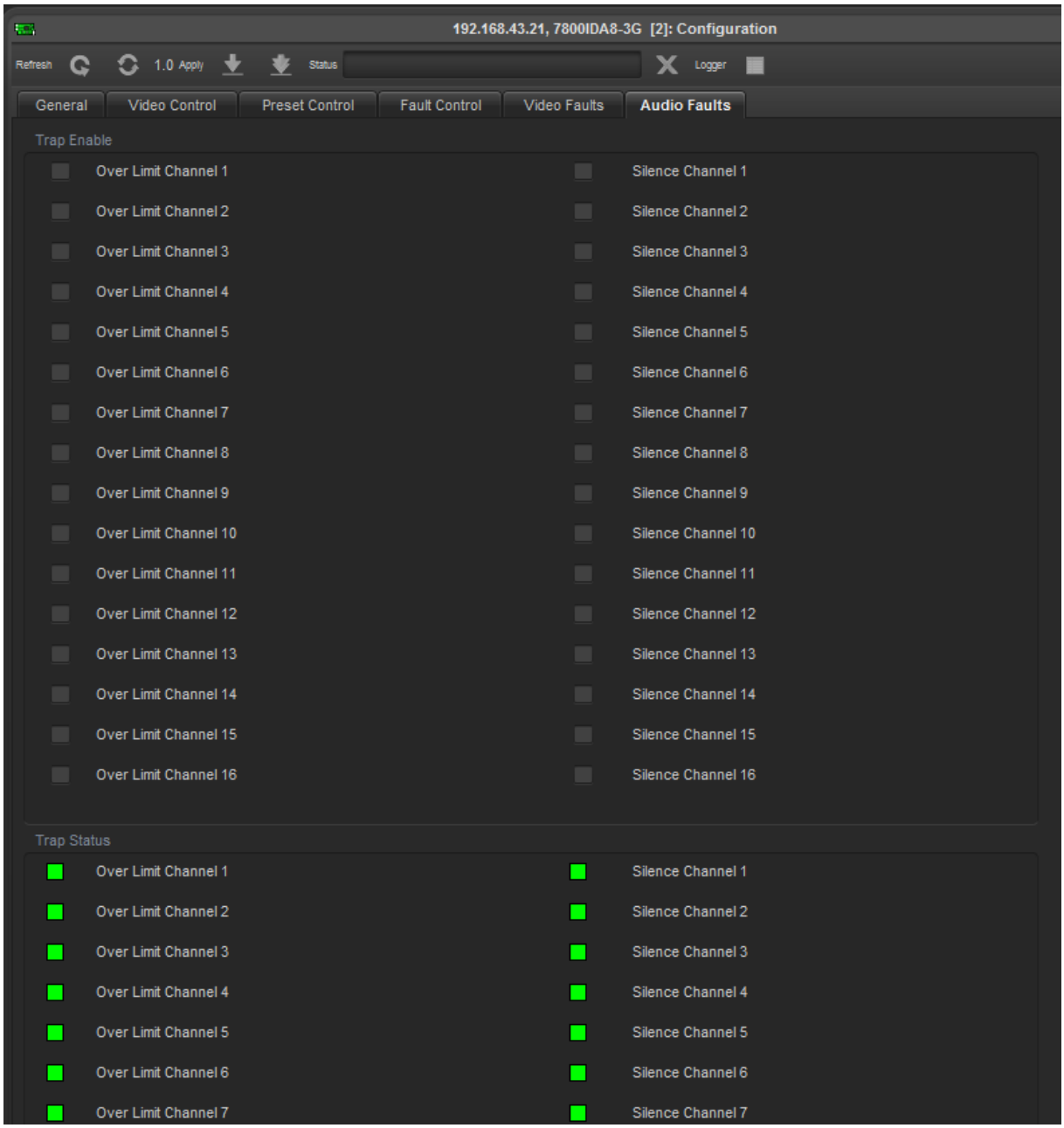

Figure 6-22: Audio Faults Tab

7. JUMPERS AND USER ADJUSTMENTS

Figure 7-1: LED and Jumper Locations

7.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper J3, located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700/7800 series frame's global status bus.

FRAME STATUS: To monitor faults on this module with the frame status indicators (on the power supply's FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position.

When this jumper is installed in the Off position local faults on this module will not be monitored.

7.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J5 located at the front of the module near the card ejector, is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section 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 J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J6. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section in the front of the binder. Once the upgrade is complete, remove the module from the frame, move J5 to the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

End of Document