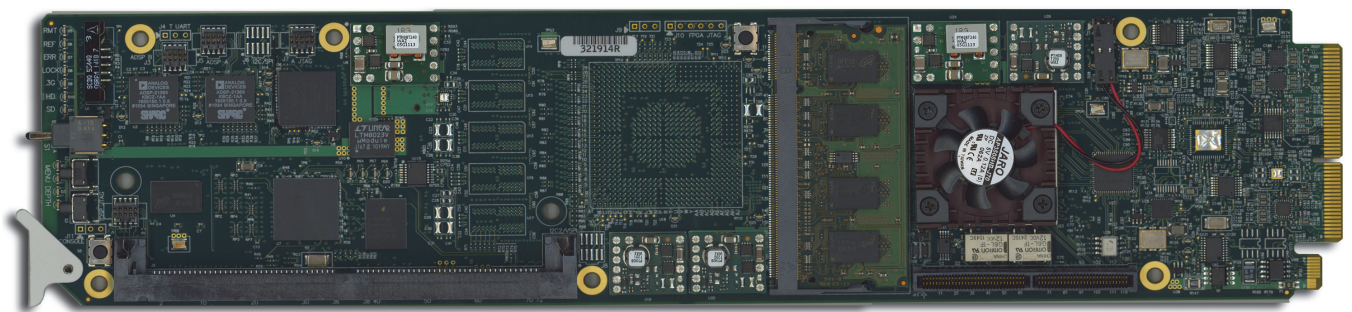


LDP-8242

Multi-Definition Loudness Processor User Manual



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9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

LDP-8242 User Manual

- Ross Part Number: 8242DR-004-06
- Release Date: July 10, 2017.

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Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

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Before using this product and any associated equipment, refer to the “**Important Safety Instructions**” listed below to avoid personnel injury and to prevent product damage.

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Warning — The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



Caution — The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Notice — The symbol with the word “**Notice**” within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.



ESD Susceptibility — This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions



Caution — This product is intended to be a component product of the DFR-8300 and OG3-FR series frame. Refer to the DFR-8300 and OG3- FR Series Frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.



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Cet appareil numérique de la classe “A” est conforme a la norme NMB-003 du Canada.

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This equipment is in compliance with the essential requirements and other relevant provisions of CE Directive 93/68/EEC.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002**, and found to comply with the limits for a Class A Digital device.



Notice — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

Maintenance/User Serviceable Parts

Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All openGear products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. See the “Warranty and Repair Policy” section in this manual for details.

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The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed out wheelie bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performance of our products.

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Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Manual Overview
- Functional Block Diagram
- Video Subsystem Overview
- Audio Subsection Overview
- Control and Data Input/Output Interfaces
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on choosing an openGear LDP-8242 Multi-Definition Loudness Processor. Thank you for joining the group of worldwide satisfied Ross Video customers!

Should you have a question pertaining to the installation or operation of your LDP-8242, please contact us at the numbers listed on the back cover of this manual. Our technical support staff is always available for consultation, training, or service.

Overview

The LDP-8242 is ideal for correcting irritating loudness differences between programs and commercials. Featuring 24-bit audio processing that supports 16 channels of embedded audio from an HD/SD-SDI signal.

With Linear Acoustic AEROMAX™ technology, the card applies loudness control on up to six channels of audio from any of the 16 channels of embedded audio. Linear Acoustic AEROMAX™ algorithms use a sophisticated multi-band approach to loudness processing. These algorithms can apply multifaceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible. Because the card processes audio loudness locally and in sync with the video, loudness is processed without the accumulated latency delay found in other loudness processors.

An optional discrete AES option provides 16 channels of discrete audio support, with 8 AES pair BNCs, which can be configured as inputs or outputs. The AES-8242 option provides discrete audio loudness processing as well as 16 channel embedding / de-embedding.

Optional Linear Acoustic UPMAX upmixing technology allows legacy stereo program audio to be converted to 5.1 channel audio, with the UMA-8242 option.

Features

The LDP-8242 includes the following features:

- Loudness Processing with Linear Acoustic AEROMAX™ algorithm
- Actively and automatically corrects irritating loudness level changes
- Automatic video delay to match audio processing delay
- Loudness control for stereo or 5.1 audio
- Sophisticated multi-band processing
- Audio channel mapping, phase inversion and level control
- 16 channels of sample rate conversion
- Passes all audio channels
- 16 channel embedding and de-embedding
- Passive relay bypass for SDI coax input/output path
- Handles all popular formats of SD (270Mbps) and HD (1.485Gbps) signals
- Reports status and configuration remotely via the DashBoard Control System
- 5-year transferable warranty

Video/Audio Signal Types

Table 1.1 lists the video/audio inputs and outputs provided by the LDP-8242. Note that some signal types are supported through the use of options.

Table 1.1 Video/Audio Signal Types

Signal ID	Description	Option/Rear Module Package Required
SDI IN A	HD-SD-SDI BNC video input	Standard
AES Audio IN/OUT (1-16)	Eight AES 3-id BNC pairs; each pair user GUI-selectable as either input or output. Independent SRC for each input, with auto/manual SRC bypass for non-PCM data.	AES-8242 licensed option
SDI OUT A	HD-SD-SDI BNC video output	Standard
Note: The input/output complement listed above and shown in Figure 1.1 and Figure 1.3 represent the maximum capability of the LDP-8242.		

Video and Audio Options

In addition to the I/O options described in **Table 1.1**, the LDP-8242 offers the video and audio options described in **Table 1.2**.

Table 1.2 Video/Audio Options

Option	Description	Option/Rear Module Package Required
Added second Linear Acoustic™ Loudness Processing function	In addition to base loudness processor, a second Linear Acoustic™ AEROMAX™ 5.1-channel or stereo audio output loudness processing can be added.	Standard
Linear Acoustic™ Upmixing software	Linear Acoustic™ AUTOMAX™ converts legacy stereo program audio (from any source received by the card) to 5.1-channel audio).	UMA-8242 licensed option

Control and Data Inputs/Outputs

Table 1.3 lists the control and data input/output interfaces (available via the rear module connections) provided by the LDP-8242.

Table 1.3 Control and Data Input/Output Interfaces

Signal ID	Description
GPI 1, 2	Two ground-closure sensing GPI inputs (each sharing common ground connection at chassis potential). GPI activation invokes a user-specified card control preset. Refer to the section “ Control and Data Input/Output Interfaces ” on page 1-15 for information.
COMM 1, 2	Two serial Rx/Tx ports, each individually configurable as RS-485 or RS-232. Refer to the section “ Control and Data Input/Output Interfaces ” on page 1-15 for information.

Supported Audio and Video Formats

Table 1.4 provides details regarding the audio and video formats supported by the LDP-8242.

Table 1.4 Supported Audio and Video Formats

Item	Description/Specification	
Input / Output Video	Raster Structure:	Frame Rate:
	1080i ^a	25; 29.97
	720p	50; 59.94
	486i ^a	29.97
	575i ^a	25
Embedded Audio	The LDP-8242 supports all four groups (16 channels) of embedded audio at full 24-bit resolution in both SD (with extended data packets) and HD.	
Discrete AES Audio	The AES-8242 licensed option enables the LDP-8242 to accept 16 channels (8 pairs) of discrete AES audio on 75W BNC connections (maximum total of inputs and outputs). Sample rate conversion can be employed to accommodate sample rate differences in the AES stream and the input video stream.	

- a. All rates displayed as frame rates; interlaced (“i”) field rates are two times the rate value shown.

Manual Overview

This manual provides installation and operating instructions for the LDP-8242.

Card Software Versions and this Manual

When applicable, Ross Video provides for continual openGear product enhancements through software updates. As such, functions described in this manual may pertain specifically to cards loaded with a particular software build. If you received your LDP-8242 card and this manual at the same time, this manual reflects all facets of your card.

The software version of your card can be checked by viewing the **Info** sub-menu on the card-edge display, or by checking the **Card Info** menu in DashBoard. Refer to the section “**Checking Card Information**” on page 5-3 for more information. This section provides guidance when your card software does not match this manual.

Card software is an earlier version

Card is not loaded with the latest software. Not all functions and/or specified performance described in this manual may be available.

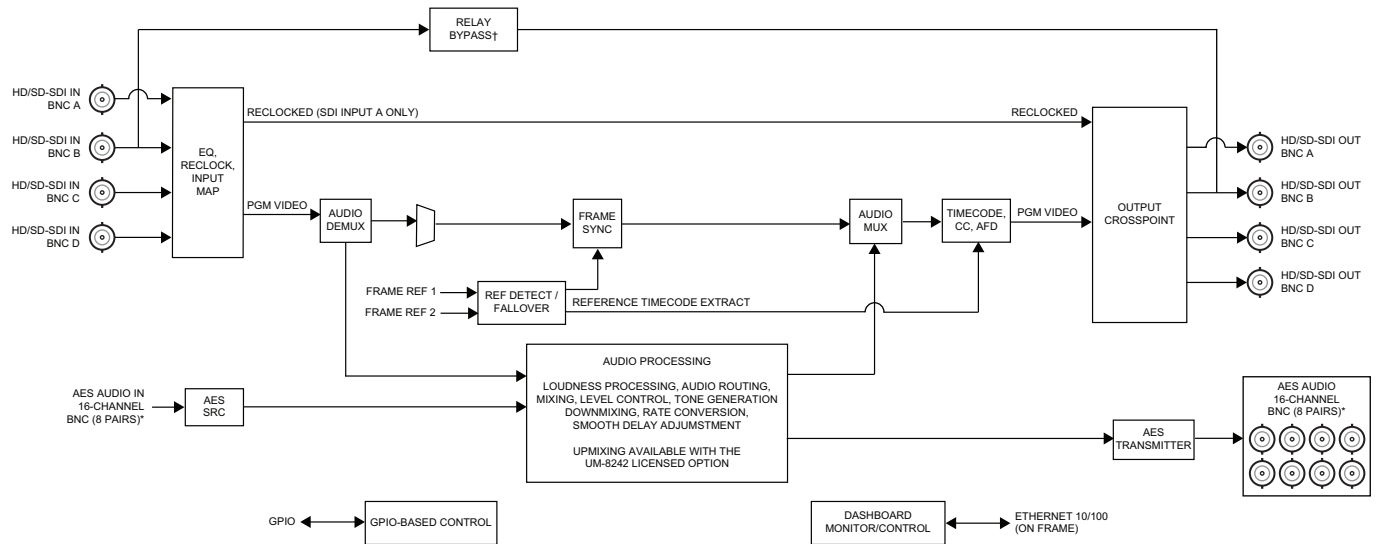
You can update your card by:

1. Contacting Ross Technical Support.
2. Downloading the latest firmware and/or software for your card onto your computer.
3. Uploading the new firmware and/or software to your card through DashBoard.

Functional Block Diagram

The base model LDP-8242 provides Linear Acoustic™ loudness processing with frame sync, video processing, embedded audio support, and timecode support. (**Figure 1.1**) The various options are described in detail in the section “**Video and Audio Options**” on page 1-3, and as applicable throughout this manual.

This section provides a functional block diagram that outlines the workflow of the LDP-8242. Note that signal connections shown depicts full input/output capability. Practical input/output signal availability is determined by the licensed features installed.



*Available with the AES-8242 licensed option.

¹ Bypass relay fully passive failover located on the rear module. Card presence not required for passive failover connection. Relay bypass is available only between the SDI IN B and SDI OUT B ports.

Figure 1.1 Simplified Block Diagram — LDP-8242

Video Subsystem Overview

Descriptions below include some functions and features that are available only as options.

The LDP-8242 features a frame sync that can select from either of two card frame reference sources, input video, or free-run (internal clock) video sync. In the event of input video loss of signal, the output can be set to disable video, go to black, go to an internal test signal generator pattern, or freeze to the last intact frame (last frame having valid SAV and EAV codes).

Video Processor

The LDP-8242 provides full color processing control (luma gain and lift, chroma saturation, and color phase) of the output video. The color correction function can be user-selected to be applied to input video or output video as shown in **Figure 1.3**.

Frame Sync Function

This function provides for frame sync control using either one of two external **FRAME REF IN (1,2)** reference signals distributed with the openGear frame, or the input video as a frame sync reference.

This function also allows horizontal and/or vertical offset to be added between the output video and the frame sync reference.

Frame sync can select from either of two card frame reference sources, or free-run input video sync. Selectable failover allows alternate reference selection should the initial reference source become unavailable or invalid. In the even of input video loss of signal, the output can be set to disable video, go to black, go to an internal test signal generator pattern, or freeze to the last intact frame (last frame having valid SAV and EAV codes).

An internal test signal generator provides a selection of 10 standard patterns such as color bars, sweep patterns, and other technical patterns. The generator output can be invoked upon loss of program video input, or applied to the program video output via user controls.

Timecode Processor

This function uses extracted timecode data from the input video (waveform or ATC), reference VITC waveform, or internal (free run) and in turn re-inserts selected timecode data into the program video signal. (**Figure 1.2**) The function can monitor video input and reference input for supported timecode formats, and then select and prioritize among SDI VITC waveform, SDI ATC_VITC, and SDI ATC_LTC timecode sources. If the preferred format is detected, the preferred format is used by the card; if the preferred format is not detected, the card uses other formats (where available) as desired.

The function also provides conversion between various timecode formats and provides independent insertion and line number controls for each SDI timecode output format.

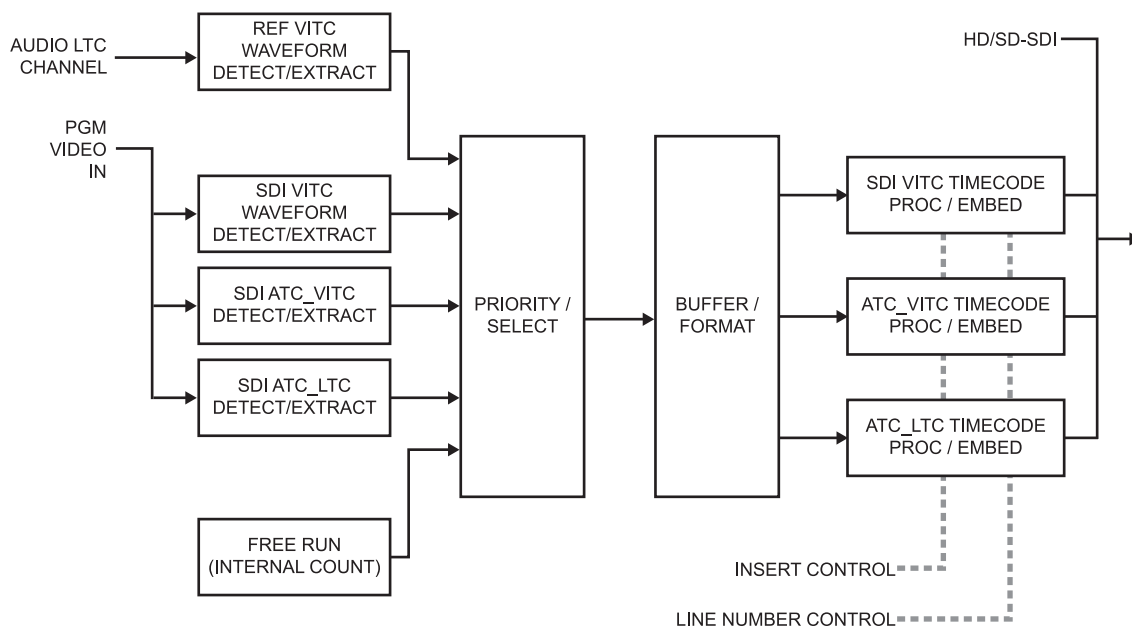


Figure 1.2 Timecode Processor

Closed Captioning Processor

This function provides support for closed captioning setup. When enabled, the function allows passage of timecode data. The function also allows the selection of the ancillary data line number where the ancillary closed caption data is outputted when the output is HD.

Audio Subsection Overview

Descriptions below include some functions and features that are available only as options.

Audio Processing Overview

The LDP-8242 audio processing subsection is built around a card internal 16-channel bus. This 16-channel bus receives inputs from an input routing crosspoint that routes de-embedded and discrete AES signals over the 16-channel bus. Correspondingly, at the output end of the 16-channel bus is an output routing crosspoint that in turn distributes the 16-channel bus signals to embedded and discrete AES audio outputs.

An Input Audio Status display shows the presence and peak level of each input audio channel received by the card. For digital audio inputs, payload is identified (PCM or data such as Dolby® Digital or E), as well as sample rate for discrete AES inputs. Discrete AES inputs can have sample rate conversion applied to align these inputs with the output timing (received sample rates from 32kHz to 96kHz are supported).

An Audio DSP function (which interfaces with the output routing block) provides eight tone generators and advanced functions such as loudness processing and upmixing. The routing and Audio DSP functions are described in detail later in this section.

As such, the audio subsection provides a full crosspoint between all supported audio inputs and output formats.

The audio subsection allows choices from the following audio inputs:

- 16 channels of de-embedded audio from the SDI program video path
- Up to 16 channels (8 pairs) of discrete AES input
- Up to 10 channels of decoded Dolby® E or AC-3 audio
- Digital silence (mute) setting

The audio subsection allows routing to the following audio outputs:

- 16 channels of embedded audio on the SDI output
- Up to 16 channels of discrete AES output on eight AES pairs



Note — *Practical AES channel count handled by the card is 8 pairs, of which each pair can be user GUI-selectable as an input or output.*

All embedded and AES channels have status displays that show the following for each channel pair:

- PCM signal presence
- Dolby® E® signal presence
- Dolby® Digital® signal presence
- Missing (no signal detected)

Embedded, and AES input channel pairs also have displays showing slow-ballistics true peak levels for each pair. Embedded and AES channels at digital silence signal level show Mute.

Output audio rates are always 48 kHz locked to output video, but discrete AES inputs can pass through the sample rate converters to align these inputs with the output timing. Output AES is always precisely synchronized with the output video.

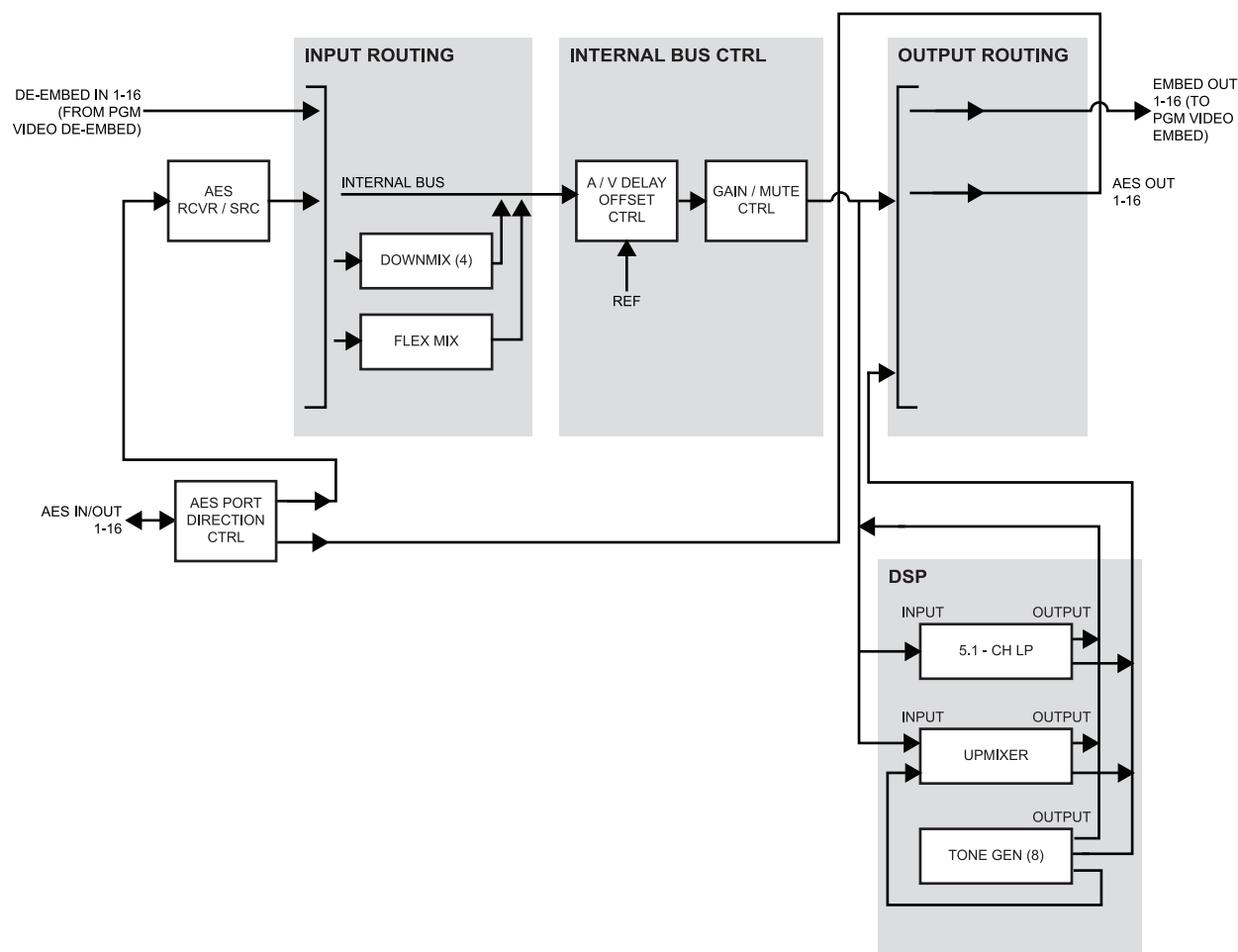


Figure 1.3 Audio Block Diagram

Audio Input Routing/Mixing Function

The input routing function provides gain and mute controls for each input signal. (**Figure 1.3**) Following these controls, selected inputs can directly exit the input routing function and be applied to the internal bus, or first be applied to one of four downmixers or flex mixers.

Downmixers

Four independent downmixers (**Downmix-A** thru **Downmix-D**) provides for the selection of any five embedded, AES discrete, Dolby® decoded, or analog audio sources serving as Left (**L**), Right (**R**), Center (**C**), Left Surround (**Ls**), and Right Surround (**Rs**) individual signals to be multiplexed into a stereo pair. The resulting stereo pairs **Downmix-A(L/R)** thru **Downmix-D(L/R)** can in turn be routed and processed just like any of the other audio sources described earlier. See **Figure 1.4** for an example.

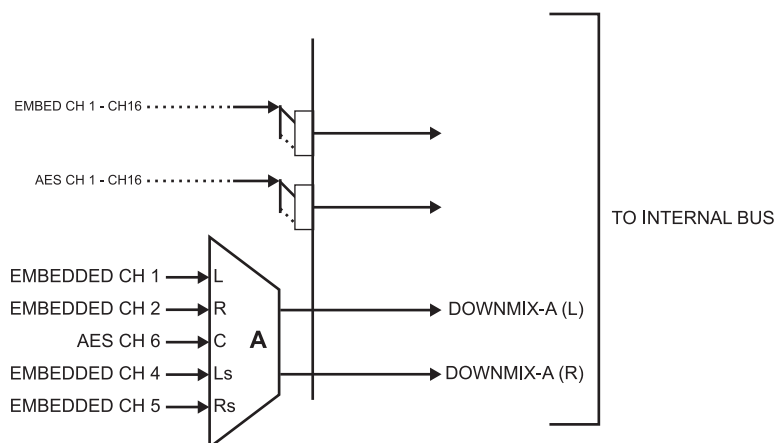


Figure 1.4 Downmixing Functional Block Diagram with Example Sources

Flex Mixer

The Flex Mixer is a flexible-structure mixer in which any of 16 summing nodes (**Flex Mix Bus A** thru **Flex Mix Bus P**) can be applied to any of the 16 inputs, thereby allowing several customizable mixing schemes. Any individual input row can be assigned to any of the Flex Mix buses.

Using this scheme, full cross-point mixing of PCM signals can be achieved within the limit of available Flex Mix buses, and eventually applied to any of the internal bus channels. **Figure 1.5** shows an example of two independent 3-to-1 mono mixers available by setting inputs (rows) 1 thru 3 to use virtual flex mix bus **Flex Mix Bus A**, and by setting inputs 4 thru 6 to use virtual flex mix bus **Flex Mix Bus B**. The **Flex Mix Bus A** and **Flex Mix Bus B** virtual outputs can then be routed over any of the internal bus channels. In this example, because rows 1 thru 3 are all applied in common to mixer node **Flex Mix Bus A**, the **Flex Mix Bus A** output is the mono-mixed sum of these inputs. The mono mix on the **Flex Mix Bus B** node similarly produces a mono mix of input rows 4 thru 6.

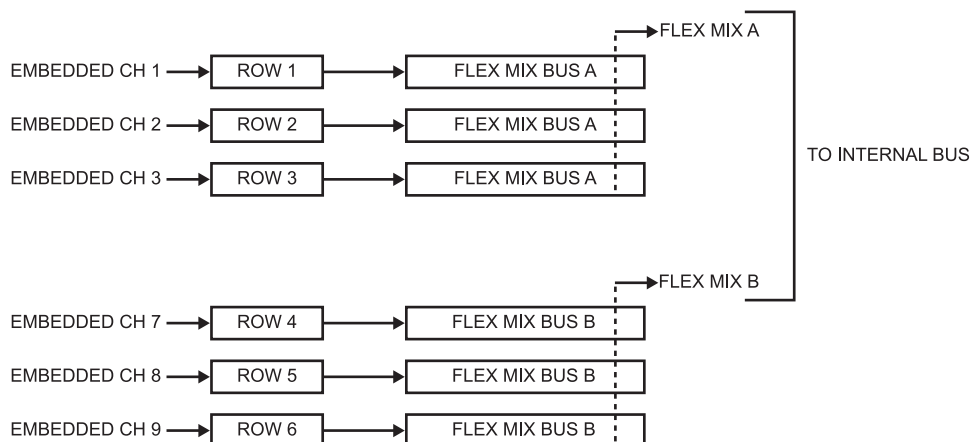


Figure 1.5 Flex Mixer with Dual Mono Mixer Example

Internal Bus

The internal bus receives its audio inputs from the input routing function and accommodates a maximum of 16 concurrent channels. This conduit serves as a centralized point for managing audio delay offset from video and master gain controls for outputs from the input routing function.

A bulk (master) video/audio delay function allows adding or reducing audio delay from the video delay. The LDP-8242 re-establishes video/audio sync following framesync changes by applying an offset in small, progressive amounts to provide a seamless, glitch-free retiming.

In addition to the master sync/delay controls, each bus channel has its own independent delay and gain control.

As shown in **Figure 1.3**, the internal bus receives inputs directly from card external sources as listed below.

- Emb Ch 1-16
- AES Ch 1-16
- Silence

Audio Output Routing Function

The output routing function provides routing to card outputs. This function can also direct internal bus signals to further mixing capabilities or advanced Audio DSP functions. This function also provides gain and mute controls for each signal.

Audio DSP functions include 5.1-channel and stereo loudness processing, and upmixing.

The Audio DSP block provides the function complement (selected via user controls) listed below. Because this block is entirely software-based, it can provide the Audio DSP combinations listed below (depending on ordered options).

- 5.1-Ch Loudness Processor
- 5.1-Ch Loudness Processor + Upmixer

Upmixer Licensed Feature (UMA-8242)

The 2.0-to-5.1 Upmixer function receives a normal PCM stereo pair from any internal bus channel pair. The stereo pair is upmixed to provide 5.1 channels (Left (**L**), Right (**R**), Center (**C**), Low Frequency Effects (**LFE**), Left Surround (**Ls**), and Right Surround (**Rs**)). Whenever the upmixer is active, it overwrites the six selected 5.1 output channels with the new 5.1 upmix signals (including replacing the original source stereo **L** and **R** inputs with new **L** and **R** signals).

The 2.0-to-5.1 upmixer can be set to upmix in any of three modes: Always upmix, Bypass upmix, or Auto enable/bypass upmixing. The Auto upmixing mode looks at the signal levels on the selected channels and compares them to a selectable level threshold. It then determines whether or not to generate 5.1 upmixing from the stereo pair as follows:

- If the upmixer detects signal level below a selected threshold on all three of the selected channels designated as **C**, **Ls**, and **Rs**, this indicates to the upmixer that these channels are not carrying 5.1. In this case, the upmixer produces new 5.1 content generated by the upmixer.
- If the upmixer detects signal level above a selected threshold on any of the three selected channels designated as **C**, **Ls**, and **Rs**, this indicates to the upmixer that the channel(s) are already carrying viable 5.1 content. In this case, the upmixer is bypassed and the channels fed to the upmixer pass unaffected to the upmixer outputs.

The examples in **Figure 1.6** and **Figure 1.7** show the automatic enable/disable upmixing function applied to example selected channels **Bus Ch 1** thru **Bus Ch 6**. As shown and described, the processing is contingent upon the signal levels of the channels selected to carry the new 5.1 upmix relative to the selected threshold (in this example, -60 dBFS).

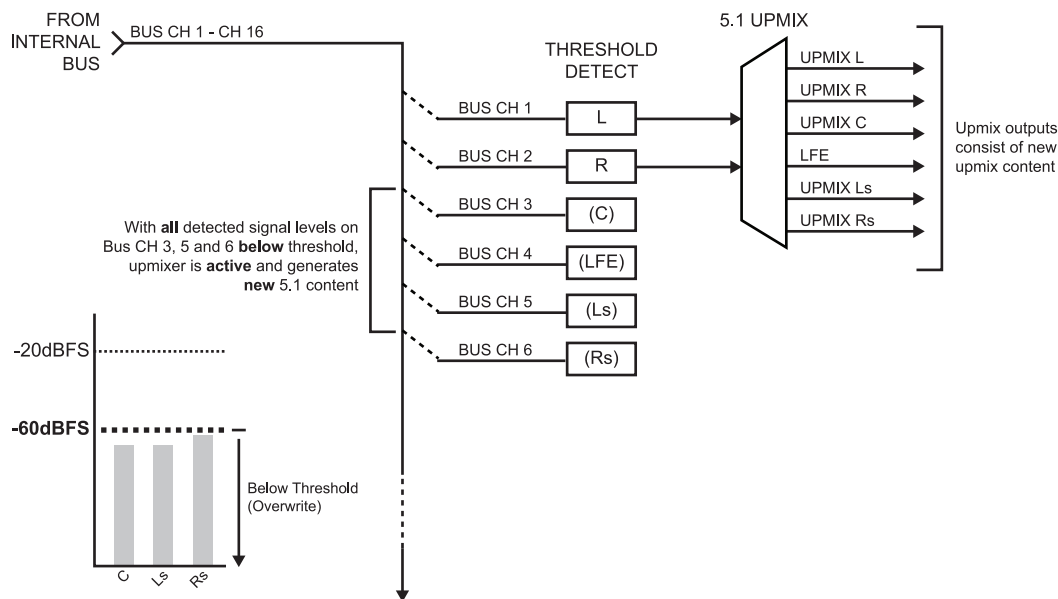


Figure 1.6 Upmixing Auto Enable with Example Sources

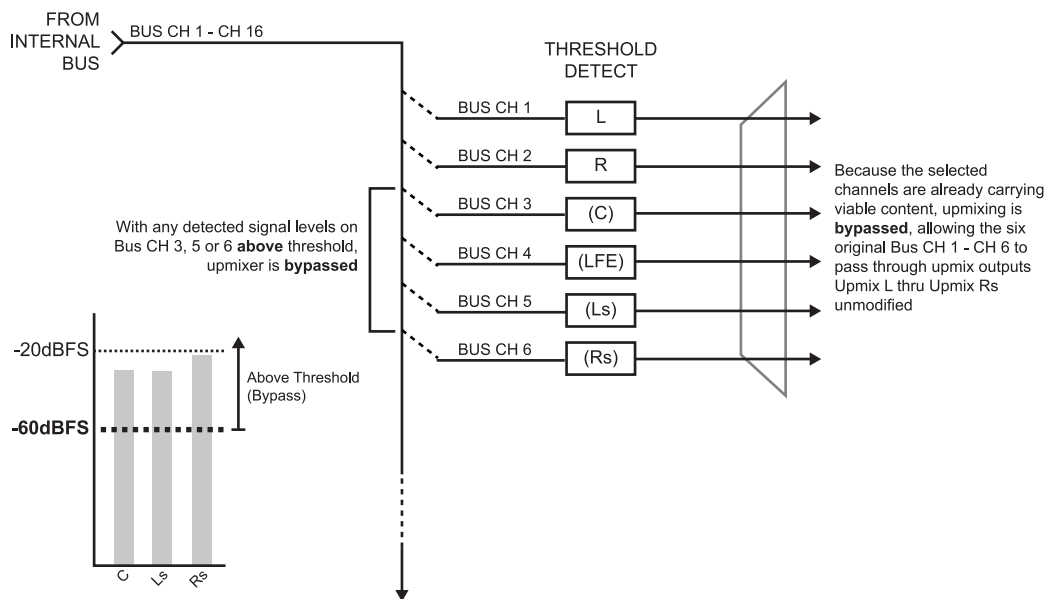


Figure 1.7 Upmixing Auto Enable Bypass with Example Sources

Loudness Processor

The loudness processor function receives up to six selected channels from the internal bus and performs loudness processing on the selected channels. A loudness processing profile best suited for the program material can be selected from several loudness processing presets. See **Figure 1.8** for an example.

Discussion and example here describes 5.1-channel loudness processor. Stereo and dual-stereo processors operate similar to described here.

The example in **Figure 1.8** shows routing of embedded output channels Emb Out Ch 1 thru Ch 6 fed through the loudness processor. A master output gain control is provided which allows fine adjustment of the overall output level.

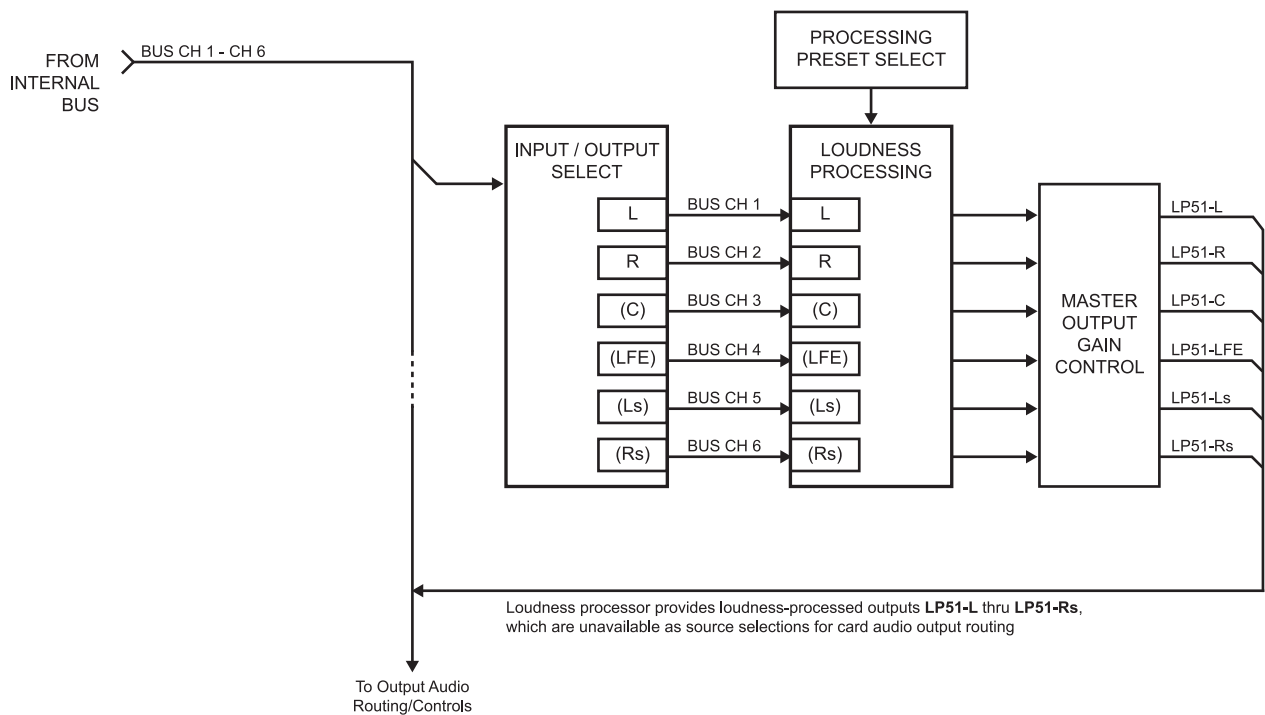


Figure 1.8 5.1-Channel Loudness Processor with Example Sources

Tone Generators

The LDP-8242 contains eight built-in tone generators (Tone Generator 1 thru Tone Generator 8). Each of the eight tone generators can be routed to the upmixer or directly to card audio outputs. (default output is 1.0kHz at -20dBFS).

Control and Data Input/Output Interfaces

This section briefly summarizes the communication types available for the LDP-8242.

Rear Modules

The LDP-8242 physically interfaces to system video and audio connections using the **R2-8242** Rear Module.

All inputs and outputs shown in the video and audio block diagrams (**Figure 1.1** and **Figure 1.3** respectively) enter and exit the card via the card-edge backplane connector. The Rear Module breaks out the LDP-8242 card-edge connections to industry standard connections that interface with other components and systems in the signal chain.

The rear module cabling is outlined in the section “**Installing a Rear Module**” on page 2-3.

GPI Interface

Two independent ground-closure sensing GPI inputs (**GPI 1** and **GPI 2**; each sharing common ground connection as chassis potential) are available. Associated with each GPI user control is a selection of one of 64 user-defined card presets in which GPI activation invokes a card control preset. Because the GPI closure invokes a user-defined preset, the resulting setup is highly flexible and totally user-defined. Invoking a user preset to effect a change involves card setup communication limited only to the items being changed; the card remains on-line during the setup, and the called preset is rapidly applied.

GPI triggering can be user selected to consider the activity on discrete GPI ports, or combinations of logic states considering both GPI inputs. This flexibility allows multistage, progressive actions to be invoked if desired. Indication is provided showing whenever a GPI input has been invoked.

Serial (COMM) Ports

The LDP-8242 is equipped with two, 3-wire serial ports (**COMM 1 - Serial Port A**, **COMM 2 - Serial Port B**) which are used for Dolby® metadata Rx and Tx. Each port can independently be GUI-configured as RS-232 or RS-485.

Documentation Terms and Conventions

In this manual, display messages and connectors are shown using the exact name shown on the LDP-8242 itself. Examples are provided below.

- Card-edge display messages are shown like this:

Ch01

- Connector names are shown like this: **AES I/O 8**

In this manual, the terms below are applicable as follows:

- All references to the **openGear frame** also includes all versions of the 20-slot frames and any available options unless otherwise noted.
- “**Board**” and “**Card**” refer to openGear terminal devices within openGear frames, including all components and switches.
- “**System**” and “**Video System**” refers to the mix of interconnected production and terminal equipment in your environment.
- The “**Operating Tip**” and “**Note**” boxes are used throughout this manual to provide additional user information.

Warnings, Cautions, and Notes

Certain items in this manual are highlighted by special messages. The definitions are provided below.

Warnings

Warning messages indicate a possible hazard which, if not avoided, could result in personal injury or death.

Cautions

Caution messages indicate a problem or incorrect practice which, if not avoided, could result in improper operation or damage to the product.

Notes

Notes provide supplemental information to the accompanying text. Notes typically precede the text to which they apply.

Installation

In This Chapter

This chapter provides instructions for installing the LDP-8242, installing the card into the frame, and cabling details.

This chapter contains the following information:

- Before You Begin
- Installing a Rear Module
- Installing a Card
- Cabling for the LDP-8242
- Setting up Network Remote Control

Before You Begin

Before proceeding with the instructions in this chapter, ensure that your openGear frame is properly installed according to the instructions in its manual.

Static Discharge

Throughout this chapter, please heed the following cautionary note:



ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

This card contains semiconductor devices which are susceptible to serious damage from Electrostatic Discharge (ESD). ESD damage may not be immediately apparent and can affect the long-term reliability of the device.

Unpacking

Unpack each card you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Installing a Rear Module

This procedure is applicable only if the **R2-8242** rear module is not currently installed in the slot where the LDP-8242 is to be installed. Cabling details are described in the section “**Cabling for the LDP-8242**” on page 2-5.

Installing a Rear Module

Use the following procedure to install a rear module in an openGear frame:

1. Locate the card frame slots on the rear of the openGear frame.
2. Remove the Blank Plate from the slot you have chosen for the LDP-8242 installation. If there is no Blank Plate installed, proceed to the next step.
3. Install the bottom of the rear module in the **Module Seating Slot** at the base of the frame's back plane. (**Figure 2.1**)

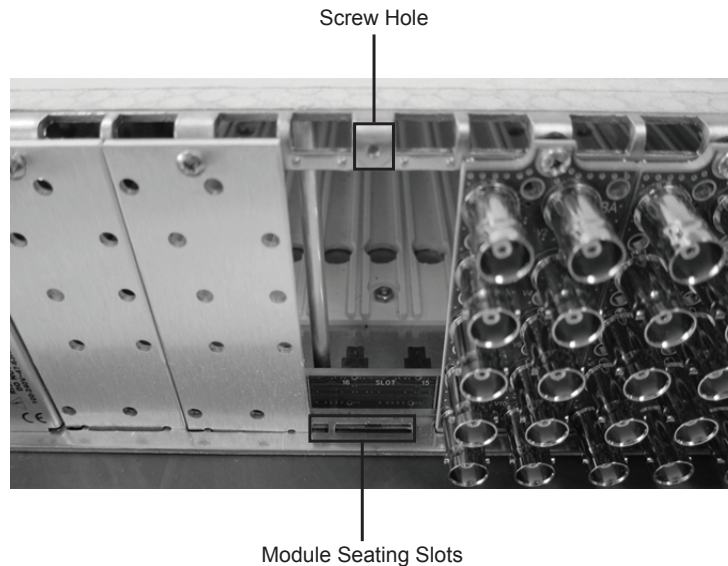


Figure 2.1 Rear Module Installation (LDP-8242 not shown)

4. Align the top hole of the rear module with the screw on the top-edge of the frame back plane.
5. Using a Phillips screwdriver and the supplied screw, fasten the rear module to the back plane of the frame. Do not over tighten.
6. Ensure proper frame cooling and ventilation by having all rear frame slots covered with rear modules or Blank Plates.

Installing a Card

This section outlines how to install the LDP-8242 when the Rear Module is already installed in a openGear frame. If you are installing the LDP-8242 card in a slot with no rear module, a rear module is required before cabling can be connected. Refer to the section “**Installing a Rear Module**” on page 2-3 for rear module installation procedure.



Caution — *If required, make certain the rear module(s) is installed before installing the LDP-8242 card into the frame slot. Damage to card and/or rear module can occur if module installation is attempted with card already installed in the slot.*

Installing the LDP-8242

Use the following procedure to install the LDP-8242 card into a frame slot:

1. Check the packaging in which the card was shipped for any extra items such as a rear module label. In some cases, this label is shipped with the card and should be installed on the rear I/O connector bank corresponding to the slot location of the card.
2. Determine the slot in which the card is to be installed.



Notice — *Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up.*

3. Open the frame front access panel.
4. While holding the card by the card-edges, align the card such that the plastic ejector tab is on the bottom.
5. Align the card with the top and bottom guides of the slot in which the card is being installed.
6. Gradually slide the card into the slot. When resistance is noticed, gently continue pushing the card until its rear printed circuit edge terminals engage fully into the rear module mating connector.



Caution — *If the card resists fully engaging in rear module mating connector, check for alignment and proper insertion in slot tracks. Damage to card and/or rear module may occur if improper card insertion is attempted.*

7. Verify that the card is fully engaged in rear module mating connector.
8. Close the frame front access panel.
9. Connect the input and output cables as outlined in the section “**Cabling for the LDP-8242**” on page 2-5.
10. Repeat steps 1 through 9 for other cards.



Operating Tip — *To remove a card, press down on the ejector tab to unseat the card from the rear I/O module mating connector. Evenly draw the card from its slot.*

This completes the procedure for installing a card in a openGear frame. Note that some Rear Modules and labels have several ventilation holes. To allow maximum ventilation, it is recommended to place the label fully over connectors such that label is flush with rear module and holes are not obscured.

Cabling for the LDP-8242

Figure 2.2 shows and describes the **R2-8242** Rear Module specifically for use with the LDP-8242. Note that the LDP-8242 BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC inputs or outputs.

Cabling Overview

This section provides a general overview of the connections available on the **R2-8242** Rear Module.

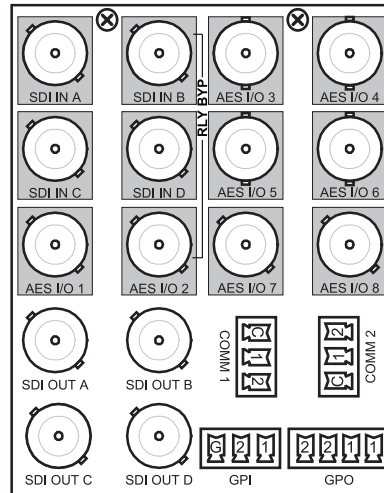


Figure 2.2 Cable Connections for the R2-8242 Rear Module

R2-8242 Full Rear Module

Each rear module occupies four slots and provides the following connections:

- One HD/SD-SDI video input BNC (**SDI IN A**)
- Eight AES I/O BNC (AES-3id) input/outputs (**AES I/O 1** thru **AES I/O 8**; I/O function of each connection is software-configurable)
- Two opto-isolated GPI inputs (terminals **GPI 1-G** and **GPI 2-G**)
- Two serial ports (**COMM1** and **COMM2**), software-configurable as RS-485 or RS-232
- One HD/SD-SDI video output BNC (**SDI OUT A**)

External Reference Signals

External frame sync reference signals are received by the LDP-8242 over a reference bus on the openGear frame, and not on any card rear module connectors. The frame has BNC connectors labeled **REF 1** and **REF 2** which receive the reference signal from an external source such as a house distribution.

COMM Port Connections

Connect external interfaces to either the **COMM 1** (Serial A) and/or **COMM 2** (Serial B) connectors as shown in **Figure 2.3**.



Note — RS-485 communication will not work if any of the connections are reversed from that shown here.

It is preferable to wire connections to Phoenix Contact™ plugs oriented as shown here rather than assessing polarity on rear module connectors. Note that the orientation of rear module connectors is not necessarily consistent within a rear module, or between different rear modules. If wiring is first connected to the Phoenix Contact™ plug oriented as shown here, the electrical orientation will be correct regardless of rear module connector orientation.

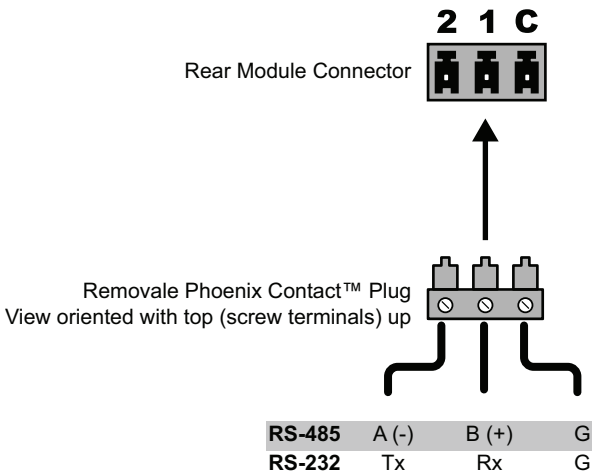


Figure 2.3 COMM Connections for RS-485 and RS-232 Protocols

GPI Port Connections

Each GPI input (**GPI 1**, **GPI 2**) consists of an opto-isolator in which a forward-biased LED activates upon an applied resistance $\leq 10\text{ k}\Omega$. (or when pulled low from an external logic source at an applied voltage $\leq 2.0\text{ VDC}$). (**Figure 2.4**)

It is preferable to wire connections to Phoenix Contact™ plugs oriented as shown here rather than assessing connections on rear module connectors. Note that the orientation of rear module connectors is not necessarily consistent within a rear module, or between different rear modules. If wiring is first connected to the Phoenix plug oriented as shown here, the electrical orientation will be correct regardless of rear module connector orientation.

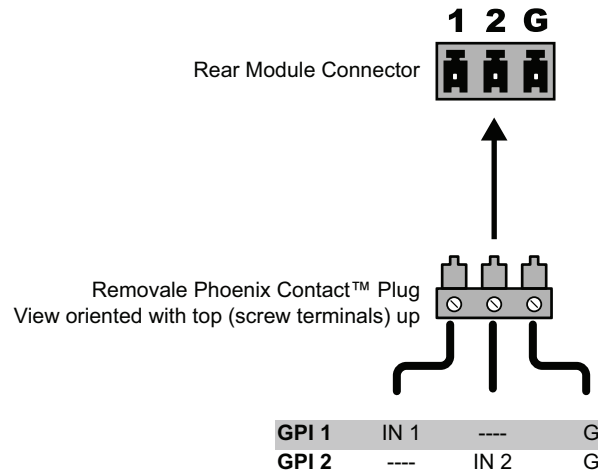


Figure 2.4 GPI Connections

Setting up Network Remote Control

If network remote control is to be used for the openGear frame and the frame has not yet been set up for remote control, refer to the *MFC-8300 Series* or *MFC-OG3 Series User Manual* for information.



Note — *To communicate with DashBoard, the openGear frame must have a Network Controller Card (MFC-8320-N or MFC-OG3-N) installed in the frame.*

If installing a card in a frame already equipped for, and connected to DashBoard, no network setup is required for the card. The card will be discovered by DashBoard and be ready for use.

Card-edge Controls

In This Chapter

This section describes the card-edge controls, indicators, and displays for using the LDP-8242.

The following topics are discussed:

- Card-edge Controls and Display
- Card-edge Monitoring

Card-edge Controls and Display

This section provides a general overview of the components used for navigating the menu system on the card-edge.

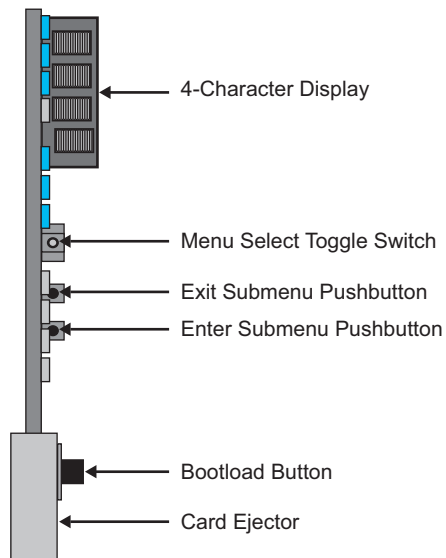


Figure 3.1 Controls, and Display

4-Character Display

Displays 4-digit abbreviated code showing menu and sub-menu selections. When in a menu displaying a parameter setting, the display shows parametric scalar value (and +/- sign where applicable).

Menu Select Toggle Switch

This switch is not implemented.

Enter Sub-menu Pushbutton

This pushbutton is not implemented.

Exit Sub-menu Pushbutton

This pushbutton is not implemented.

Card-edge Monitoring

The front-edge of the LDP-8242 has LED indicators for communication activity. Basic LED displays and descriptions are provided in **Table 3.1**.

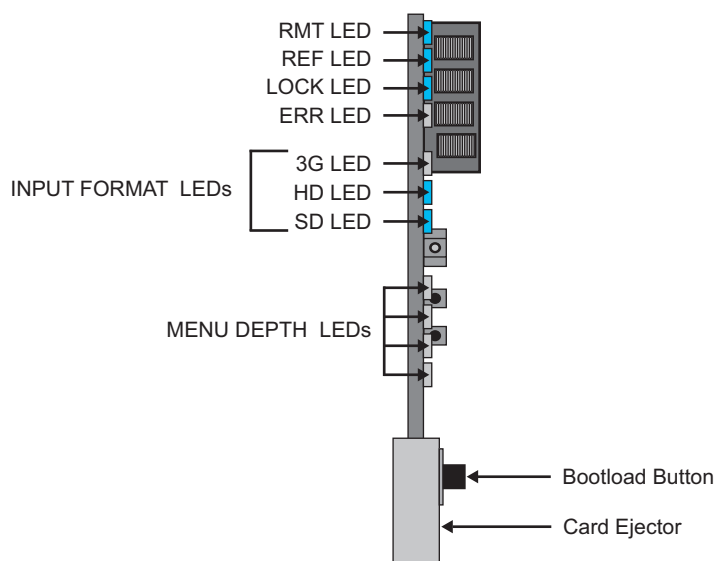


Figure 3.2 Indicators, and Display

Status and Selection LEDs

Table 3.1 shows and describes the LDP-8242 card-edge controls.

Table 3.1 LEDs on the LDP-8242

LED	Color	Display and Description
RMT	Blue	When flashing, this LED indicates when the card is receiving control messages from DashBoard.
REF	Blue	When lit, this LED indicates when the card is receiving valid frame sync when set up for reference frame sync.
LOCK	Blue	When lit, this LED indicates when the LDP-8242 is locked to input video.
ERR	This LED is not implemented.	
INPUT FORMAT	Blue	Two blue LEDs indicate the input signal format being received and locked onto by the card as follows: <ul style="list-style-type: none">• HD (1080p 29.97/25, 720p)• SD (625i, 525i) Continuous cycling of the LEDs indicates the card has not locked onto a particular format (as in the case of no signal input)
MENU DEPTH	These LEDs are not implemented.	

DashBoard Menus

In This Chapter

This section describes the DashBoard interface controls for using the LDP-8242.

The following topics are discussed:

- Video Input Tab
- Video Proc Tab
- Timecode Tab
- Closed Captioning Tab
- Framesync Tab
- AFD/WSS/VI Tab
- Output Video Tab
- Audio Bus Input Routing/Controls Tab
- Output Audio Routing/Controls Tab
- Loudness Processing Tabs
- Loudness Metering Tab
- Upmixing Tab
- COM and Metadata Routing Tab
- GPIO Controls Tab
- Presets Tab

Video Input Tab

The **Video Input** tab selects the card program video input.

Table 4.1 Video Input Menu Items

Menu Title	Item	Parameters	Description
	Input Selection	SDI A	Selects the input video source to be applied to the card's program video input.
		SDI B	

Video Proc Tab

The **Video Proc** tab provides video proc and color correction parametric controls.

Table 4.2 Video Proc Menu Items

Menu Title	Item	Parameters	Description
	Video Proc	On	Provides master control of all video proc functions. When set to On, the currently displayed settings take effect.
		Off	Video proc is bypassed
	Reset to Unity	Confirm	Provides unity reset control of all Video Proc functions. When Confirm is clicked, a dialog displays, requesting confirmation. Click Yes to proceed with the unity reset, click No to reject unity reset.
	Luma Gain	0 to 200	Adjusts gain percentage applied to luma (Y channel). Unity is 100%.
	Luma Lift	-100 to 100	Adjusts lift applied to Luma (Y channel)
	Color Gain	0 to 200	Adjusts gain percentage (saturation) applied to chroma (C channel). Unity is 100%.
	Color Phase	0 to 200	Adjusts gain percentage (saturation) applied to Chroma (C channel). Unity is 100%.
	Gang Luma/Color Gain	On	Changing either the Luma Gain or Color Gain controls increases or decreases both the Luma and Color gain levels by equal amounts
		Off	Disables this feature. Changing the Luma Gain has no impact on the Color Gain setting and vice versa.

Timecode Tab

The **Timecode** tab provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.

Table 4.3 Timecode Menu Items

Menu Title	Item	Parameters	Description
	Reference VITC Status (read-only)	#	<p>Displays the current status and contents of the four supported external timecode formats.</p> <p>If a format is receiving timecode data, the current content (timecode running count and line number) is displayed.</p> <p>If a format is not receiving timecode data, “Not Present” is displayed.</p>
	Input VITC Status (read-only)	#	
	Input ATC_LTC Status (read-only)	#	
	Input ATC_VITC Status (read-only)	#	
	Incoming ATC Packet Removal	Enabled	<p>Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.)</p>
		Disabled	
	Source Priority #	#	<p>Selects the priority assigned to each supported received formats, and internal Free Run in the event the preferred source is unavailable.</p> <p>Source Priority 1 thru Source Priority 4 select the preferred format to be used in descending order (i.e., Source Priority 2 selects the second-most preferred format, and so on.)</p>
	Output Status Display (read-only)	#	Displays the current content and source used for the timecode data is valid.
		Insertion Disabled	The Timecode Insertion button is set to Disabled, and the output insertion is disabled.

Table 4.3 Timecode Menu Items

Menu Title	Item	Parameters	Description
	Output Status Display (read-only)	Free Run	If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count mode). Because the 1's digit of the display Frames counter goes from 0-29, the fractional digit (along with the 1's digit) indicates frame count as follows: 0.0 Frame 0 0.1 Frame 1 1.0 Frame 2 1.1 Frame 3 ... 29.1 Frame 59
	Offset	Advanced	Allows the current timecode count to be advanced on the output video
		Delayed	Allows the current timecode count to be delayed on the output video
	Offset Field	# ^a	Delays/advances timecode by one field
	Offset Frame	# ^a	Delays/advances timecode by up to 5 frames
	SD VITC Waveform Output # Line Number	6 to 22	For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers where the VITC waveform is inserted. If only one output line is to be used, set both controls for the same line number.
	SD VITC Waveform Insertion	Enabled	Affects VITC waveforms inserted (or copied to a new line number) by this function. An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.
		Disabled	
	SD ATC_VITC Insertion	Enabled	For SD output, enables or disables SD ATC_VITC timecode insertion into the output video.
		Disabled	
	SD ATC Insertion Line	#	Selects the line number for ATC_VITC.
	HD ATC_LTC Insertion	Enabled	For HD output, enables or disables ATC_LTC timecode insertion into the output video.
		Disabled	
	HD ATC_LTC Insertion Line	#	Selects the line number for ATC_LTC timecode data
	HD ATC_VITC Insertion	Enabled	For HD output, enables or disables ATC_VITC timecode insertion into the output video.
		Disabled	

Table 4.3 Timecode Menu Items

Menu Title	Item	Parameters	Description
	HD ATC_VITC Insertion Line Field #	#	Selects the line number for ATC_VITC1 and ATC_VITC2. If only one output line is to be used, set both controls for the same line number.
	ATC VITC Legacy Support	Enabled	Accommodates equipment requiring ATC_VITC packet in both fields as a “Field 1” packet (non-toggling). Non-toggling VITC1 and VITC2 packets do not conform to SMPTE 12M-2-2008 preferences. As such, ATC_VITC Legacy Support should be enabled only if required by downstream equipment.
		Disabled	Disables this feature
	Free Run Hours	#	Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled. Initialization can only be applied when the card is outputting Free Run timecode (as shown by Output Status displaying “Free Run”). If failover to Free Run occurs due to loss of external timecode(s), the Free Run count assumes its initial count from the last valid externally supplied count.
	Free Run Minutes	#	
	Free Run Seconds	#	
	Apply Free Run Values	Confirm	

- a. The default value is 0.

Closed Captioning Tab

The **Closed Captioning** tab provides support for closed captioning setup.

Table 4.4 Closed Captioning Menu Items

Menu Title	Item	Parameters	Description
	Input Status (read-only)	#	Closed captioning is present. The display message indicates the VANC line number of the incoming closed captioning packet (or SD waveform-based VANC line number)
		Not Present	No closed captioning is present in the video signal
		Disabled	
		Captioning Rejected Due To	Refer to the section “ Closed Captioning ” on page 5-7 for details on this message
	Closed Captioning	On	Closed captioning is set to standard default line number. Refer to the section “ Ancillary Data Line Number Locations and Ranges ” on page 5-4 for details. Note that SD output is locked to line 21. The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
		Off	Disables closed captioning output insertion control
	HD Output Line	#	Selects the VANC line number (9-41) for the closed caption data when the output is HD. Although the output line drop-down will allow any choice within the 9-41 range, the actual range is automatically clamped (limited to) certain ranges to prevent inadvertent conflict with active picture area depending on video format. Refer to the section “ Ancillary Data Line Number Locations and Ranges ” on page 5-4 for more information. The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data unless existing metadata is to be intentionally overwritten.

Framesync Tab

The **Framesync** tab provides video frame sync/delay control and output control/loss of program video failover selection controls.

Audio timing offset from video is performed using the delay controls on the **Audio Bus Input Routing** tab. Refer to the section “**Audio Bus Input Routing/Controls Tab**” on page 4-14 for details.

Table 4.5 Framesync Menu Items

Menu Title	Item	Parameters	Description
	Mode	Free Run	Output video is locked to the card's internal clock. Output video is not locked to external reference.
		Lock to Reference	Output video is locked to external reference received on the openGear frame (REF 1 or REF 2 BNCs). Default uses REF 1 with failover to REF 2 in the event a valid reference signal is not present on REF 1. (External reference signals REF 1 and REF 2 are distributed to the card and other cards via the openGear frame bus). If a valid reference is not detected, the Card State field displays “Reference Invalid”, indicating an invalid frame sync reference error.
		Lock to Input	Uses the program video input signal as the reference standard. If Lock to Input is used for frame sync, any timing instability on the input video will result in corresponding instability on the output video.
	Initial Startup Format	#	Selects a synthesized frame sync format/rate to be invoked in the time preceding stable lock to external reference. Set this control to that of the intended external reference to help ensure smoother frame sync locking. This control also sets the card test pattern format where the card's initial output at power-up is the internal pattern instead of program video.
	Output Mode	Input Video	Card outputs input program video (or loss of signal choices described below)
		Flat Field (Black)	Card outputs black flat field
		Freeze	Card outputs last frame having valid SAV and EAV codes

Table 4.5 Framesync Menu Items

Menu Title	Item	Parameters	Description
	Output Mode	Test Pattern	Card outputs standard technical test pattern. This pattern is selected using the Pattern menu described below.
	On Loss of Video	Disable Outputs	Disables program video SDI outputs in the event of a program input video loss of signal (LOS)
		Flat Field (Black)	Program video output goes to black flat field in the event of a program input video LOS
		Freeze	Program video output goes to last frame having valid SAV and EAV codes in the event of a program input video LOS
		Test Pattern	Program video output goes to standard technical test pattern in the event of a program input video LOS. This pattern is selected using the Pattern menu.
	Pattern	#	Provides a choice of standard technical patterns when Test Pattern is invoked in other menus (e.g. On Loss of Video)
Reference Offset^a	Vertical (Lines)	-1124 to 1124	Sets vertical delay (in number of lines of output video) between the output video and the frame sync reference. Positive values provide delay; negative values provide advance.
	Horizontal (ms)	-64 to 64	Sets horizontal delay (in ms of output video) between the output video and the frame sync reference. Positive values provide delay; negative values provide advance.
	Minimum Latency (Frames)	0 to 16	When framesync is enabled, specifies the smallest amount of latency allowed by the frame sync (latency measurement in output video frames). The frame sync will not output a frame unless the specified number of frames are captured in the buffer. Refer to the section “ Notes on Frame Sync Latency ” below for details.
	Video Delay (read-only)	#ms / #frames #lines	Displays the current input-to-output video delay (in msec) as well as in terms of frames/fractional frames (number of lines)
	Framesync Status (read-only)	On	Framesync status is valid
		Off	Framesync Enable is set to Off
		No valid reference detected	Improper or missing framesync reference
		Running - Local Clock	Framesync derived using card local clock

Table 4.5 Framesync Menu Items

Menu Title	Item	Parameters	Description
	Framesync Status (read-only)	Minimum Latency #	Latency frames selection exceeds limits. The limit is determined by the Minimum Latency setting in this tab

- a. Offset advance is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.

Notes on Frame Sync Latency

Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. For example, with a 525i59.94 output, the practical maximum limit is 13. When using this control, be sure to check the **Framesync Status** display as follows:

Framesync Status On

Latency frames selection within limits.

Framesync Status Minimum Latency Frames set to 3 the maximum amount for this standard

Latency frames selection exceeds limits.

AFD/WSS/VI Tab

The **AFD/WSS/VI** tab allows assignment of AFD, WSS, and/or VI codes to the SDI output video, and allows custom ARC settings to be applied for each. Also allows translation between WSS, VI, and AFD active ARC formats.

For More Information on...

- AFD, WSS, and/or VI codes, refer to the section “**Assigning AFD/WSS/VI Codes**” on page 5-8.

AFD/WSS/VI Tab

Table 4.6 outlines the menus on the **AFD/WSS/VI** sub-tab.

Table 4.6 AFD/WSS/VI Menu Items

Menu Title	Item	Parameters	Description
Input	AFD Status (read-only)	#	Displays the current status and contents of the three supported ARC formats.
	WSS Status (read-only)	#	If a format is received, the current formatting code and description is displayed.
	VI Status (read-only)	#	If a format is not receiving data, the message “Not Present” is displayed.
	Force Input Mapping	Follow Trigger	Uses the ARC coding inherent in the received triggering ARC
		4x3 ARC Codes	For received triggering formats coded as 4x3 applies the H/V coding selected here
		16x9 ARC Codes	For received triggering formats coded as 16x9, applies the H/V coding selected here
	Trigger on AFD	On	Allows trigger on AFD
		Off	Rejects AFD-coded triggering
	Trigger on WSS	AFD	Allows triggering on AFD-coded WSS
		ETSI	Allows triggering on ETSI-coded WSS
		Off	Rejects WSS-coded triggering
	Trigger on VI	AFD	Allows triggering on AFD-coded WSS
		SMPTE	Allows triggering on SMPTE-coded WSS
		Off	Rejects VI-coded triggering
	WSS/VI Priority	WSS	If multiple formats are present on the input video, AFD pre-empts other formats, followed by WSS or VI (as set here)
		VI	

Table 4.6 AFD/WSS/VI Menu Items

Menu Title	Item	Parameters	Description
Output	AFD Output	Enabled	Inserts AFD packet on output, and allows changing line number
		Disabled	Turns off AFD format on output
		Follow Input Line	Inserts AFD packet on same line as received AFD line number (where applicable)
	WSS Output	AFD Enabled	Inserts AFD-coded WSS on output
		ETSI Enabled	Inserts ETSI-coded WSS on output
		Disabled	Turns off WSS format on output
	VI Output	AFD Enabled	Inserts AFD-coded VI on output
		SMPTE Enabled	Inserts SMPTE-coded VI on output
		Disabled	Turns off WSS format on output
	AFD Status (read-only)	#	<p>Displays the current output status, coding, and H/V ratio for AFD, WSS, and VI formats.</p> <p>The code displayed shows the outputted code. If the code is modified by user settings in the AFD Map tab, these changes are shown here. Refer to the section “AFD/WSS/VI Tab” on page 4-11 for more information.</p> <p>If a format is active and enabled (as set with the Output Enable controls), the code and H/V description is displayed.</p> <p>If a format is not outputting data, the message “Disabled” is displayed. In these cases, no output is inserted for the format.</p>
	WSS Status (read-only)	#	
	VI Status (read-only)	#	
	AFD Output Line Field #	#	<p>Allows selecting the line location of the AFD data within the video signal Ancillary Data space.</p> <p>The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.</p> <p>For progressive formats, the Field 1 control serves as the line number control.</p>

Output Video Tab

The **Output Video** tab provides an output video crosspoint between up to four SDI output ports and the card program video and auxiliary streams.

Table 4.7 Output Video Menu Items

Menu Title	Item	Parameters	Description
	SDI Out #	Program	For each SDI output port supported by the card, provides a crosspoint for routing program processed video, reclocked, or other video handled by the card.
		Input # Reclock	

Audio Bus Input Routing/Controls Tab

The **Audio Bus Input Routing/Controls** tab provides routing, gain, and individual/master audio-video delay controls for embedded, AES, analog, and downmix/flex mix input audio. These controls route selected audio sources onto the card 16-channel internal bus (which is used for all audio processing).

Input Routing Tab

Default factory preset routing routes embedded Channel 1-16 to bus channels Bus Ch1-16. Bus Ch2 to Bus Ch16 have controls identical to the controls for Bus Ch1.

For each bus channel, its source should be considered and appropriately set. Unused bus channels should be set to Silence.

Table 4.8 Input Routing Menu Items

Menu Title	Item	Parameters	Description
Source	Bus Ch#	Embed Ch#	Routes the specified embedded channel to be the source for the selected destination
		AES Ch# ^a	Routes an AES channel to be the source for the selected destination bus channel. AES port connectors (channel pairs) on the rear module are set as either input or output using the AES Port Direction control. Make certain an AES channel pair is not being used as an output before assigning it as a source here. Refer to the section “ Output Audio Routing/Controls Tab ” on page 4-18 for details on using this control.
		Downmix #	Routes a downmixer output channel to be the source for the selected destination bus channel. Refer to the section “ Input Downmixers Tab ” on page 4-15 for details on this control.
		Flex Mix #	Routes one of sixteen flex mix summing nodes to be the source for the selected destination bus channel. Refer to the section “ Input Flex Mix Tab ” on page 4-17 for details on this control.
Gain	Gain	-80 to 20	Provides relative gain (in dB) control
Mute	Mute	Selected	Mutes the specified channel
		Cleared	The specified channel is not muted

Table 4.8 Input Routing Menu Items

Menu Title	Item	Parameters	Description
Channel #	Delay Offset (ms)	-800 to 800	Adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays.
	Absolute Audio Delay Status (read-only)	# samples / #ms	Shows current delay from video for the corresponding audio channel. Maximum advance/delay offset is dependent on video format. Refer to the section “ Technical Specifications ” on page 7-2 for details.
Master Audio/Video Delay	Bulk Audio/Video Delay Offset (msec)	-800 to 800	Adds or reduces (offsets) entire bus audio delay from the matching video delay (audio delay settings adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays.
	Video Delay (read-only)	#ms / # frames # lines	Shows current delay from video for the audio bus. Maximum advance/delay offset is dependent on video format. Refer to the section “ Technical Specifications ” on page 7-2 for details.

- a. AES inputs are only available on cards equipped with the AES-8242 licensed option (AES audio I/O).

Input Downmixers Tab

The **Input Downmixers** sub-tab provides four independent downmixers that each multiplex any five embedded, AES, analog, or Dolby® decoder output audio channel sources (as L, R, C, Ls, Rs inputs) into a stereo pair (Downmix A(L), Downmix A(R) to D(L), or Downmix D(R)).

Downmixers B-D have controls identical to the controls for Downmixers A.

For each downmixer input channel, its source should be considered and appropriately set. Unused channels should be set to Silence.

Table 4.9 Input Downmixers Menu Items

Menu Title	Item	Parameters	Description
Downmixer #	#	Embed Ch#	Separate menus for each of the four independent downmixers that direct any combination of card audio inputs to each downmixer input channel.
		AES Ch#	
		Silence	

Table 4.9 Input Downmixers Menu Items

Menu Title	Item	Parameters	Description
	Center Mix Ratio	-80 to 20 ^a	<p>Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix.</p> <p>Minimum attenuation setting (-0.0dB) applies no ratiometric reduction. Center channel content is restored as in-phase center-channel content with no attenuation, making center-channel content more predominate in the overall mix.</p> <p>Maximum attenuation setting (-80.0dB) applies a -80dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel at a -80dB ratio relative to overall level, making center-channel content less predominate in the overall mix.</p> <p>The default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.</p>
	Surround Mix Ratio	-80 to 20 ^a	<p>Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix.</p> <p>Minimum attenuation setting (-0.0dB) applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix.</p> <p>Maximum attenuation setting (-80.0dB) applies a -80dB ratiometric reduction of surround-channel content. Surround-channel content is restored at a -80dB ratio relative to overall level, making surround-channel content less predominate in the overall mix.</p> <p>The default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.</p>

a. The default value is -3dB.

Input Flex Mix Tab

The **Input Flex Mix** sub-tab provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. Each input channel has independent gain and mute controls.

Flex Mix input channels 2-16 have controls identical to the controls for Flex Mix 1.

For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to Silence.

Table 4.10 Input Flex Mix Menu Items

Menu Title	Item	Parameters	Description
Source	Flex Mix#	Silence	Selects the audio input source to be directed to the corresponding bus channel.
		Embed Ch #	
		AES Ch #	
Gain	Gain	-80 to 20	Provides relative gain (in dB) control
Mute	Mute	Selected	Mutes the specified channel
		Cleared	The specified channel is not muted
Flex Mix #	Flex Mix Bus	Flex Mix #	Each Flex Mix input channel can be fed as desired to any of 16 summing node buses (Flex Mix A-P). The Flex Mix buses can be routed and processed the same as any other audio input source. Refer to the section “ Input Flex Mix Example ” on page 5-15 for an example of applying a common Flex Mix Bus to various input channels.

Output Audio Routing/Controls Tab

The **Output Audio Routing/Controls** tab provides controls to route card audio from card processing paths to 16-channel embedded audio destinations external of the card. Use the **Embed Audio Out** sub-tab to access embedded output routing.

Embed Audio Out Tab

Default factory preset routing routes bus channels Bus Ch 1-16 to embedded outputs Emb Ch 1-16. Emb Ch1-16 controls are identical to those of Emb Ch1.

Table 4.11 Output Audio Routing/Controls Menu Items

Menu Title	Item	Parameters	Description
Emb Ch #	Source	Bus Ch#	Routes a card internal bus channel (Bus Ch1-16) to be the source for the selected embedded output channel.
		Upmix #	Routes an upmixed channel to be the source for the selected embedded output channel. This menu option is only available with the UM-8242 licensed feature.
		LP51 #	Routes a loudness-processed channel to the source for the selected embedded output channel. Where stereo loudness process is available, selections for these channels are LP2 L and LP2R.
		Tone #	Routes one of eight tones to be the source for the selected embedded output channel
		Silence	Mutes the selected embedded output channel. Use this setting for any unused embedded output channels.
	Gain	-80 to 20	Provides relative gain (in dB) control for the corresponding embedded output channel.
	Mute	Selected	Mutes the specified channel
		Cleared	The specified channel is not muted
	Peak (read-only)	# dBFS	Displays the peak level for the corresponding embedded output channel

Table 4.11 Output Audio Routing/Controls Menu Items

Menu Title	Item	Parameters	Description
AES Ch #	Source	Silence	Mutes the selected AES output channel. Use this setting for any unused AES output channels. If an AES pair is used as an input, the channels do not have to be muted here.
	Gain	-80 to 20	Provides relative gain (in dB) control for the corresponding embedded output channel.
	Mute	Selected	Mutes the specified channel
		Cleared	The specified channel is not muted
	Peak (read-only)	# dBFS	Displays the peak level for the corresponding embedded output channel

Loudness Processing Tabs

The Loudness Processing functions are arranged in sub-tabs: Channel Mapping, and Custom Preset.

For More Information on...

- the Custom Preset sub-tab, refer to the section “Using Presets” on page 5-23.

Channel Mapping Tab

The **Channel Mapping** sub-tab provides channel selection for 5.1 and/or stereo channels to be loudness processed. Also provides channels for selecting loudness processing profile preset. Note that the 5.1-channel loudness processor is described in **Table 4.12**. The stereo loudness processor has identical controls with omission of controls other than L and R.

For convenience, Measurement 1 and Measurement 2 audio loudness metering displays are duplicated on this sub-tab. Refer to “**Loudness Metering**” on page 5-18 for full descriptions of these displays and their controls.

Table 4.12 Channel Mapping Menu Items

Menu Title	Item	Parameters	Description
Meter #	Sources - #	Bus Ch #	Separate drop-down lists for each loudness processor input channel that directs any combination of card audio processing channels to each of the loudness processor inputs. Set any unused channel inputs to Silence.
		Silence	
	Processing	Enabled	Enables loudness processing, and allows selection of preset loudness profile best suited for the program material and/or model of processing desired from the Preset menu.
		Disabled	Disables loudness processing.
	Preset	TV 5B General	This is the general, recommended preset for all types of content. It provides moderate dynamic range compression and is calibrated to produce audio having an average dialog loudness of -24LKFS with no additional output level trim. Use of this preset as an initial setting is recommended.
		TV 5B Light	Similar to TV 5B General, this preset varies in that multi-band compression is reduced closer to 2:1, thereby providing a more gentle action. This preset sacrifices agility in loudness control in favor of a more gentle compression profile; this preset may not be suitable for some material.

Table 4.12 Channel Mapping Menu Items

Menu Title	Item	Parameters	Description
	Preset	TV 5B Heavy	Similar to TV 5B General, this preset varies in that multi-band compression is increased for greater level density/adherence to target at the expense of dynamic range.
		TV 5B Loud	Similar to TV 5B Heavy, but with a louder, more punchy perception.
		ITU Loud Limit	Utilizes a specially tuned input AGC plus multi-band and a final limiter to gradually adjust the average program loudness to an internally set AGC value, with the multi-band and final limiters acting until the AGC gains control of the level. This preset is most appropriate for ingest or live program material. This preset bypasses the multi-band AGC. As such, it has less ability to manage spectral balance.
		Protection Limit	Bypasses all processing except for final output limiter, which is set only to prevent overload. Unless the audio received has already been loudness processed, this setting is typically not recommended.
		Custom	Refer to the section “ Custom Preset Loudness Processing ” on page 5-17.
	Master Output Gain (dB)	-20 to 11	Allows fine adjustment of the overall output gain. This control is primarily useful in matching the output level to an alternate LKFS target level if required. Also, it is useful (where desired) in matching various Processing Profile presets to have similar output levels.

Loudness Metering Tab

The **Loudness Metering** tab provides an ITU-R BS.1770-1/ATSC A/85 Audio Loudness measurement of two independent 5.1-channel groups (L, R, C, LFE, Ls, and Rs). If desired, the independent meters can be set to provide pre and post-processing assessments of the same program material.



Note — *This function provides only loudness metering as described here; this function does not provide active loudness correction. Selected channels are only monitored by this function, with no affect on the channels.*

Table 4.13 Loudness Metering Menu Items

Menu Title	Item	Parameters	Description
Meter #	Sources - #	Bus Ch #	For Meter 1 and Meter 2, separate drop-down lists for each loudness meter source (input) channel.
		Upmix #	
		Loudness Processor #	Source input channels include drop-downs for L, R, C, LFE, Ls, Rs, Aux 1, and Aux 2 channels. LFE, Aux 1, and Aux 2 channels are not included in loudness measurements.
		Tone #	
		Silence	
	Measurement	#	Dual displays for Meter 1 and Meter 2 that show respective current aggregate ITU-R BS.1770-1 loudness for the selected monitored channels.
			-inf LUFS display indicates loudness meter is not receiving any input. For example, as in the case of wrong (muted) channels being routed to meter instead of intended channels.
	Short Term Window (sec)	0.1 to 60.0 ^a	Ganged Short Term Window control for Meter 1 and Meter 2 sets the duration (in seconds) that sampling time accumulates before each averaging recalculation. Refer to the section “ Loudness Metering ” on page 5-18 for an example.
	Measurement	Reset	Clears the accumulated moving average data, and re-starts measurement

a. The default value is 1.8.

Upmixing Tab

The **Upmixing** tab provides upmixing of any normal PCM stereo pair into 5.1 surround sound. Note that this function requires the UMA-8242 option.



Note — For any six channels selected for this function, the **Left** and **Right** channel selection always serve as the stereo input pair.

Table 4.14 Upmixing Menu Items

Menu Title	Item	Parameters	Description
Up Mixer Controls	Mode	Auto	Automatic enable/bypass of 5.1 upmix function as follows: <ul style="list-style-type: none"> If detected signal level on all three of the selected channels designated as Center, Left Surround, and Right Surround are <i>below</i> the level threshold set using the 5.1 Detection Threshold control, upmixer produces new 5.1 content generated by the upmixer. If detected signal level on any of the three of the selected channels designated as Center, Left Surround, and Right Surround is <i>above</i> the level threshold set using the 5.1 Detection Threshold control, upmixing is bypassed and the channels fed to the upmixer pass unaffected to the upmixer outputs.
		Always Upmix	Manual enable turns on upmixer and overwrites content on all six selected channels with new 5.1 content generated by the upmixer regardless of original signal level or content.
		Bypass	Manual disable bypasses the upmixer. When bypassed, the input audio channels pass unaffected to the upmixer output.
	Input Channel Selection	Bus Ch#	Selects the audio input sources to be directed to the corresponding upmixer input
		LP #	
		Tone #	
		Silence	
	Status (read-only)	Auto Mode- Currently Upmixing	With Upmix Mode is set to Auto , indicates selected channels designated as Center, LFE, Left Surround, and Right Surround are clear for use; upmixer is currently up-mixing received stereo pair and overwriting the six selected channels with new 5.1 upmix.
		Auto Mode - Currently Bypassed	With Upmix Mode is set to Auto , indicates selected channels designated as Center, LFE, Left Surround, and Right Surround have content (such as existing original 5.1 or other content); upmixer is bypassed and allows normal passage of six selected channels.

Table 4.14 Upmixing Menu Items

Menu Title	Item	Parameters	Description
	Status (read-only)	Upmixing	Indicates Upmix Mode is set to Always Upmix and is currently up-mixing received stereo pair and overwriting the six selected channels with new 5.1 upmix.
		Bypassed	Indicates Upmix Mode is set to Bypass , the upmixer is manually disabled and is currently passing all selected channels unaffected.
	Auto Crossfade Speed Upmix to Bypass	#	Individual controls select the relative cross fade transition speed between Upmix to Bypass (going to inactive; from 5.1 to 2.0) and Bypass to Upmix (going to active; from 2.0 to 5.1) when upmixer enable is set to Auto and the active threshold (as set by the 5.1 Detection Threshold control) is crossed in either direction. To suit program material and production aesthetic preferences, several choices are available as shown to the left. Slower settings allow for a more gradual transition between modes, however with a longer interval before levels stabilize. Faster settings conversely allow for a smaller interval before levels stabilize, however with greater perceived abruptness.
	Auto Crossfade Speed Bypass to Upmix	#	
	5.1 Detection Threshold (dBFS)	-150 to 0 ^a	Adjusts the threshold at which selected channels designated as C, LFE, Ls, and Rs are considered to have viable content, or at which signal levels can be considered insignificant when upmixer enable is set to Auto. Setting affects automatic enable/bypass of 5.1 upmix function as follows: If detected signal level on all three of the selected channels designated as Center, Left Surround, and Right Surround are <i>below</i> the level threshold set using the 5.1 Detection Threshold control, upmixer allows overwrite of all six selected channels with the new 5.1 signal complement. If detected signal level on any of the three of the selected channels designated as Center, Left Surround, and Right Surround is <i>above</i> the level threshold set using the 5.1 Detection Threshold control, upmixer is bypassed, thereby releasing the selected six channels and allowing the original channels to pass unaffected.

Table 4.14 Upmixing Menu Items

Menu Title	Item	Parameters	Description
	Center Width	0* to 100	<p>Adjusts center channel content (in terms of percentage) applied to L and R channels.</p> <p>Minimum setting keeps all L+R (mono) content confined to center (C) channel, with any center channel content removed from L and R channels.</p> <p>Higher settings progressively blend respective L and R mono content back into L and R channels, with 100% setting resulting in center channel level going to zero and L/R channels becoming normal L/R channels containing some mono content.</p>
	Surround Depth Control	0 to 100*	<p>Adjusts surround channel content (in terms of percentage) applied to Ls and Rs channels.</p> <p>Maximum setting results in greatest surround channel levels.</p> <p>Lower settings progressively diminish surround channel levels, with 0% setting resulting in no Ls or Rs level, with Ls and Rs content progressively folded back into L and R, respectively.</p>

a. 0dB equivalent to +24dBu => 0dBFS.

COM and Metadata Routing Tab

The **COM and Metadata Routing** tab provides input and output support of Dolby® metadata routing between the Dolby® decoder/encoder and serial /video interface.

Table 4.15 COM and Metadata Routing Menu Items

Menu Title	Item	Parameters	Description
Serial Port Controls	COM #	#	Selects the source for metadata to be exported (outputted from the card) over a specific Serial Port (1 or 2).
		None	Configures the port to be used as an input
	Serial Port Conflicts (read-only)	#	Reports when a given port is both an output and input.
SMPTE 2020 Embedder Controls	Metadata Source	#	Selects the source of metadata to be exported (outputted from the card) for VBI embedding at the card SDI output.
	Input Status (read-only)	#	Indicates if Dolby® metadata is present on input SDI VBI, as well as VBI line number.
		Not Present	No metadata is detected
Metadata Embedding	Embedded Metadata Output	On	Enables SMPTE 2020-1 metadata embedding in the SDI video output.
		Off	Disables this feature
	Embedded Output Line	9 to 41	Allows selection of SMPTE 2020-1 metadata line location within the VANC space for re-inserted Dolby® metadata

GPIO Controls Tab

The **GPIO Controls** tab provides two independent GPI controls for GPI 1 and GPI 2 that invoke a user-defined card presets upon receiving a contact closure-logic level on the corresponding GPI input.

Table 4.16 GPIO Controls Menu Items

Menu Title	Item	Parameters	Description
GPI #	GPI # (read-only)	Open	Indicates the GPI is not present on the specified GPI input.
		Closed	Indicates when the GPI is present.
	Preset Number ^a	No Preset	No Preset setting inhibits going to a preset if the state corresponding to the drop-down becomes true. This setting is typically used to inhibit GPI for an unused GPI. This setting should be considered and used for any logic state that is not specifically to be used for a valid GPI state.
		#	Allows any of 64 user-defined presets to be invoked when the state corresponding to the drop-down becomes true. GPI go-to number settings are independent of saved presets and cannot be defined under a preset.
	GPI Coding	Disabled	GPI conditions on both GPI ports are ignored; no preset is invoked as a result of GPI status. Use this setting as a master disable of GPI functions. Use this setting if GPI is not to be used.
		Edge	Refer to the section “ GPI Controls ” on page 5-22 for details.
		Binary ^b	

- Individual drop-downs (one for each of the four GPI states monitored by the card) allow invoking a card preset when the corresponding GPI state is true.
- Selecting Binary triggering without controlled GPI inputs will result in inadvertently invoking a preset.

Presets Tab

Presets are especially useful in defining card settings to invoke particular actions upon receiving a GPI trigger. Refer to the section “**GPIO Controls Tab**” on page 4-27 for more information.

Table 4.17 Presets Menu Items

Menu Title	Item	Parameters	Description
Preset #	Name	#	Allows entry of names that are useful in describing the purpose or action of a particular preset, as shown in the examples here. Up to 62 ASCII characters can be entered.
	Save		Stores all current card control settings for the selected preset and saves all current card control settings to Preset # - norm.
	Load		Recalls the preset
	Delete		Clears the preset. After a delete, pressing Load replaces the deleted preset with factory default settings.
	Save/Delete	Protected	Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. Use this setting when all presets are as intended. When toggling between button modes, make sure to wait for the card Settings status indicator to turn green before moving on.
		Unprotected	Allows preset Save and Delete buttons to save or delete current card settings to the selected preset. Use this setting when writing or editing a preset.

Operation

In This Chapter

This section provides additional information for using the LDP-8242.

The following topics are discussed:

- Control and Display Descriptions
- Accessing the Card via DashBoard
- Checking Card Information
- Ancillary Data Line Number Locations and Ranges
- Timecode Setup Examples
- Closed Captioning
- Assigning AFD/WSS/VI Codes
- Input Audio Status
- Audio Bus Input Routing Controls
- Output Audio Routing Controls
- Custom Preset Loudness Processing
- Loudness Metering
- Upmixing
- COM and Metadata Routing
- GPI Controls
- Using Presets



Operating Tip — *Wait 30 seconds after the last setting change to ensure all changes are saved to the non-volatile memory of the card.*

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays (both on-card and remote controls) for using the LDP-8242 card. The LDP-8242 functions can be accessed and controlled using any of the user interfaces described here.

The format in which the LDP-8242 functional controls, indicators, and displays appear and are used varies depending on the user interface being used. Regardless of the user interface being used, access to the LDP-8242 functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Sub-menus under which related controls can be accessed (as described in the section “**Function Sub-menu/Parameter Sub-menu Overview**” below).

After familiarizing yourself with the arrangement described in Function Sub-menu/Parameter Sub-menu Overview, proceed to the subsection for the particular user interface being used. Descriptions and general instructions for using each user interface are individually described in the following subsections: “**Accessing the Card via DashBoard**” on page 5-3.

When a setting is changed, settings displayed on DashBoard are the settings as effected by the LDP-8242 card itself and reported back to the remote control; the value displayed at any time is the actual value as set on the card.

Function Sub-menu/Parameter Sub-menu Overview

The functions and related parameters available on the LDP-8242 card are organized into function sub-menus, which consist of parameter groups as shown below.

Figure 5.1 shows how the LDP-8242 card and its sub-menus are organized, and also provides an overview of how navigation is performed between cards, function sub-menus, and parameters.

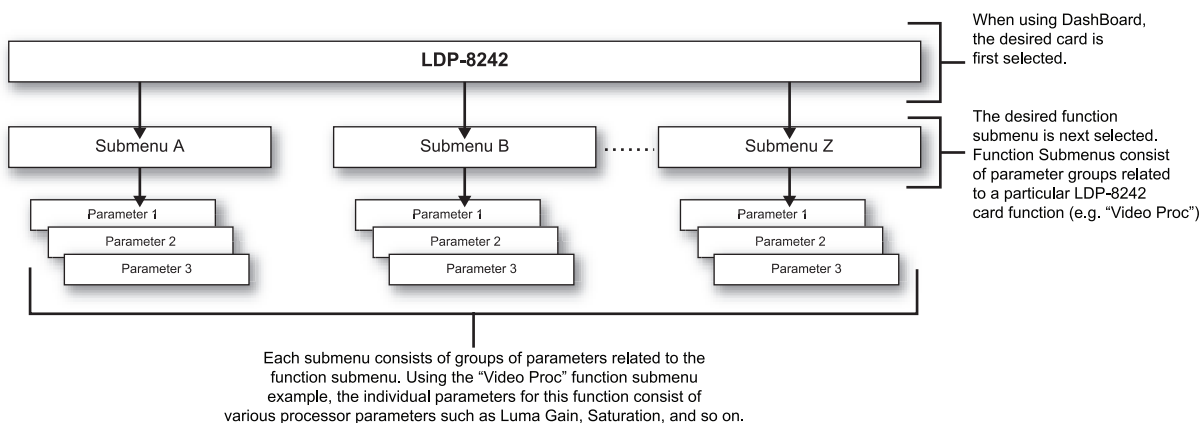


Figure 5.1 Function Sub-menu/Parameter Sub-menu Overview

Accessing the Card via DashBoard

Access the LDP-8242 card using DashBoard as described below.

Accessing the Card via DashBoard

When the card is accessed in DashBoard its function sub-menu screen showing tabs for each function is displayed. The particular sub-menu screen displayed is the previously displayed screen from the last time the card was accessed by DashBoard.

To display the menus in DashBoard for your card

1. On the computer connected to the frame LAN, open DashBoard.
2. In the left side Basic View Tree, locate the frame containing the LDP-8242 card to be accessed
3. Expand the tree to access the cards within the frame.
4. Select the card to be accessed.

Checking Card Information

The operating status and software version the LDP-8242 card can be checked using DashBoard.

Proper operating status in DashBoard is denoted by green icons for the status indicators. Yellow or red icons respectively indicate an alert or failure condition. Refer to the chapter “**Troubleshooting**” on page 6-1 for corrective action.

Status Displays

Clicking the **Status** sub-tab shows the status the signal being received by the LDP-8242, and other card conditions. A green icon shows that any changes made on DashBoard are successfully saved on the card's memory.

Clicking the **Product** sub-tab shows product information such as card model, options installed, and firmware versions. Use this information when communicating to Ross Video regarding the card.

Ancillary Data Line Number Locations and Ranges

Table 5.1 lists typical default output video VANC line number locations for various ancillary data items that may be passed or handled by the card.

Table 5.1 Typical Ancillary Data Line Number Locations/Ranges

Item	Default Line No. / Range	
	SD	HD
AFD	12 (Note 2)	9 (Note 2)
ATC_VITC	13 (Note 2)	9/8 (Note 2)
ATC_LTC	—	10 (Note 2)
Dolby® Metadata	13 (Note 2)	13 (Note 2)
SDI VITC Waveform	14/16 (Note 2)	—
Closed Captioning	21 (locked)	10 (Note 2)

Notes:

1. The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
2. While range indicated by drop-down list on GUI may allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. Limiting ranges for various output formats are as follows:

Format	Line No. Limiting	Format	Line No. Limiting	Format	Line No. Limiting
525i	12-19	720p	9-25	1080p	9-41
625i	9-22	1080i	9-20		

Because line number allocation is not standardized for all ancillary items, consideration should be given to all items when performing set-ups. **Figure 5.2** and **Figure 5.3** show an example of conflicted and resolved VANC allocation within an HD-SDI stream.

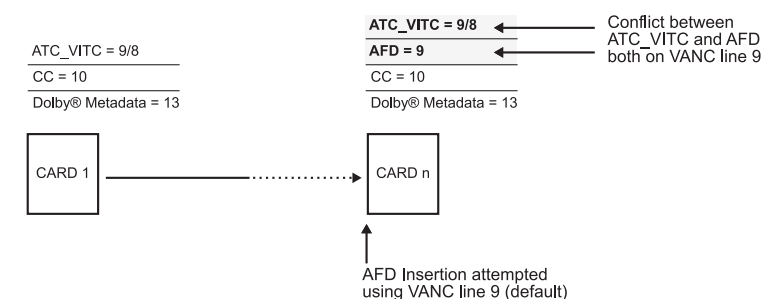


Figure 5.2 Example VANC Line Number Allocation — Conflict

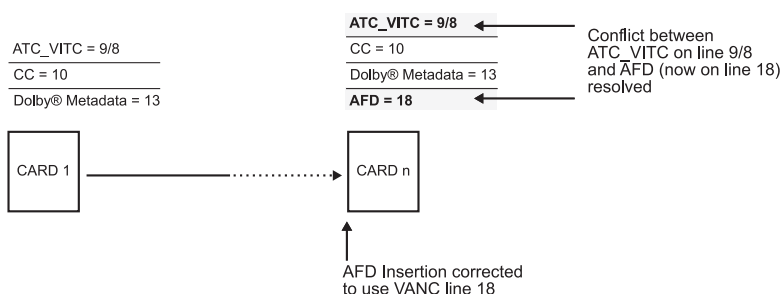


Figure 5.3 Example VANC Line Number Allocation — Resolved

Timecode Setup Examples

Shown below is an example in which received SDI video with SDI VITC waveform timecode is to be converted to SDI ATC_VITC timecode data.



Reference VITC Status	05:49:08:20.1
Input VITC Status	05:49:08:19.1
Input ATC_LTC Status	Not Present
Input ATC_VITC Status	Not Present

- A** Noting that the incoming video contains VITC waveform timecode data (as shown in the status display), set the Source Priority drop-down lists to include VITC Waveform timecode data (**SDI VITC**) as a choice. This extracts VITC Waveform timecode data from the incoming video.

Source Priority 1	Input VITC
Source Priority 2	Input ATC_VITC
Source Priority 3	Reference VITC
Source Priority 4	Free Run

- B** In this example, it is desired to provide SD ATC_VITC timecode data in the output video. As such, set **SD ATC_VITC Insertion** to **Enabled**.

SD ATC_VITC Insertion	Enabled
SD ATC Insertion Line	13 - SMPTE 12M-2-2008 Recommended

In the example here, the line numbers are set to the default SMPTE 12M-2-2008 recommended value.

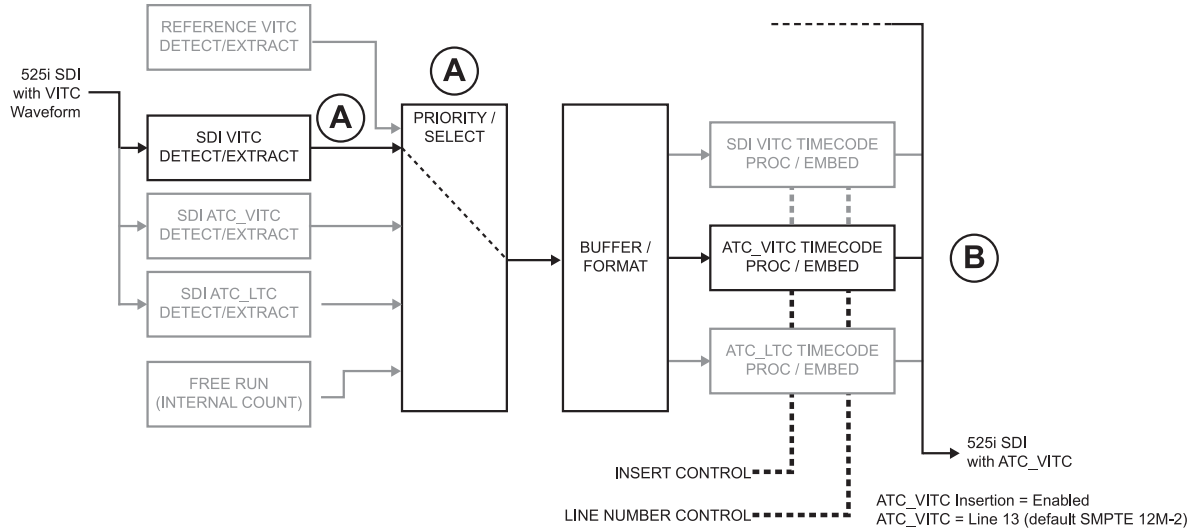


Figure 5.4

Setting the Source Priority

Source Priority 1 thru **Source Priority 4** select the preferred format to be used in descending order (i.e., Source Priority 2 selects the second-most preferred format, and so on. See **Figure 5.5**.

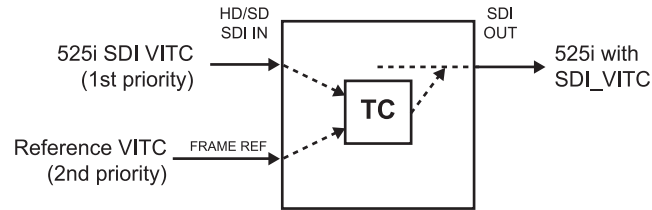


Figure 5.5 Example of Setting the Source Priority

In the above example, Input VITC 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by the card.

The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, the card then uses the reference VITC data received on the frame reference.

Offset Controls

Although the output line drop-down on the controls described in the section “**Timecode Tab**” on page 4-4 will allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. Refer to the section “**Ancillary Data Line Number Locations and Ranges**” on page 5-4 for more information.

The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.

Disable Output Setting

The Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, the card will indeed disable all timecode output should the ordinate preferred format(s) become unavailable.

Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.

Closed Captioning

Packet closed captioning status **Captioning Rejected Due To** message can appear due to the items described below. The closed captioning function assesses `cdp_identifier`, `cdp_frame_rate`, `ccdata_present`, and `caption_service_active` items contained in the packet header to make the determinations listed below. Refer to **CEA-708-B** for more information.

The closed captioning function does not support PAL closed captioning standards.

Table 5.2

Message	Description
Unsupported Frame Rate	Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.
Data Not Present	Packet is marked from closed captioning source external to the card that no data is present.
Service Inactive	Packet is marked from closed captioning source external to the card indicating packet does not contain active caption service.
No Data ID	Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).

Assigning AFD/WSS/VI Codes

Shown below is an example in which received 625i50 SDI video is being up converted to 720p50. The settings shown in the example below provide for directing the scaler to re-aspect the 4:3 input video to full, centered 16:9 re-aspecting, and mark the output video with the AFD code representing the new re-aspected H/V format.

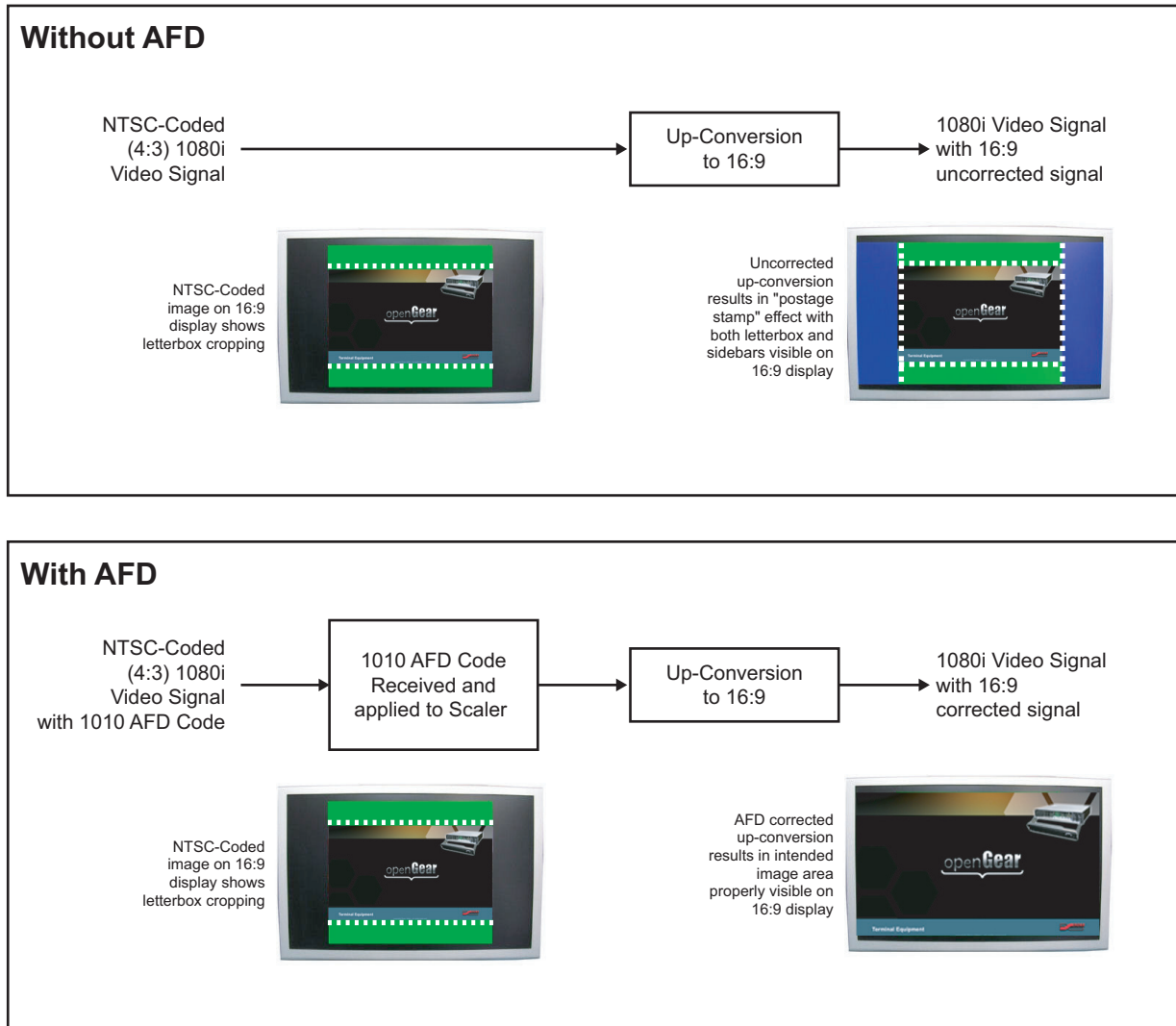


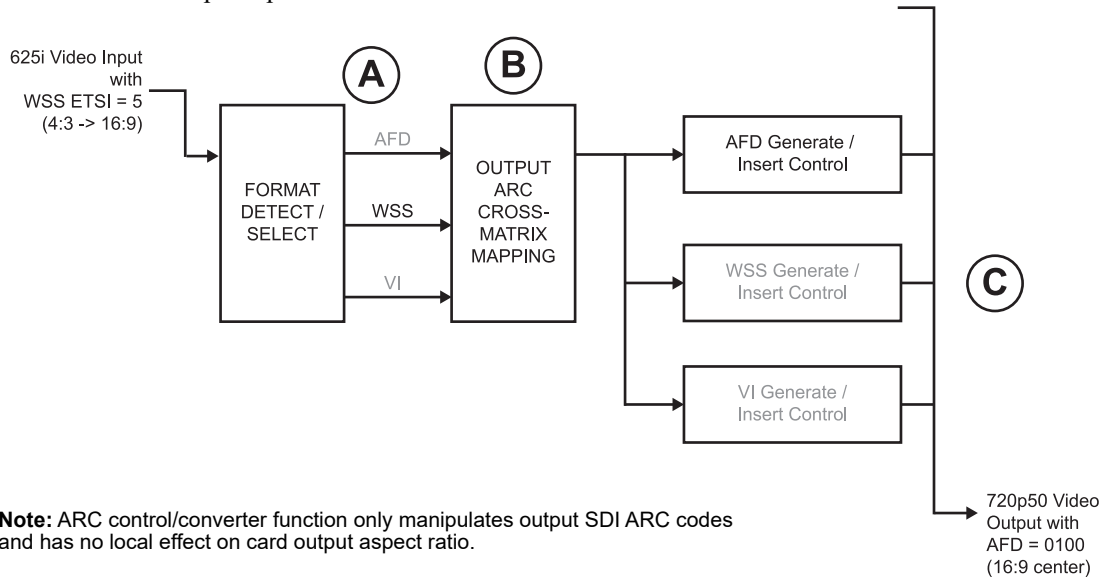
Figure 5.6 Examples of AFD

Settings performed on the **AFD/WSS/VI** tab can be applied directly to the output video, or the settings applied here can be custom modified if desired for any of the eleven 4x3 codes and any of the eleven 16x9 codes available here using the AFD Map sub-tab. Refer to the section “**AFD/WSS/VI Transition Matrix**” on page 5-10 for more information. Some AFD codes are not supported in WSS and VI formats. Refer to the section “**AFD/WSS/VI Transition Matrix**” on page 5-10 for more information.

Line number control available only for AFD format. WSS and VI use fixed line numbers per applicable standards.

Setup Example

Note that Active ARC control is unavailable. The ARC control/convert function seen in the following example only manipulates output SDI ARC codes and has no local effect on card output aspect ratio.



- A** Noting that the incoming video contains WSS coding, Trigger on WSS is set to ETSI, with other choices set to Off. The settings here allow ARC to trigger only on an ETSI-coded WSS received code.

Input	
AFD Status	<input type="radio"/> Not Present
WSS Status	<input checked="" type="radio"/> Detected, 4x3 0100 Letterbox 16x9 Center
VI Status	<input type="radio"/> Not Present
Trigger on AFD	Off
Trigger on WSS	ETSI
Trigger on VI	Off

- B** In this example, it is desired to use the H/V re-aspecting inherent in the received video ARC, perform the re-aspecting with no modification, and output an AFD code representing the re-aspecting performed.

Force Input Mapping	Follow Trigger
---------------------	----------------

As such, **Force Input Mapping** is set to **Follow Trigger**, thereby bypassing the Output ARC Cross-Matrix Map table and directly perform the re-aspecting defined by the received code (in this example, Letterbox 16x9). Also in this example, the scaler is directed to apply the output AFD re-aspecting by setting **Scaler Follow AFD** to **Enabled**.

- C** In this example, since only AFD is to be outputted, **AFD Output** is set to **Enabled**, with WSS and VI choices set to **Disabled**. **AFD Status** shows AFD code now being outputted.

The insertion line number (using its default value here), can be set using the **AFD Output Line** controls (for the progressive format in this example, the Field 1 control serves as the line number control).

Output	
AFD Status	<input checked="" type="radio"/> Enabled, 16x9 0100 Letterbox 16x9 Center
WSS Status	<input type="radio"/> Disabled or no valid mapping
VI Status	<input type="radio"/> Disabled or no valid mapping
AFD Output	Enabled
WSS Output	Disabled
VI Output	Disabled
AFD Output Line Field 1	10
AFD Output Line Field 2	323

AFD/WSS/VI Transition Matrix

This section lists valid translations between WSS, VI, and SMPTE 2016 AFD codes for both 4x3 and 16x9-coded frames. Shaded cells indicate invalid translation which cannot be used.

4:3 Codes

Table 5.3 4:3 Codes

Input					Output				
AFD	WSS ETSI 625	WSS ETSI 525	VI	Description	AFD	WSS ETSI 625	WSS ETSI 525	VI	Description
0010	4			4x3 Letterbox 16x9 top	0010	4	0	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9 top
0011	2			4x3 Letterbox 14x9 Top	0011	2	0	1 (NTSC) 2 (PAL)	4x3 Letterbox 14x9 Top
0100	5	2		4x3 Letterbox 16x9 Center	0100	5	2	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9 Center
0101, 0110, 0111				Undefined					
1000	0	0	0 1 (NTSC) 2 (PAL)	4x3 Coded Frame	1000	0	0	1 (NTSC) 2 (PAL)	4x3 Coded Frame
1001				4x3 Center	1001	0	0	1 (NTSC) 2 (PAL)	4x3 Center
1010	3			4x3 16x9 Center	1010	3	2	1 (NTSC) 2 (PAL)	4x3 16x9 Center
1011	1			4x3 14x9 Center	1011	1	0	1 (NTSC) 2 (PAL)	4x3 14x9 Center
1100			3, 4, 7	Reserved	1100		0	1 (NTSC) 2 (PAL)	Reserved
1101	6			4x3 Protect 14x9	1101	6	0	1 (NTSC) 2 (PAL)	4x3 Protect 14x9
1110				4x3 Letterbox 16x9; Protect 14x9 Center	1110		2	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9; Protect 14x9 Center
1111				4x3 Letterbox 16x9; Protect 4x3 Center	1111		2	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9; Protect 4x3 Center

16:9 Codes

Table 5.4 16:9 Codes

Input					Output				
AFD	WSS ETSI 625	WSS ETSI 525	VI	Description	AFD	WSS ETSI 625	WSS ETSI 525	VI	Description
0010				16x9 Letterbox 16x9 Top	0010		1	5 (NTSC) 6 (PAL)	16x9 Letterbox 16x9 Top
0011				16x9 Letterbox 14x9 Top	0011		1	5 (NTSC) 6 (PAL)	16x9 Letterbox 14x9 Top
0100				16x9 Letterbox 16x9 Center	0100		1	5 (NTSC) 6 (PAL)	16x9 Letterbox 16x9 Center
0101, 0110, 0111				Undefined					
1000	7	1	0 5 (NTSC) 6 (PAL)	16x9 Coded Frame	1000	7	11	5 (NTSC) 6 (PAL)	16x9 Coded Frame
1001				16x9 4x3 Center	1001		1	5 (NTSC) 6 (PAL)	16x9 4x3 Center
1010				16x9 Center Protect 16x9	1010	7	1	5 (NTSC) 6 (PAL)	16x9 Center Protect 16x9
1100				Reserved	1100		1	5 (NTSC) 6 (PAL)	Reserved
1101				16x9 4x3 Protect 14x9	1101		1	5 (NTSC) 6 (PAL)	16x9 4x3 Protect 14x9
1110				16x9 Protect 14x9	1110		1	5 (NTSC) 6 (PAL)	16x9 Protect 14x9
1111				16x9 Protect 4x3	1110		1	5 (NTSC) 6 (PAL)	16x9 Protect 4x3

AFD Map Tab

The **AFD Map** sub-tab allows bi-directional re-aspecting from 4x3 frames to companion 16x9 frames, and allows customizing aspect ratio settings for the AFD codes (and the corresponding WSS and VI Translation equivalents) supported by the card.

In the example below, separate control groups for 4x3 and 16x9 coded input frames allow custom ARC (as well as pan/tilt) for various coded frames.

By default, each row is set for its companion re-aspected output, along with output AFD code for the companion output (i.e., 4x3 frames get re-aspected to a companion 16x9 re-aspecting and AFD code, and similarly 16x9 frames get re-aspected to a companion 4x3 re-aspecting and AFD code).

Input:4x3		V Zoom(60-200)	H Zoom(60-200)	Pan	Tilt	Output AFD Code
4x3 Letterbox 16x9 Top 0010		100.0	100.0	0.0	12.5	16x9 0010 Letterbox 16x9 Top
4x3 Letterbox 14x9 Top 0011		116.7	100.0	0.0	7.1	16x9 0011 Letterbox 14x9 Top

Input:16x9		V Zoom(60-200)	H Zoom(60-200)	Pan	Tilt	Output AFD Code
4x3 Letterbox 16x9 Protect 4x3 1111		133.3	100.0	0.0	0.0	16x9 1111 Protect 4x3
16x9 Letterbox 16x9 Top 0010		75.0	100.0	0.0	-12.5	4x3 0010 Letterbox 16x9 Top
16x9 Letterbox 14x9 Top 0011		75.0	100.0	0.0	-7.1	4x3 0011 Letterbox 14x9 Top

16x9 Protect 4x3 1111		100.0	133.0	0.0	0.0	4x3 1111 Letterbox 16x9 Protect 4x3
-----------------------	--	-------	-------	-----	-----	-------------------------------------

Input:16x9		V Zoom(60-200)	H Zoom(60-200)	Pan	Tilt	Output AFD Code
16x9 Letterbox 16x9 Top 0010		75.0	100.0	0.0	-12.5	4x3 0010 Letterbox 16x9 Top

Scaling and Pan/Tilt factors effect the re-aspecting and position offset here that result in a 4x3 0010 Letterbox 16x9 Top image when these defaults are applied.

The AFD coding representing the applied re-aspecting is applied to the output video.

Your card can only mark the output signal with an AFD code, and does not perform any re-aspecting.

Input Audio Status

The fields in the **Input Audio Status** tab display signal status and payload for embedded and discrete audio received by the card. Individual signal status and peak level displays for embedded audio input pairs, and AES pairs 1 thru 8 (where licensed) as described below. AES pair status also shows sample rate.

- **Unlocked** — Indicates AES pair or embedded channel does not contain recognized audio PCM data.
- **PCM** — Indicates AES pair or embedded channel contains recognized AES audio PCM data.
- **Dolby E** — Indicates AES pair or embedded channel contains Dolby® E encoded data.
- **Dolby Digital** — Indicates AES pair or embedded channel contains Dolby® Digital encoded data.



Note — The Dolby status field shown below only occurs for valid Dolby® signals meeting SMPTE 337M standard. If a Dolby® pair is passed through the card without decoding, the signal is passed with all related gain controls set to unity.

	Status	Peak
Emb 1-2	PCM	-34.0 dBFS / -33.5 dBFS
Emb 3-4	PCM	-20.1 dBFS / -20.1 dBFS
Emb 5-6	PCM	-26.0 dBFS / -29.0 dBFS
Emb 7-8	Dolby Digital	Data
Emb 9-10	Dolby E, Line 233	Data
Emb 11-12	PCM	< -150.0 dBFS / < -150.0 dBFS
Emb 13-14	PCM	< -150.0 dBFS / < -150.0 dBFS
Emb 15-16	PCM	< -150.0 dBFS / < -150.0 dBFS
	Status	Peak
AES 1-2	PCM	-34.0 dBFS / -33.5 dBFS
AES 3-4	PCM	-20.1 dBFS / -20.1 dBFS
AES 5-6	Unlocked	---
AES 7-8	Unlocked	---
AES 9-10	Unlocked	---
AES 11-12	Unlocked	---
AES 13-14	Unlocked	---
AES 15-16	Unlocked	---
	Peak	
Analog 1-2	< -126.0 dBu / < -126.0 dBu	
Analog 3-4	< -126.0 dBu / < -126.0 dBu	
Analog 5-6	< -126.0 dBu / < -126.0 dBu	
Analog 7-8	< -126.0 dBu / < -126.0 dBu	

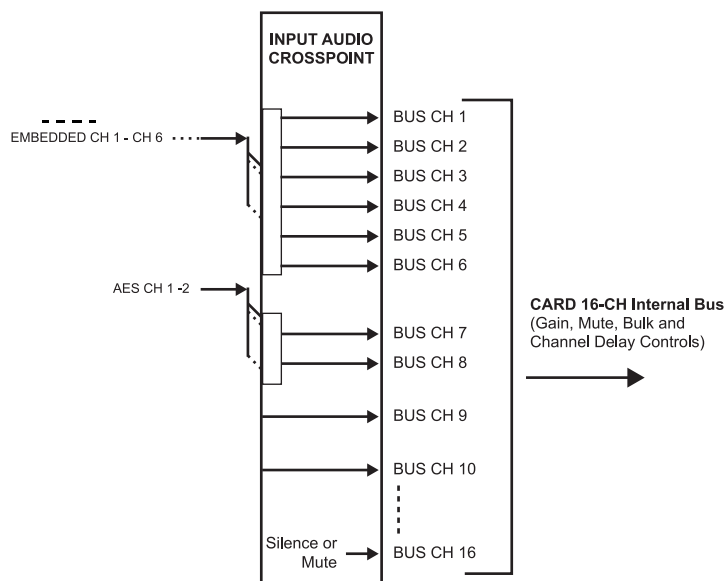
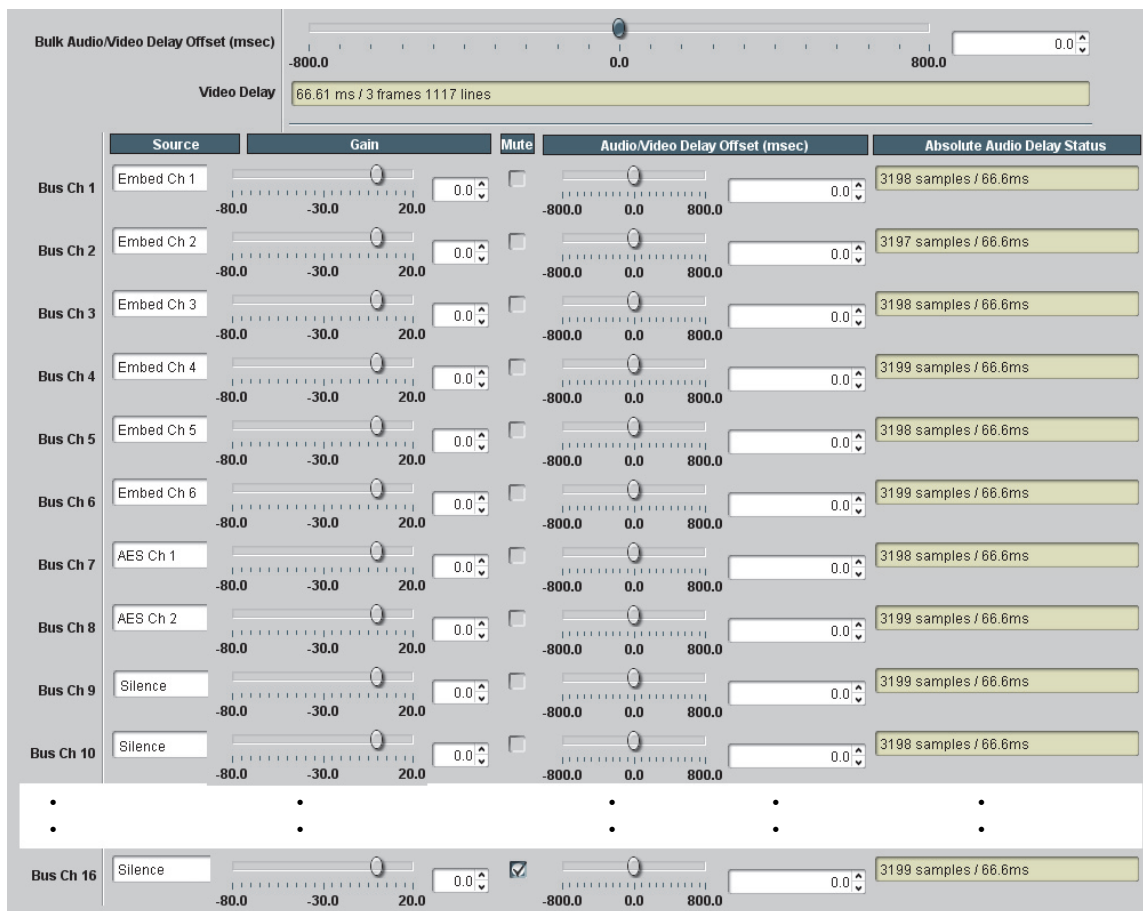
Example of Input Audio Status

For More Information on...

- controls for multi-source audio routing, refer to the section “**Audio Bus Input Routing/Controls Tab**” on page 4-14.

Audio Bus Input Routing Controls

All audio inputs are transferred through the card via the 16-channel Internal Bus. The example below shows various Source selections that direct Emb Ch 1 thru Ch 6 and AES Ch 1 and Ch 2 onto the card internal bus (unused bus channels can be set to Silence or Mute). Each bus channel provides Gain, Mute, and Audio/Video Delay Offset controls. A Bulk Audio/Video Delay control provides master control of all 16 internal bus channels. The source-to-destination correlation shown here is only an example; any of the sources can route to any of the internal bus channels.



Input Downmixers Example

Figure 5.7 shows selection from various sources and the resulting stereo pair Downmix A(L) and Downmix A(R). The two signals comprising the pair can be routed and processed the same as any other audio input source. Note that the stereo pair consists of basic L/R PCM signals with no additional encoded information.

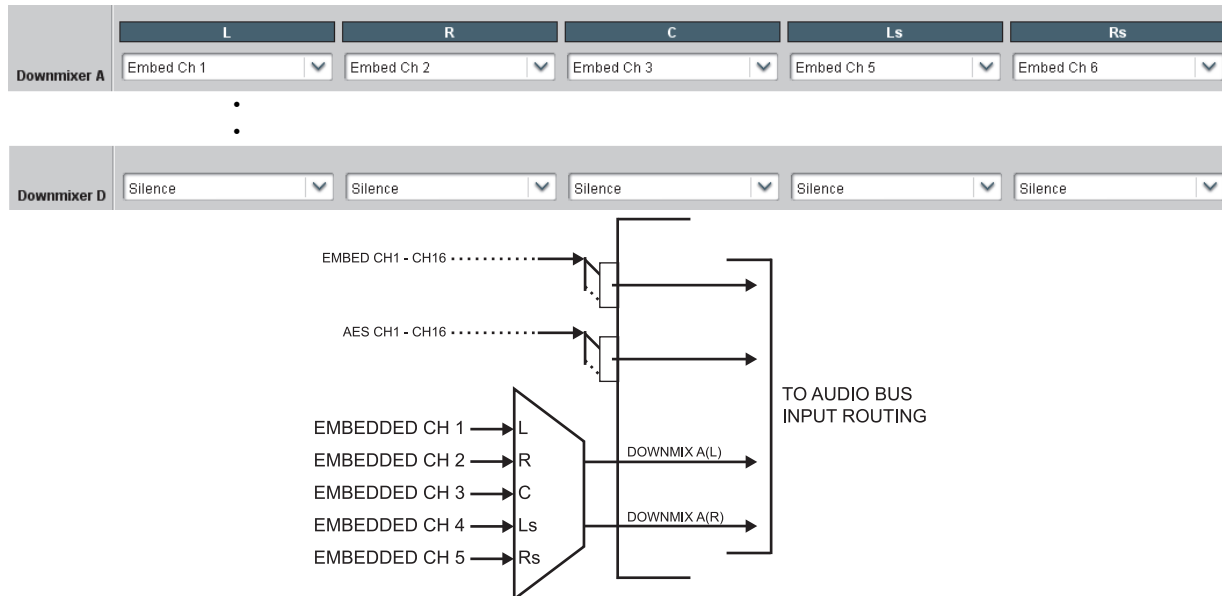


Figure 5.7 Input Downmixers Example

Input Flex Mix Example

Figure 5.8 illustrates input mono mixers provided by selecting Flex Mixer Bus A for the Flex Mix 1 thru Flex Mix 4 inputs, and Flex Mixer Bus B for the next four inputs.

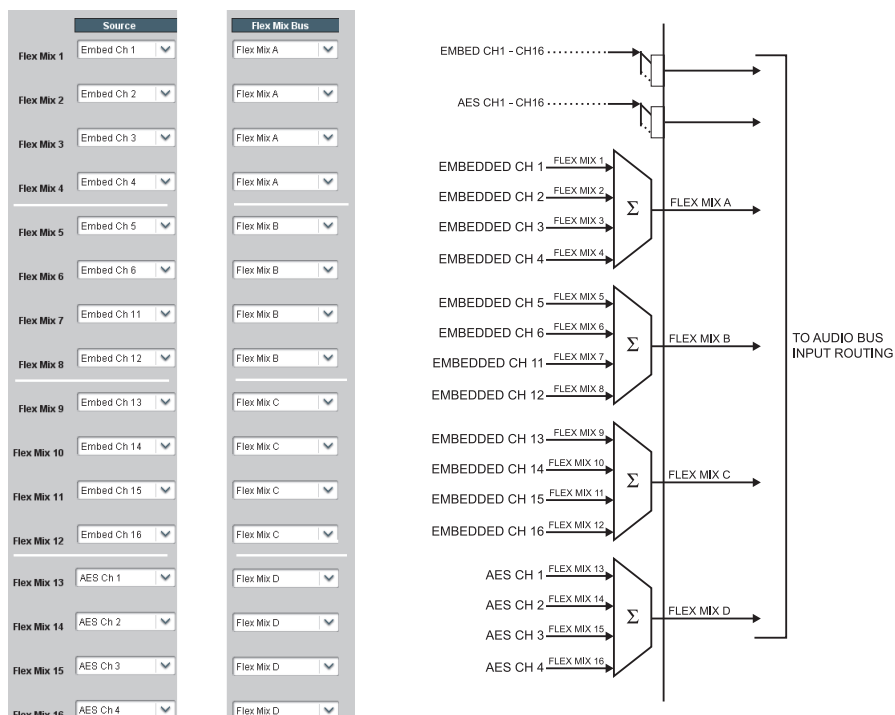


Figure 5.8 Input Flex Mix Example

Output Audio Routing Controls

The card internal bus, Audio DSP outputs, and the Dolby encoder output pair are available as sources for the card embedded audio outputs.

The example here shows various Source routing selections (using the Emb Audio Out sub-tab) that direct upmix outputs L thru Rs to Embedded outputs Ch 1 thru Ch 6, the pre-upmix Bus Ch1 and Ch 2 sources to Embedded outputs Ch 7 and Ch 8, (unused embedded channels can be set to Silence or Mute).

Each bus channel provides Gain, Mute, and a peak level display.

The source-to-destination correlation shown here is only an example; any of the digital audio output destinations described on the following pages can receive inputs from any of the internal bus, or DSP sources.

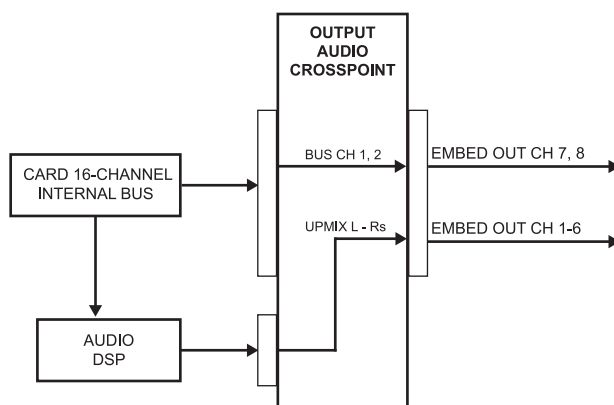


Figure 5.9 Example of Output Audio Routing Setup

Custom Preset Loudness Processing

The **Custom Preset** sub-tab provides custom detailed parametric controls for modifying any of the factory Presets profiles to suit user preferences.

Modification of default presets settings using the Custom Preset page can have a profound effect on program material technical and aesthetic aspects. Setup should only be performed by authorized personnel, and should be fully assessed before being used for on-air programming.

Custom settings may result in loudness processing that is no longer compliant with ITU BS.1770 – ATSC A/85.

The Custom Preset page exposes parametric controls correlating to functional blocks as shown in **Figure 5.10**.

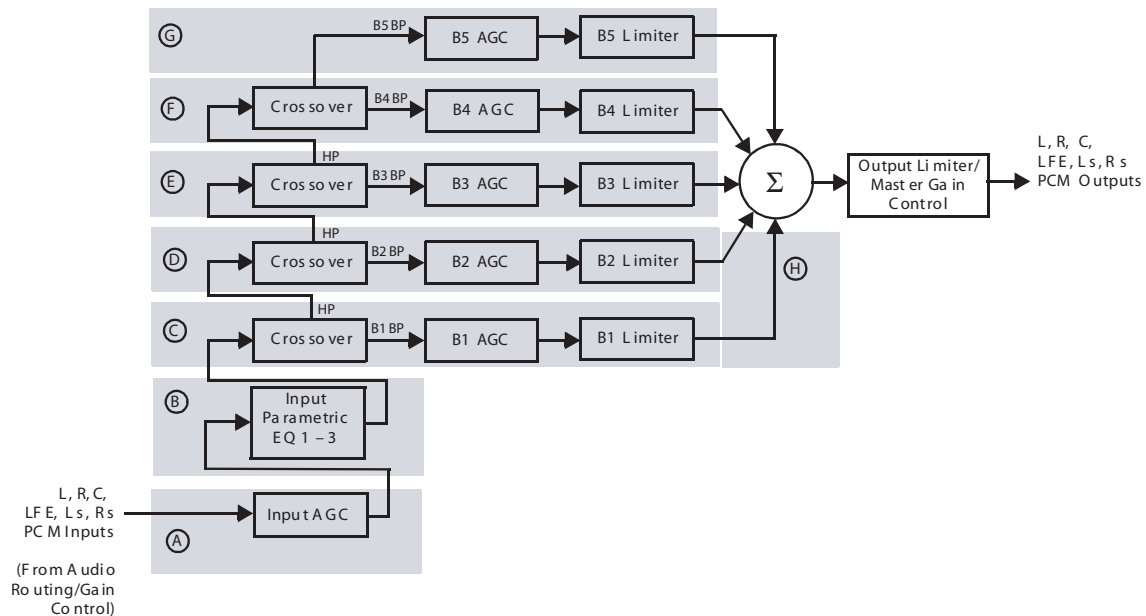


Figure 5.10 Custom Preset Example

Loudness Metering

Shown below are the **Custom Preset** sub-tab parametric controls corresponding to A thru H on the previous page. Non-standard controls and unique functions are described below.

- **Parametric EQ 1 thru 3** — Provides 3 bands to provide notch filters. Default set to 0 dB (no effect). Each filter has a ± 12 dB gain control, and selectable center frequencies from 20 Hz – 22.05 kHz.
- **Inf:>1Thr** check boxes — When enabled, automatically increases AGC ratio to Infinity:1 once a signal exceeds the AGC threshold, allowing for expansion below the threshold and limiting above the threshold. Useful for bass frequency control.
- **Soft Clip controls** — For low-frequency bands 1 and 2, sets the point above in which band 1 (low bass) and band 2 (mid bass) are very quickly limited, acting more like a clipper without the artifacts. This helps maintain a “tight” bass sound.

Applying and Saving Custom Presets

Presets are engaged on the **Channel Mapping** sub-tab page. The Presets drop-down on this page only populate the fields here with the defaults used for a particular preset profile.

1. In **Presets** drop-down on the **Channel Mapping** sub-tab page, select **Custom**.
2. On this sub-tab page, select the default preset to “build from” (i.e., preset closest to desired custom) and press **Load Template**. The fields here are now populated with the detailed default settings for the selected default preset profile.
3. Perform parametric changes as desired. Listen to material and assess changes performed. **Note:** Any changes made on this page are saved using card global presets and not locally on this page.
4. Save the custom settings in accordance with Presets tab instructions in Chapter 3. Operating Instructions of the card’s product manual.

The screenshot displays the 'Custom Preset' configuration interface. It is organized into several sections with various controls:

- Input AGC:** Gate Threshold dB (-21.0), Freeze Threshold dB (-31.0), Ratio (12.5:1), AGC Range dB (25.0), Threshold dB (-14.0), Attack ms (24), Release ms (42).
- Parametric EQ 1:** Frequency Hz (23), Level dB (0), Q (1.50).
- Parametric EQ 2:** Frequency Hz (2890), Level dB (0), Q (2.00).
- Parametric EQ 3:** Frequency Hz (15530), Level dB (0), Q (1.00).
- MultiBand AGC All:** Ratio (2.7:1), Range dB (16.0), Progressive Rise ms (50).
- MBAGC Low Bass 20-60hz:** Inf:>1Thr (unchecked), Attack ms (22), Release ms (56), Threshold dB (0.0), Limit Threshold dB (6.8), Output Level dB (0.0).
- MBAGC Mid Bass 30-200hz:** Inf:>1Thr (unchecked), Attack ms (32), Release ms (67), Threshold dB (0.0), Limit Threshold dB (9.0), Output Level dB (0.0).
- MBAGC Low Mid 170hz-1.2khz:** Inf:>1Thr (unchecked), Attack ms (42), Release ms (68), Threshold dB (0.0), Limit Threshold dB (9.5), Output Level dB (0.0).
- MBAGC High Mid 0.95-6.1khz:** Inf:>1Thr (checked), Attack ms (46), Release ms (74), Threshold dB (0.0), Limit Threshold dB (11.2), Output Level dB (0.0).
- MBAGC Brilliance >5.2khz:** Inf:>1Thr (checked), Attack ms (66), Release ms (84), Threshold dB (0.0), Limit Threshold dB (12.0), Output Level dB (0.0).
- MultiBand Soft Clip:** B1 Soft Clip Thr dB (6.0), B2 Soft Clip Thr dB (6.0), Output Lim Drv dB (-5.0).

At the bottom right, it states: 'Manufactured under license from Linear Acoustic Inc.™'

Figure 5.11 Example of Configuring Custom Presets

In **Figure 5.12**, the last 3 measurement periods are averaged in each reported LUFS value. This cycle is continually repeated. The Measurement Window parameter sets the sampling time accumulated before each averaging recalculation.

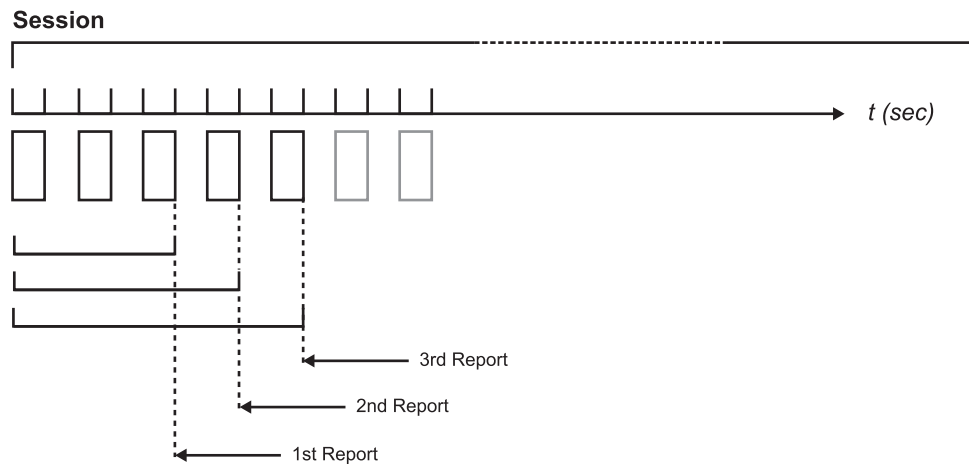


Figure 5.12 Example of Averaged Measurements

Upmixing

Separate drop-down lists for **Left**, **Right**, **Center**, **LFE**, **Left Surround**, and **Right Surround** allow a stereo pair to be upmixed to 5.1-channel.

L	R	C
Bus Ch 1	Bus Ch 2	Bus Ch 3

LFE	Ls	Rs
Bus Ch 4	Bus Ch 5	Bus Ch 6

Example of Upmixer Bus Channel Selections

The example here shows selection of bus channels 1 and 2 as the received stereo source (**Bus Ch 1** and **Ch 2** for **Left** and **Right** drop-down list selections in the Upmixer Selection tool). Using the setup shown in the example, when upmix is active (either forced upmix or auto-enabled) the **Upmix L** thru **Upmix Rs** channels comprise a 5.1-channel upmix of the input stereo pair. If any content is present on the monitored C, LFE, Ls, or Rs input channels whose is above a user-defined level threshold (Bus Ch 3 thru Ch 6 in this example), all six inputs channels pass through the upmixer, with upmixing bypassed. Upmixer output channels **Upmix L** thru **Upmix Rs** are available as sources for the card audio output routing.

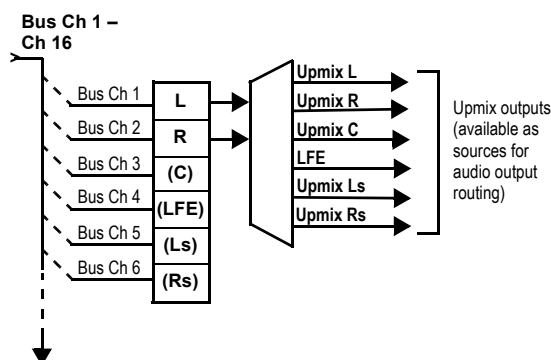


Figure 5.13 Upmixer Output Channels

Typically the 5.1 Detection Threshold control should be set to provide a usable threshold that maintains a threshold at which valid levels large enough over the threshold disable the auto upmix (A) while nuisance levels considerably below the threshold (B) are rejected, allowing the upmixer to stay locked in the enabled mode and overwrite these signals with the new signals.

Optimum setting is dependent on program material general overall levels. A -60dB setting is recommended for material closely adhering to the SMPTE -20dBFS Alignment level for normal material such as dialog.

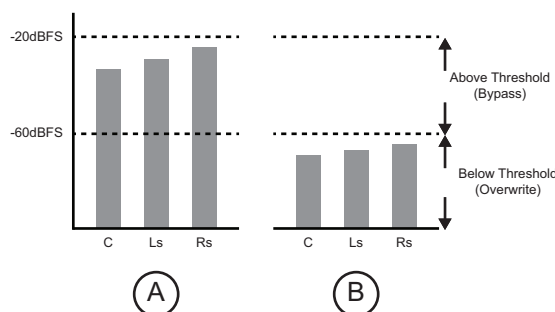


Figure 5.14 5.1 Detect Threshold Example

COM and Metadata Routing

For serial ports 1 and 2, you can select the source for metadata to be exported (outputted) from the card over a port as shown from the choices listed to the left and shown below. (None selection frees the port to be used as an input.)

If settings here and described below attempt to set a given port as both an output and an input, Serial Ports Conflicts status display indicates conflict such as “Port A configured as both input and output”.

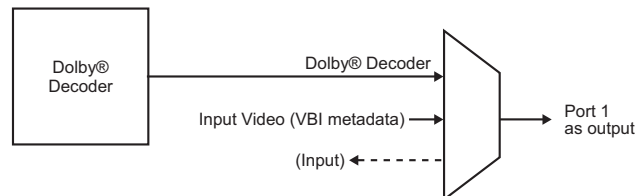


Figure 5.15 Port as an Output

For VBI embedding at the card SDI output, selects the source of metadata to be exported (outputted) from the card from the available choices and shown below.)

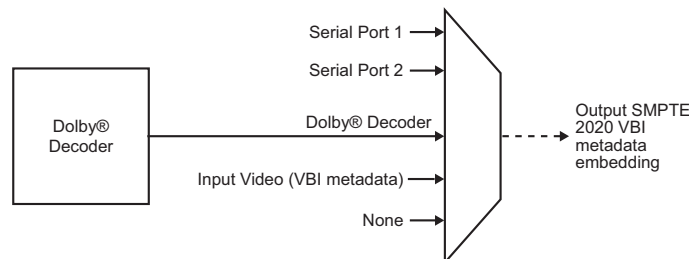


Figure 5.16 Example of VBI Embedding at the SDI Output

Indicates if Dolby metadata is present on input SDI VBI, as well as VBI line number. If no metadata present, displays “Not Present”.

Although the output line drop-down will allow any choice within the 9 thru 41 range, the actual range is automatically clamped (limited to) certain ranges to prevent inadvertent conflict with active picture area depending on video format. Refer to the section “**Ancillary Data Line Number Locations and Ranges**” on page 5-4 for more information.

The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data unless existing metadata is to be intentionally overwritten.

Typically, when encoding is active it is recommended that whatever metadata source the encoder is using (e.g., input video SMPTE 2020, decoder, or serial) be also applied to metadata output embedding, and also that the line number be set to overwrite obsolete input VBI metadata. This avoids any ambiguity of having different metadata packets on multiple lines.

GPI Controls

The LDP-8242 provides two independent GPI controls for **GPI 1** and **GPI 2** that invoke a user-defined card preset upon receiving a contact closure-logic level on the corresponding GPI input.

Edge GPI Coding

Edge GPI coding triggers on transitional state changes occurring on individual GPI inputs for the four states on the GUI (Figure 5.17).

In this example, when **GPI 2** “closes” (edge trigger going from HI to LO), **Preset 7** is invoked. Preset 7 would be defined to invoke the settings desired for this GPI action.

When GPI 2 “opens” (edge trigger going from LO to HI), **Preset 8** is invoked. Preset 8 could be defined to invoke normal settings to revert to the pre-GPI condition. The state shown in bold is the currently active state.

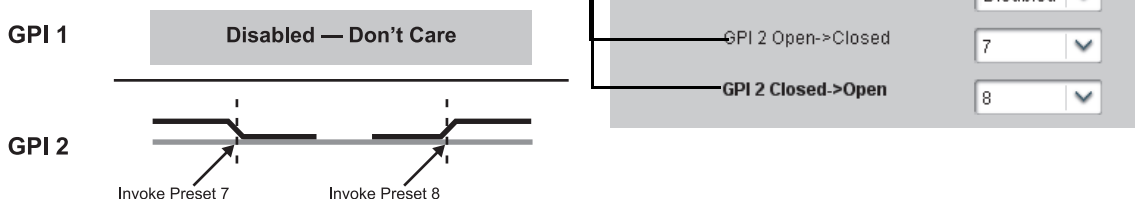


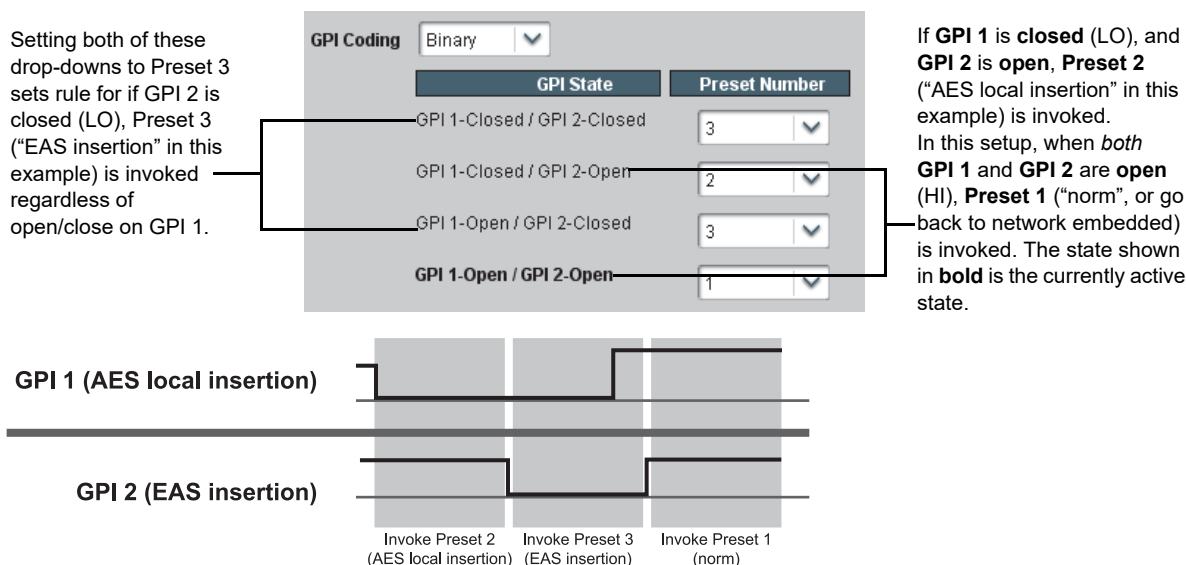
Figure 5.17 Example of Edge GPI Coding

Binary GPI Coding

Binary GPI coding triggers on conditions that consider state combinations on both GPI 1 and GPI 2 for the four state combinations on the GUI (Figure 5.18). This mode is useful where both GPIs must be considered before invoking an action. In Figure 5.18, both GPIs are to be considered:

- “AES local insertion” on GPI 1 preempts network embedded audio by invoking Preset 2.
- “EAS insertion” on GPI 2 preempts both network embedded audio and AES local insertion by invoking Preset 3.

Setting both of these drop-downs to Preset 3 sets rule for if GPI 2 is closed (LO), Preset 3 (“EAS insertion” in this example) is invoked regardless of open/close on GPI 1.



If **GPI 1** is **closed** (LO), and **GPI 2** is **open**, **Preset 2** (“AES local insertion” in this example) is invoked. In this setup, when **both GPI 1 and GPI 2** are **open** (HI), **Preset 1** (“norm”, or go back to network embedded) is invoked. The state shown in **bold** is the currently active state.

Figure 5.18 Example of Binary GPI Coding

Using Presets

Presets allow convenient recall of custom user settings performed on the card.

Saving and Uploading a Preset

When a preset is invoked, **only** the setting changes called by the preset are re-loaded, avoiding unnecessary delay or signal disruption that would otherwise result from a global preset change.



Note — Preset transfer between card download and file upload is on a group basis (i.e., individual presets cannot be downloaded or uploaded separately. After uploading a presets file, engagement of a desired preset is only assured by pressing the **Press To Load** button for a desired preset.

To save your settings to a preset

1. Click **Save** to display the **Save** dialog. This button is located at the bottom of the **Presets** tab and next to the **Download Presets** field.
2. Browse to a desired save location. For example, My Documents\My Presets.
3. If desired, re-name the file before committing the save.
4. Click **Save** in the **Save** dialog.

To upload a preset

1. Click **Upload** to display the **Open** dialog. This button is located at the bottom of DashBoard window.
2. Browse to the location where the file was saved on the computer or drive.
3. Select the desired file.
4. Click **Open** to load the file to the card.

Event Based Loading

Event-based loading allows a defined preset to be automatically engaged upon various received signal statuses. Event-based loading is particularly useful in providing automated card setup when transitioning from normal processing to processing supporting an alternate format. as **Figure 5.19** provides an example of an event based loading setup when transitioning from network HD to local/legacy SD.

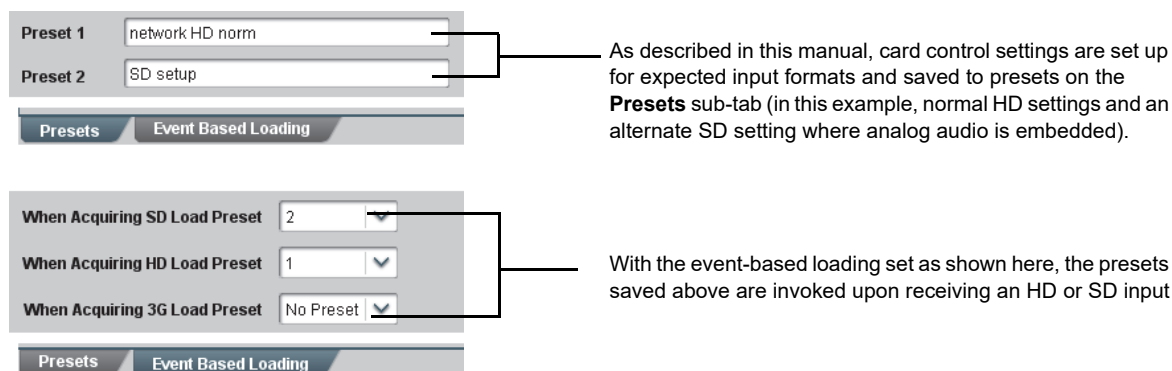


Figure 5.19 Example of Event Based Loading

Troubleshooting

In This Chapter

This chapter provides general troubleshooting information and specific symptom/corrective action for the LDP-8242 card and its remote control interface. The LDP-8242 card requires no periodic maintenance in its normal operation; if any error indication (as described in this chapter) occurs, use this chapter to correct the condition.

The following topics are discussed:

- Error and Failure Indicator Overview
- Card-edge Status/Error Indicators and Display
- DashBoard Status/Error Indicators and Displays
- Basic Troubleshooting Checks
- Processing Error Troubleshooting
- Troubleshooting an Upgrade

Error and Failure Indicator Overview

The LDP-8242 card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the LDP-8242 card is being used (i.e, standalone or network controlled through DashBoard), check all available indications in the event of an error or failure condition.

The various LDP-8242 card and remote control error and failure indicators are individually described in the following sections.

The descriptions below provide general information for the various status and error indicators. For specific failures, also use the appropriate sub-section listed below.

- **“Basic Troubleshooting Checks”** on page 6-5
- **“Processing Error Troubleshooting”** on page 6-6

Card-edge Status/Error Indicators and Display

Figure 6.1 shows and describes the LDP-8242 card-edge status indicators and display. These indicators and the display show status and error conditions relating to the card itself and remote (network) communications (where applicable). Because these indicators are part of the card itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.

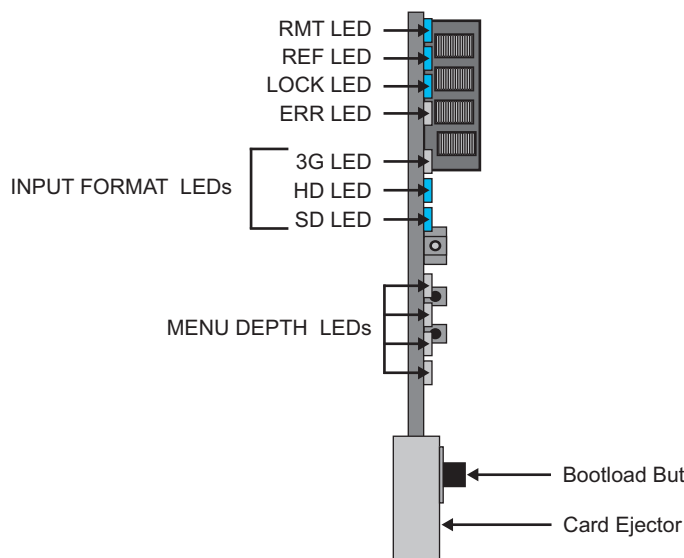


Figure 6.1 Card-edge Status Indicators and Display

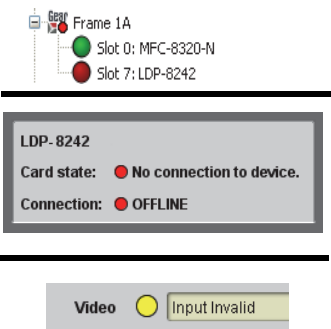
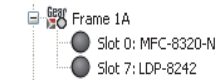
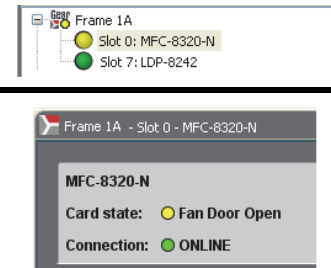

Table 6.1 Status/Error Indicators and Display

Item	Function
Display	Displays 4-digit abbreviated code showing menu and sub-menu selections. When in a menu displaying a parameter setting, the display shows parametric scalar value (and +/- sign where applicable).
Card-edge Manual Controls	These controls are not implemented.
Input Format Indicators	Three blue LEDs indicate the input signal format being received and locked onto by the LDP-8242: <ul style="list-style-type: none"> • HD (1080p2997/25, 720p) • SD (625i, 525i) Continuous cycling of the LEDs indicates the LDP-8242 has not locked onto a particular format (as in the case of no signal input).
Menu Depth Indicators	This function is currently not implemented.
RMT LED	When flashing, this LED indicates that the LDP-8242 is receiving control message from remote network control (DashBoard)
REF LED	When lit, this LED indicates that the LDP-8242 is receiving valid framesync when set up for framesync reference.
LOCK LED	When lit, this LED indicates that the LDP-8242 unable to lock to framesync, or unable to lock to input standard.
ERR LED	This LED is not implemented.

DashBoard Status/Error Indicators and Displays

Table 6.2 shows and describes the DashBoard status indicators and displays. These indicator icons and displays show status and error conditions relating to the LDP-8242 card itself and remote (network) communications.

Table 6.2 DashBoard Status Indicators Icons and Displays

Indicator Icon or Display	Error Description
	<p>Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the LDP-8242 card in slot 7).</p> <p>Specific errors are displayed in the Card Info pane (in this example "No connection to device" indicating LDP-8242 card is not connecting to frame/LAN).</p> <p>If the LDP-8242 card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).</p>
	<p>Gray indicator icon in Card Access/Navigation Tree pane shows card(s) are not being seen by DashBoard due to lack of connection to frame LAN (in this example, both a LDP-8242 card in slot 7 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen).</p>
	<p>Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the MFC-8320-N Network Controller Card).</p> <p>Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card "Slot 0: MFC-8320-N") opens the Card Info pane for the selected card. In this example, a "Fan Door Open" specific error is displayed.</p>
	<p>Yellow indicator icon in LDP-8242 Card Info pane shows error alert, along with cause for alert (in this example, the LDP-8242 is receiving no video input, or a video input that is invalid for the card and/or its current settings).</p>

Basic Troubleshooting Checks

Failures of a general nature (affecting many cards and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. **Table 6.3** provides basic system checks that typically locate the source of most general problems. If required and applicable, perform further troubleshooting in accordance with the other troubleshooting tables in this section.

Table 6.3 Basic Troubleshooting Checks

Item	Checks
Verify for power presence	On both the frame Network Controller Card and the LDP-8242, in all cases when power is being properly supplied there is always at least one indicator illuminated. Any card showing no illuminated indicators should be cause for concern.
Check Cable connection secureness and connecting points	Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on BNC connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended card inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.
Card seating within slots	Make certain all cards are properly seated within its frame slot. (It is best to assure proper seating by ejecting the card and reseating it again.)
Check status indicators and displays	On both DashBoard and the LDP-8242 card-edge indicators, red indications signify an error condition. If a status indicator signifies an error, proceed to the following tables in this section for further action.
Troubleshoot by substitution	All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item.

Processing Error Troubleshooting

Table 6.4 provides LDP-8242 processing troubleshooting information. If the LDP-8242 card exhibits any of the symptoms listed in **Table 6.4**, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the LDP-8242 is not appropriately set for the type of signal being received by the card.

The error indications shown below are typical for the corresponding error conditions listed. Other error indications not specified here may also be displayed on DashBoard and/or the LDP-8242 card-edge status indicators.

Where errors are displayed on both the LDP-8242 card and network remote controls, the respective indicators and displays are individually described in this section.

Table 6.4 Troubleshooting Processing Errors by Symptom

Symptom	Error/Condition	Corrective Action
<ul style="list-style-type: none"> DashBoard shows Video yellow icon and Input Invalid message in LDP-8242 Card Info pane. Card-edge Input Format LEDs show continuous cycling. 	No video input present	Make certain intended video source is connected to appropriate LDP-8242 card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
DashBoard shows none in Reference message in LDP-8242 Card Info pane.	Frame sync reference not properly selected or not being received	<ul style="list-style-type: none"> If external frame sync reference is not intended to be used, make certain the Framesync Mode selection list is set to Free Run or Input Video as desired. If external frame sync reference is intended to be used, make certain selected external frame sync reference is active on frame sync frame bus. (External reference signals Reference 1 and Reference 2 are distributed to the LDP-8242 and other cards via a the frame bus.). Refer to the section “ Framesync Tab ” on page 4-8 for more information.
Video/audio synchronization or delay noted.	Source synchronization condition	Use the Audio/Video Delay Offset controls to compensate for video/audio delay. Refer to the section “ Audio Bus Input Routing/Controls Tab ” on page 4-14 for more information.
Ancillary data (closed captioning, timecode, Dolby® metadata, AFD) not transferred through LDP-8242.	VANC line number conflict between two or more ancillary data items	Make certain each ancillary data item to be passed is assigned a unique line number (refer to the section “ Ancillary Data Line Number Locations and Ranges ” on page 5-4).
AES audio not processed or passed through card.	AES Port Direction Select not set to match intended use for AES rear module port.	Each AES channel pair has port direction selectors that set the AES as input or output. Make certain port is set as input or output, as intended, in accordance with the section “ Output Audio Routing Controls ” on page 5-16.

Table 6.4 Troubleshooting Processing Errors by Symptom (Continued)

Symptom	Error/Condition	Corrective Action
Card will not retain user settings, or setting changes or presets spontaneously invoked.	GPI Controls tab GPI Coding set to Binary with no controlled GPI source connected to GPI inputs	If GPI is not to be used, make certain GPI Coding control on GPI Controls tab is set to Disabled. (If control is left on Binary with no inputs, the pull-up HI logic state on the open inputs will be interpreted as two “HI’s” on the inputs, resulting in an invoked preset.

Troubleshooting an Upgrade

In very rare cases of the card locking up during a firmware upgrade (such as power interruption during the upgrade process), the LDP-8242 can be set to boot from its non-volatile file (safe image) held in the card's RAM. When this safe image is loaded, the LDP-8242 is now rebooted/unlocked and can receive a target firmware upgrade *.bin file. Contact Ross Technical Support for this file.

Perform the following steps in the order listed as necessary until correct operation is restored.



Note — *The LDP-8242 presets may be erased following this procedure. You may be able to re-apply them after performing this procedure as described in the section “Using Presets” on page 5-23.*

To recover the card after a failed upgrade

1. Place the LDP-8242 in its frame slot but do not fully insert into the slot yet.
2. Hold the lower (**Bootload**) button in and slide the card into a powered frame slot. Refer to **Figure 3.1** for the button location.
3. With the card fully in the slot, continue holding the button for approximately 3 seconds.
4. Release the button.
5. When the card-edge 4-character display reports “BOOT”, the card is now rebooted and ready to receive its firmware *.bin operating file.
6. Display the LDP-8242 in DashBoard as outlined in the section “**Accessing the Card via DashBoard**” on page 5-3.
7. Select the **Product** tab. Note the recovery image now shown in the **FPGA Version** field. This indicates that the LDP-8242 is ready to receive its operating firmware *.bin file.
8. Upload the desired LDP-8242 firmware *.bin file as follows:
 - From the **Device View**, click **Upload** to display the **Select file for upload** dialog.
 - Navigate to the *.bin upload file you wish to upload.
 - Click **Open**.
 - Click **Finish** to display the **Uploading to Selected Devices** dialog.
9. Monitor the upgrade.

Specifications

In This Chapter

This chapter provides the technical specification information for the LDP-8242. Note that technical specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section provides technical specifications for the LDP-8242. Input/output types and number of input/outputs in some cases are a function of option(s) installed. Input/outputs requiring options are specified below. Refer to **Table 1.2** for detailed information on available input/output complements and corresponding options/rear module requirements

Table 7.1 LDP-8242 Technical Specifications

Category	Parameter	Specification
Standards Accommodated	HD	1080i 59.94, 1080i 50, 1080p 29.97, 1080p 25 720p 59.94, 720p 50, 720p 29.97, 720p 25
	SD	486i 59.94, 576i 50
SDI Inputs and Outputs	Number of Inputs	4 BNC input connectors (maximum)
	Number of Outputs	4 BNC output connectors (maximum)
	Data Rates Supported	SMPTE 292 HD-SDI: 1.485Gbps or 1.485/1.001Gbps SMPTE 259M-C SD-SDI: 270Mbps
	Impedance	75W terminating
	Return Loss	-10dB
	Cable Equalization	HD: 591ft (180m) Belden 1694A
		SD: 1050ft (320m) Belden 1694A
	Jitter, Alignment (HD / SD)	0.2UI / 0.2UI
	Jitter, Timing (HD / SD)	1.0UI / 0.2UI
	Connector Type	BNC
AES Inputs and Outputs (LDP-8242-A)	Number of inputs/outputs (maximum total between inputs and outputs)	8 pairs (16-channel) on BNC connectors per AES3-id
	SMPTE Standards Accommodated	SMPTE 276M
	Impedance	75W
	Return Loss	> 15dB @ up to 6.144MHz
	Input Level	0.2 to 2.0Vp-p
	Output Level	1.0Vp-p
	Input SRC Range	32kHz to 96kHz
	Connector Type	BNC
Audio/Video Delay	Frame Sync Min. Latency	2 lines
	Configurable Video Delay (HD / SD)	1.0 / 5.0 seconds (max.)
	Configurable Audio Delay	<ul style="list-style-type: none"> • 16-channel; independent delay per channel; 1 sample step size • Up to 5 sec delay for each channel

Table 7.1 LDP-8242 Technical Specifications

Category	Parameter	Specification
Frame Reference Input	Number of Inputs	Two non-terminating (looping) Frame Reference inputs with selectable failover
	Standards Supported	SMPTE 170M/318M (“black burst”) SMPTE 274M/296M (“tri-color”)
	Return Loss	> 35dB up to 5.75MHz
Serial Ports	Number of Ports	2
	Rx Functions	Closed captioning input, Dolby® metadata input
	Tx Functions	Closed captioning output, Dolby® metadata output, card status logging
	Connector Type	Each port is 3-wire independently configurable for RS-232 or RS-485 protocol using Phoenix Contact™ connectors with removable screw terminal blocks
GPI Ports	Number of Ports	2
	Mapping	User-configurable; GPI activation invokes a selected user preset (see the “ Response ” specifications below)
	Response	GPI acknowledge upon falling-edge input triggered by $R \leq 10k\Omega$ (or $V_{in} \leq 2.0V$) GPI release upon rising-edge input triggered by $R \geq 10k\Omega$ (or $V_{in} \geq 2.0V$) “G” (GND) terminal at chassis-ground potential; suitable for use with 3.3V LVCMOS logic
	Maximum Recommended Logic Control Voltage Range	0 to 5 VDC
	Connector Type	Each port is opto-isolated with self-sourcing current on 3-wire (IN 1, IN 2, GND) Phoenix Contact™ connector with removable screw terminal blocks
Other	Internal Tone Generators	8 built-in tone generators, each configurable for 18 discrete sine wave frequencies ranging from 50Hz to 16kHz Generator source signal level is equivalent to -20dBu
	Frame Communications	10/100Mbps Ethernet with Auto-MDIX
Environment	Operating temperature:	32°F – 104°F (0°C – 40°C)
	Relative humidity (operating or storage)	< 95%, non-condensing
Power	Max. Power Consumption	< 20W

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your LDP-8242, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the “**Contact Us**” section.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Re-seat the Card in the Frame** — Eject the card and re-insert it into the frame.
4. **Check Control Settings** — Refer to the Installation and User Controls sections of this manual to verify all user-adjustable component settings.
5. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
6. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
7. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Warranty and Repair Policy

The LDP-8242 is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your LDP-8242 proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this LDP-8242 has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This LDP-8242 User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the LDP-8242 are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

In Case of Problems

Should any problem arise with your LDP-8242, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your LDP-8242. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

The Ross Video Technical Support Department will continue to provide advice on any product manufactured by Ross Video Limited, beyond the warranty period without charge, for the life of the equipment.

Contact Us

Contact our friendly and professional support representatives for the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

Technical Support

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