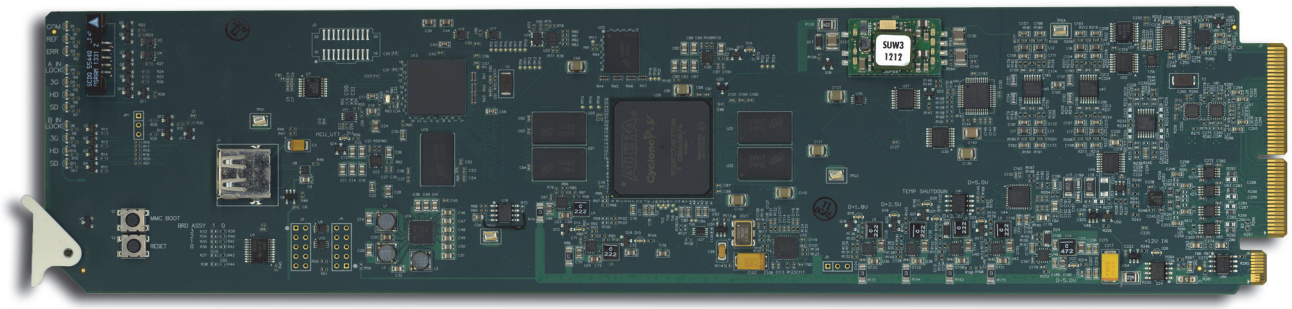
openGear

HDC-8223(-S)

HD-Down Converter and Distribution Amplifier

User Manual



ROSS

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Our mission is to:

1. Provide a Superior Customer Experience
    - offer the best product quality and support
2. Make Cool Practical Technology
    - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at *solutions@rossvideo.com*.

David Ross
CEO, Ross Video
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Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
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.)*

HDC-8223(-S) User Manual

- Ross Part Number: 8223DR-004-05
- Release Date: June 20, 2016.

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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.

Important Regulatory and Safety Notices to Service Personnel

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

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage to persons or equipment.

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 frames. 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.*

Warning — *Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.*

Warning — *Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.*
This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained with the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair. To reduce the risk of fire, replacement fuses must be the same time and rating. Only use attachments/accessories specified by the manufacturer.

EMC Notices

United States of America
FCC Part 15

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

Notice — *Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.*

CANADA

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appariel numerique de la classe "A" est conforme a la norme NMB-003 du Canada.

EUROPE

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

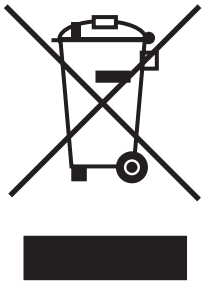
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Contact Us" section on the last page of this manual. All openGear products 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.

Environmental Information

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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Contents

Introduction

In This Chapter

This chapter contains the following sections:

A Word of Thanks

Congratulations on choosing an openGear HDC-8223(-S) HD Down Converter and Distribution Amplifier. 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 HDC-8223(-S), 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 HDC-8223(-S) is a monitoring quality down-converter that also offers optional audio support. The down-converted SDI and analog composite signals are selected through four, 2:1 crosspoints allowing any combination of SD-SDI or analog composite (CVBS) outputs on the four card processed video outputs. With the R2C-8223 full rear module, four analog audio channels are available.

The HDC-8223(-S) also provides ARC processing and timecode/closed-captioning conversion from packet-based timecode formats and CEA608/708 HD formats to SD VITC-based (waveform) timecode and line 21 closed captioning (available on both SDI and analog video outputs).

The HDC-8223(-S) provides the following inputs and outputs:

- **HD/SD SDI IN A / SDI IN B** – two dual-rate HD/SD-SDI inputs (GUI-selectable or basic failover)
- **PROCESSED VIDEO OUT (1-4)** – via four independent 2:1 GUI-selectable crosspoints, each of the four BNC outputs can independently be set as SD-SDI or analog composite (CVBS) outputs
- **RLCK OUT (1-4)** – four HD/SD-SDI reclocked buffered video outputs
- **AN-AUD OUT (1-4)** – four balanced analog audio outputs *(R2C-8223 rear module only)*

Video Subsystem Overview

The HDC-8223(-S) features a downconverting scaler, video proc, and user-adjustable aspect ratio control and zoom control. The HDC-8223(-S) video subsystem also provides the functions described below.

Rear Modules

The HDC-8223(-S) physically interfaces to system video connections at the rear of its frame using a rear module.

All inputs and outputs shown in **Figure 1.3** enter and exit the card via the card edge backplane connector. The rear module breaks out the HDC-8223(-S) card edge connections to BNC and other connections that interface with other components and systems in the signal chain.

For More Information on...

- the required rear modules, refer to the section "**Supported Rear Modules**" on page 2-3.

Input Select

The HDC-8223(-S) can select from either of two HD/SD-SDI inputs using either manual control, or settings that provide failover to the alternate secondary input. (Failover is simple signal presence check only.)

Video Processor

The HDC-8223(-S) provides full color processing control (luma gain and lift, chroma saturation, and color phase) of the output video.

Scaler Function

The scaler function provides down-conversion to SD from multiple standard SD and HD video formats and multiple frame rates, with auto-format detect/down-conversion of SMPTE 292/259M formats. Color framing is preserved on CVBS outputs for all conversions.

The scaler function also provides aspect ratio conversion that provides a choice from several standard aspect ratios. User-defined settings allow custom user-defined H and V aspect ratio control, as well as pan/tilt control. Reticule insertion provides safe action area marking as well as other reticule functions and patterns.

Frame Sync (HDC-8223-S Only)

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

This option 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. 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).

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.

Closed Captioning Processor

This function provides support for closed captioning setup. When receiving HD-SDI, both CEA 608 and CEA 708 are supported, with CEA 608 and CEA 708 (containing CEA 608 packets) converted to line 21 closed captioning on outputs down-converted to SD.

Timecode Processor

As illustrated in **Figure 1.1**, this function provides for extraction of timecode data from the input video, and in turn re-insertion of timecode data into the output SDI or analog composite. In this manner, timecode data can be preserved, even after format conversion. The function can monitor the SDI video input of the card for supported timecode formats and convert the timecode to either or both ATC_VITC or VITC waveform (with selectable odd/even field line number control). ATC_VITC and VITC waveform outputs are available on SD-SDI outputs; VITC waveform only is available on CVBS outputs.

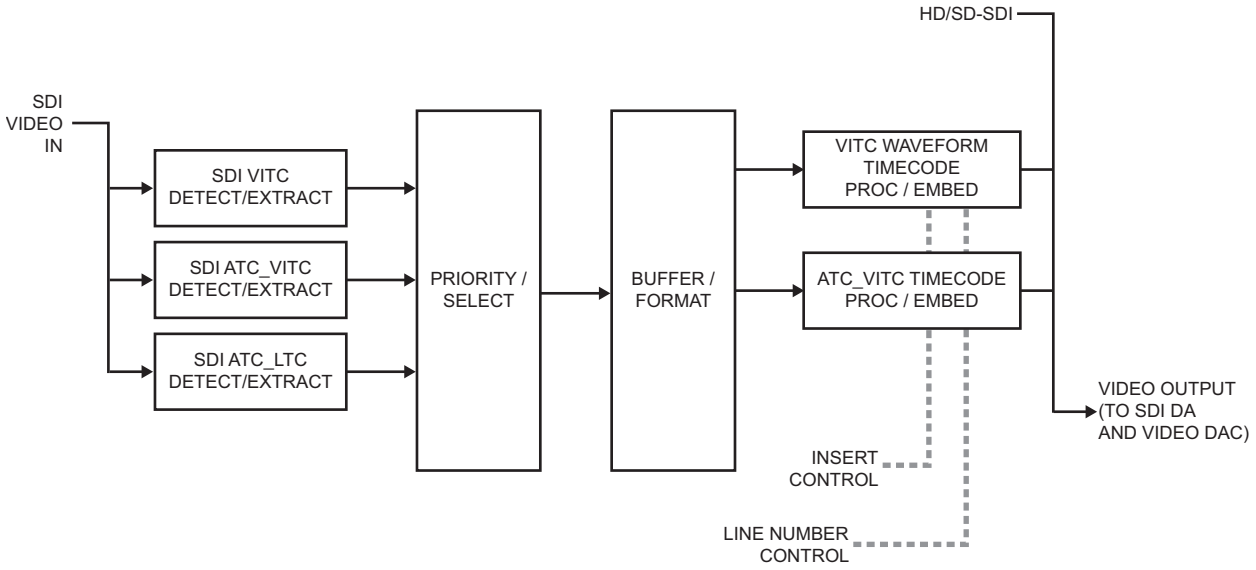


Figure 1.1 *Timecode Processor*

Audio Overview

The audio processor operates as an internal audio router. This function chooses from the following inputs:

- 16 channels of embedded audio from the SDI video input (1-to-1 routing to SDI output)
- 16 discrete tone generators (with ascending frequencies of 100Hz to 16 kHz; default -20dBFS level)
- Downmix L/R

The router function provides the following audio outputs:

- 16 channels of embedded audio on SDI processed outputs
- 4 channels of balanced analog audio on four 3-wire balanced analog audio outputs

Output audio crosspoints allow any of these sources to be routed to any of the 16 embedded output channels or the four analog audio outputs. Each output channel has a mute control and phase invert control. Peak-responding DashBoard bar graph level meters are also provided.

The processor function provides group enable/disable and de-embedding of the 16-channel embedded audio SDI input. A bulk delay control allows lip sync correction by offsetting the audio from video by up to 3000msec.

Audio Down Mix Function

The Audio Down Mixer function provides a downmix to Left only/Right only (**Lo/Ro**). Any five embedded channels can be selected for Left (**L**), Right (**R**), Center (**C**), Left Surround (**Ls**), and Right Surround (**Rs**) individual signal to be down-mixed into stereo pair Down Mix Left (**DM-L**) and Down Mix Right (**DM-R**). The resulting stereo pair **DM-L** and **DM-R** can in turn be routed to any embedded audio pair as desired (or de-embedded to an analog audio output). (**Figure 1.2**.)

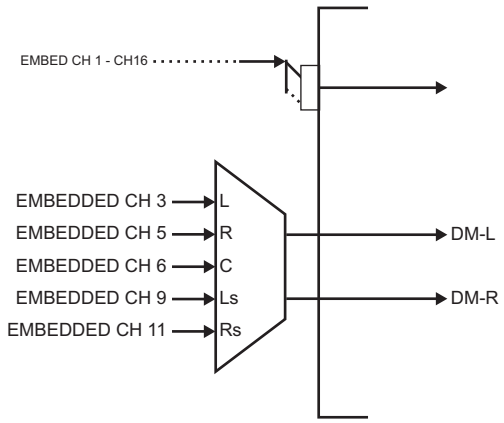


Figure 1.2 *Audio Down Mix Functional Block Diagram with Example Sources*

Simplified Block Diagrams

This sections provides functional block diagrams of the HDC-8223(-S) based on the rear module that the card is installed in and when the Frame Sync option is enabled on the card.

R2-8223 Overview

Figure 1.3 outlines the workflow of the HDC-8223(-S) when installed with the R2-8223 full rear module.

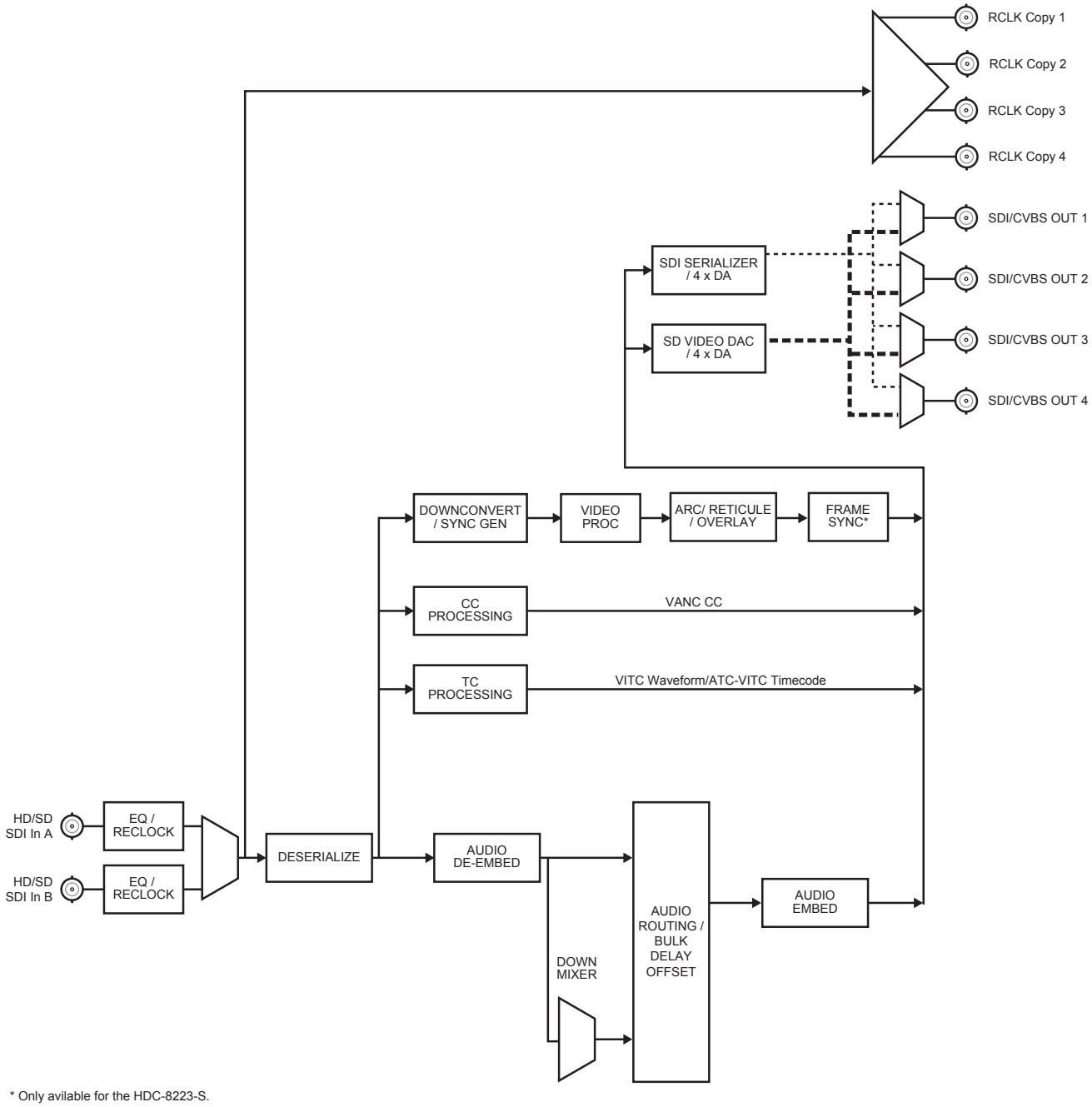
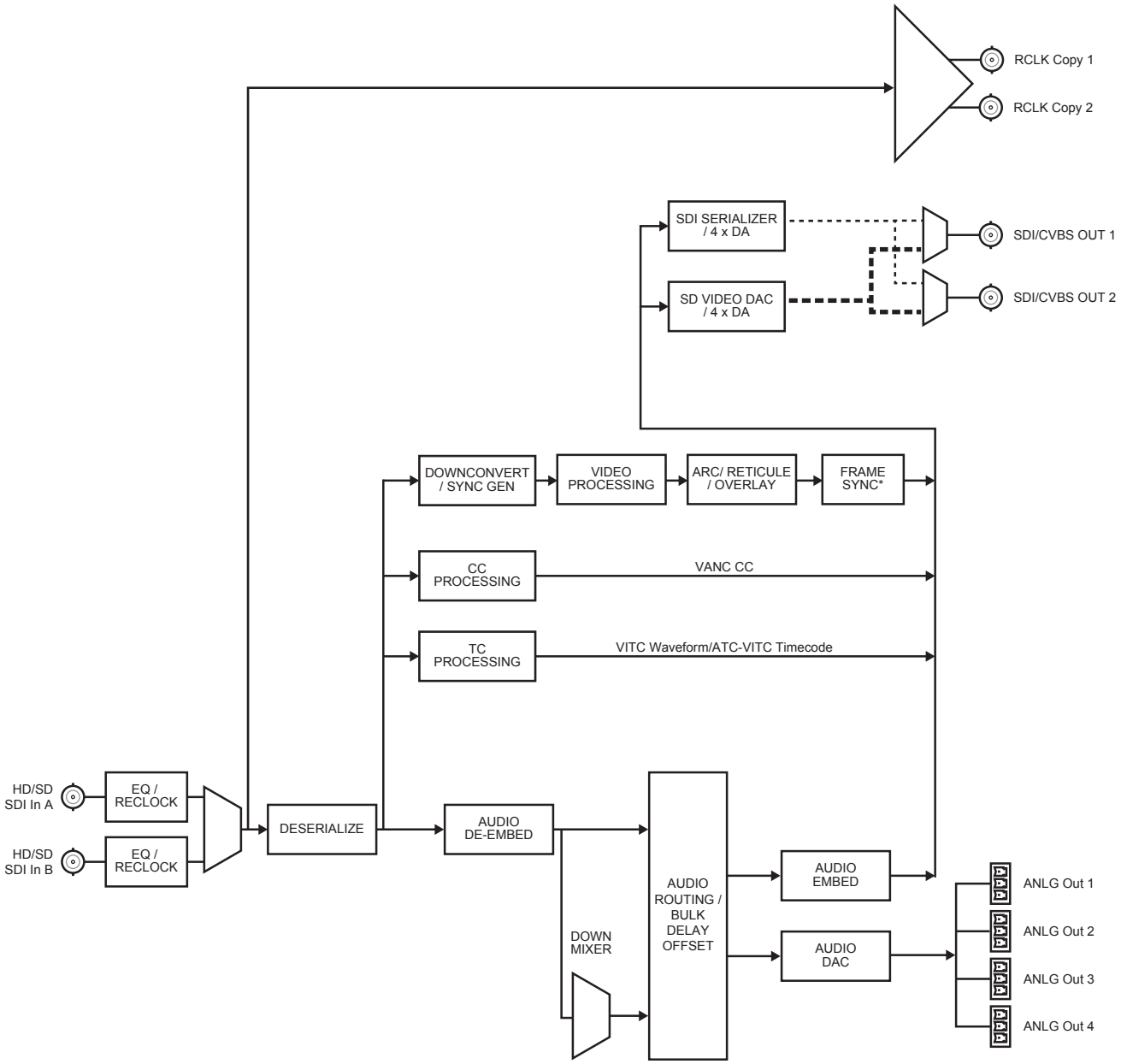


Figure 1.3 *Functional Block Diagram — R2-8223 Rear Module*

R2C-8223 Rear Module

Figure 1.4 outlines the workflow of the HDC-8223(-S) when installed with the R2C-8223 full rear module.



* Only available for the HDC-8223-S.

Figure 1.4 *Functional Block Diagram — R2C-8223 Rear Module*

Documentation Terms and Conventions

The following terms and conventions are used throughout this manual.

Terms

The following terms are used:

- "**Board**", and "**Card**" refer to openGear terminal devices within openGear frames, including all components and switches.
- "**DashBoard**" refers to the DashBoard Control System.
- "**DFR-8321 series frame**" refers to all versions of the DFR-8321 series frames and any available options unless otherwise noted.
- "**HDC-8223**" refers only to the HDC-8223 without the Frame Sync option enabled.
- "**HDC-8223(-S)**" refers to both the HDC-8223 and the HDC-8223-S unless otherwise noted.
- "**HDC-8223-S**" refers only to the HDC-8223 with the Frame Sync option enabled.
- "**OG3-FR series frame**" refers to the OG3-FR series frames and any available options unless otherwise noted.
- "**openGear frame**" refers to the DFR-8321 series and OG3-FR series frames and any available options unless otherwise noted.
- "**Operator**" and "**User**" refer to the person who uses HDC-8223(-S).
- "**R2-8223**" refers to the full rear module that provides four reclocked outputs and four processed outputs.
- "**R2C-8223**" refers to the full rear module that provides two reclocked outputs, two processed outputs, and four analog outputs.
- "**SAA**" refers to Safe Action Area.
- "**STA**" refers to Safe Title Area.
- "**System**" and "**Video system**" refer to the mix of interconnected production and terminal equipment in your environment.

Conventions

The following conventions are used:

- The "**Operating Tips**" and "**Note**" boxes are used throughout this manual to provide additional user information.

Installation

In This Chapter

This chapter provides instructions for installing the Rear Module(s) for the HDC-8223(-S), installing the card into the openGear frame, and cabling details.

The following topics are discussed:

- Before You Begin
- Installing the HDC-8223(-S)
- Cabling Overview

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.*

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 the HDC-8223(-S)

This section outlines how to install a rear module and a card in an openGear frame. The same procedure applies regardless of the rear module or card model.

Supported Rear Modules

The **R2-8223** Full Rear Module or the **R2C-8223** Full Rear Module can be used.

Installing a Rear Module

If the Rear Module is already installed, proceed to the section "**Installing the Card**" on page 2-4.

To install a rear module in the openGear frame

1. Locate the card frame slots on the rear of the frame.
2. Remove the Blank Plate from the slot you have chosen for the card 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**)

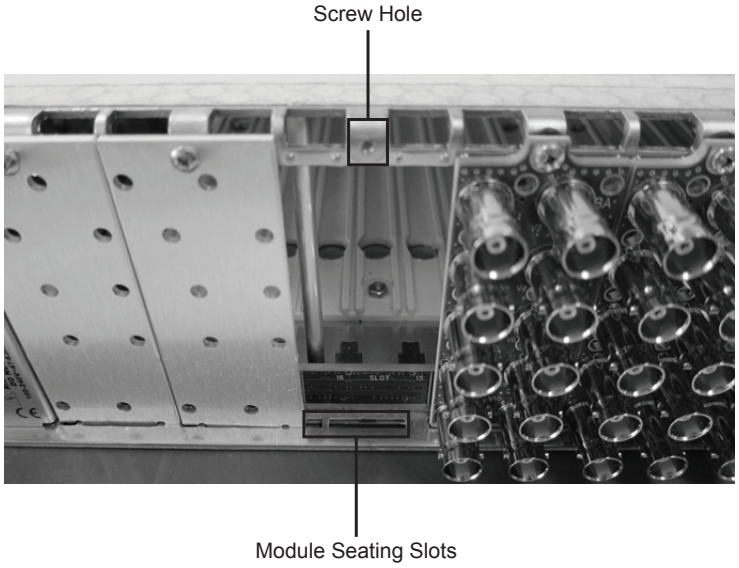


Figure 2.1 *Rear Module Installation in an openGear Frame (Card not shown)*

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 the Card

This section outlines how to install the card in an openGear frame. If the card is to be installed in any compatible frame other than a Ross Video product, refer to the frame manufacturer's manual for specific instructions.

To install the card in an openGear frame

1. Locate the Rear Module you installed in the procedure "**Installing a Rear Module**" on page 2-3.

Notice — *Heat and power distribution requirements within a frame may dictate specific slot placements of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using convectional cooling.*

2. Hold the card by the edges and carefully align the card-edges with the slots in the frame.
3. Fully insert the card into the frame until the rear connection plus is properly seated in the Rear Module.
4. Verify whether your label is self-adhesive by checking the back of the label for a thin, wax sheet. You must remove this wax sheet before applying the label to the rear module surface.
5. Affix the supplied **Rear Module Label** to the BNC area of the Rear Module.

Cabling Overview

This section provides information for connecting cables to the installed rear modules on the openGear frames. Connect the input and output cables according to the following sections. The input is internally terminated with 75ohms. It is not necessary to terminate unused outputs. The cabling is the same regardless of the card model.

R2-8223 Cabling Overview

Each rear module occupies two slots and accommodates one card. This rear module provides two HD/SD-SDI coaxial inputs, four output copies of the re-clocked inputs, and four processed coaxial outputs (can be configured as analog composite or SD-SDI). (**Figure 2.2**)

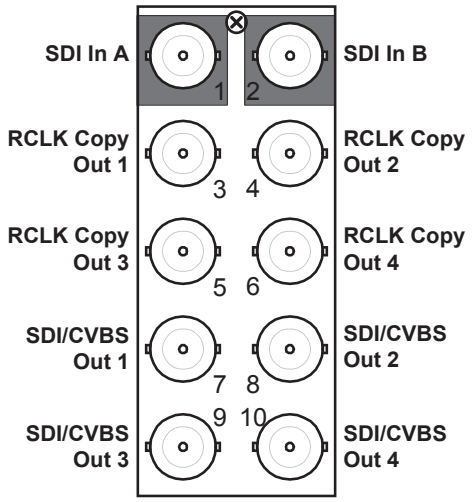


***Figure 2.2** Cable Connections for the R2-8223 Rear Modules*

R2C-8223 Cabling Overview

Each rear module occupies two slots and accommodates one card. This rear module provides two SDI inputs, two output copies of the re-clocked input, two SDI-Composite outputs, and four analog audio outputs. (**Figure 2.3**)

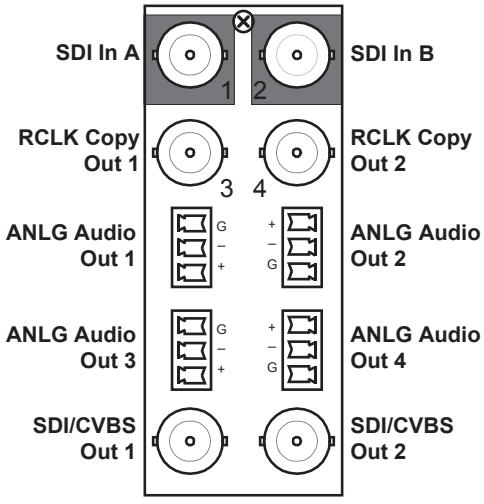


***Figure 2.3** Cable Connections for the R2C-8223 Rear Modules*

Audio Cabling

The **R2C-8223** rear module provides 3-pin audio terminal blocks with removable connectors. Each block has locations for the positive, negative, and grounded wires of a balanced audio cable.

To cable the analog audio connections

1. Insert an analog audio wire to the designated polarity slots on the connector of the rear module. (**Figure 2.4**)

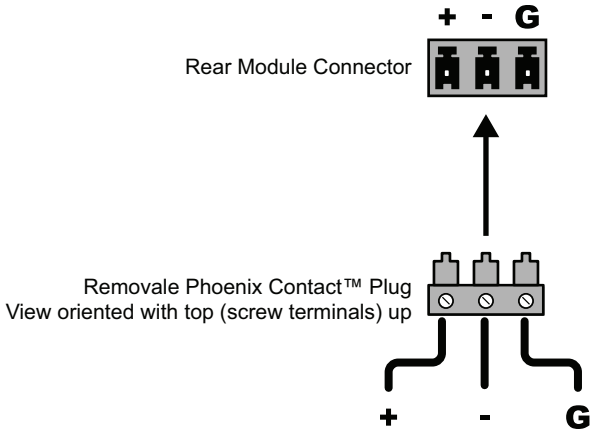


Figure 2.4 *Connector Wiring for Rear Module Input Sockets*

Note — *Unbalanced connections can be connected across the **+** and **G** terminals. Note that this connection will experience a 6dB voltage gain loss. Adjust input gain for these connections accordingly.*

2. Use a tweaker screwdriver to tighten the corresponding capture screw.
3. Repeat steps 1 and 2 for each wire on each connector.
4. Once the cables are wired to the connectors, install the connectors on the terminal blocks for the rear module.

User Controls

In This Chapter

This chapter provides a general overview of the monitoring features available on the card-edge.

The following topics are discussed:

- Control and Monitoring Features

Control and Monitoring Features

This section describes the card-edge status LEDs and display. These LEDs and the display show status and error conditions relating to the card itself and remote (network) communications (where applicable). Because these LEDs are part of the card itself and require no external interface, the LEDs are particularly useful in the event of communications problems with external devices such as network remote control devices. Refer to **Figure 3.1** for the location of the LEDs.

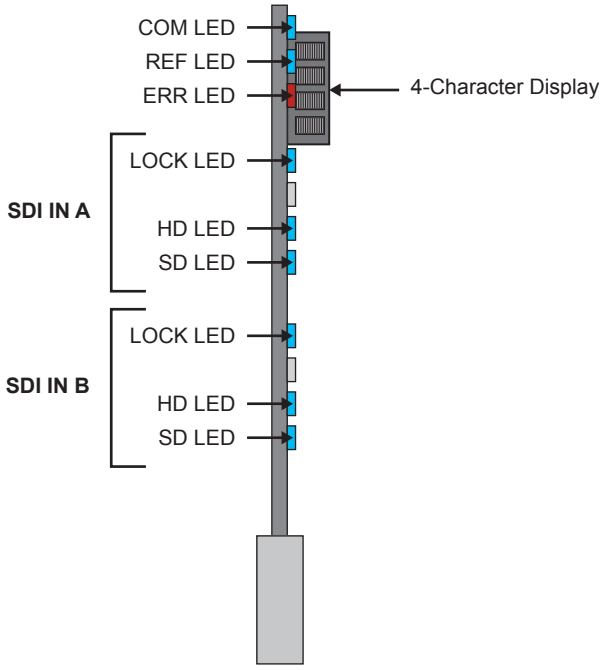


***Figure 3.1** HDC-8223(-S) Card-edge Controls*

Status LEDs

Table 3.1 provides basic LED descriptions.

Table 3.1 LEDs on the HDC-8223

LED	Color	Display and Description
COM	Flashing Blue	When flashing, this LED indicates that the HDC-8223 is receiving control message from DashBoard.
REF	Blue	When lit, this LED indicates that the HDC-8223 is receiving valid reference.
ERR	Red	When lit, this LED indicates an internal error.
SDI IN #	Blue	Three blue LEDs for each SDI input (A and B) indicate the input signal raster format being received and locked onto by the HDC-8223(-S) (LOCK, HD, SD). Continuous cycling of the LEDs indicates the HDC-8223(-S) has not locked onto a particular format (as in the case of no signal input).
	Flashing Blue	When flashing, this LED indicates that the HDC-8223(-S) is receiving a signal which cannot be processed

Operation

In This Chapter

This chapter provides information for operating your HDC-8223(-S) and includes an overview of using DashBoard, ancillary data line locations and ranges, and notes on some of the specific features of the card.

The following topics are discussed:

- Control and Display Descriptions
- Using DashBoard
- Ancillary Data Line Number Locations and Ranges
- Timecode
- Closed Captioning
- Reticules
- Output Audio Routing Controls
- Adding an Overlay
- Scaler
- Firmware Upgrades

Control and Display Descriptions

The HDC-8223(-S) functions can be accessed and controlled by DashBoard.

When a setting is changed, settings displayed on DashBoard are the settings as effected by the 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 card are organized into function **sub-menus**, which consist of parameter groups. **Figure 4.1** shows how the HDC-8223 and its sub-menus are organized, and also provides an overview of how navigation is performed between cards, function sub-menus, and parameters.

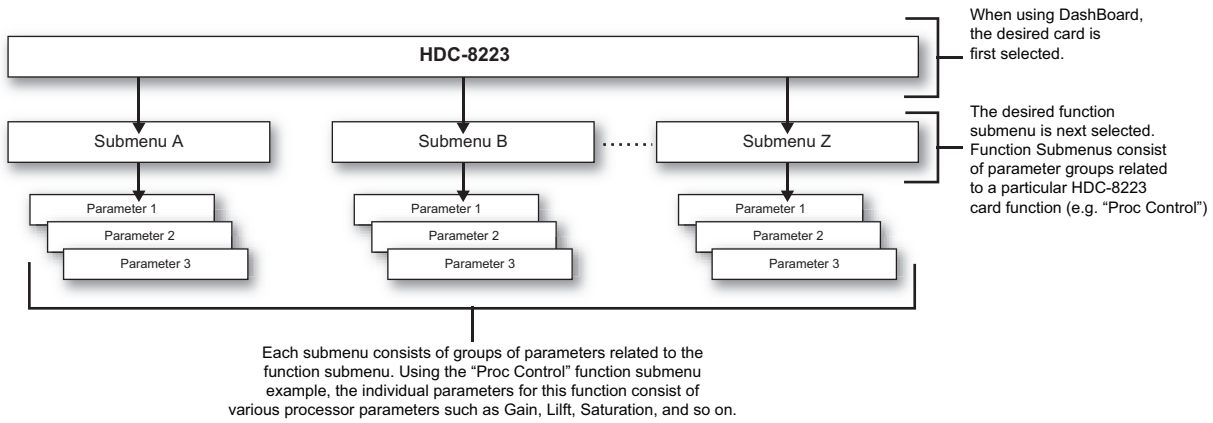


Figure 4.1 *Function Sub-menu/Parameter Sub-menu Overview — HDC-8223*

Using DashBoard

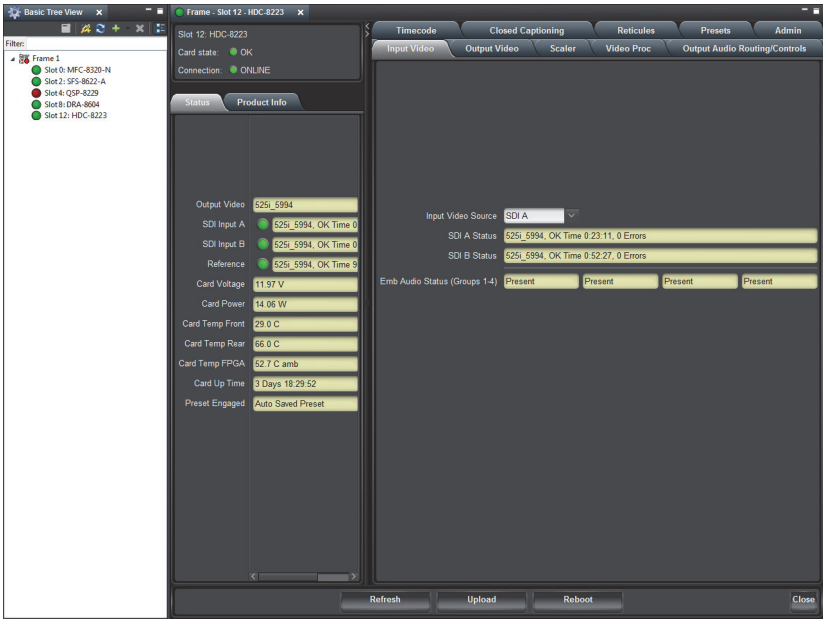
Before proceeding, ensure that the DashBoard Control System is installed on a PC connected to your facility network. The DashBoard software and user manual are available from the Ross Video website.

To launch DashBoard

1. Ensure that you are running DashBoard software version 6.2.0 or higher.
2. Launch DashBoard by double-clicking its icon on your desktop.
3. Ensure that the openGear frame with the HDC-8223(-S) card(s) is displayed in the Tree View located on the left-side of the DashBoard window. It may take 30 seconds or more to update the Tree View. Consult the ***MFC-8300 Series*** or ***MFC-OG3 Series User Manual*** and ***DashBoard User Manual*** should the Tree View not display the card.

To access a card in DashBoard

1. From the **Tree View**, expand the node for the openGear frame your cards are installed in. A list of cards installed in the frame is now displayed. In the example below, the node for Frame 1 is expanded to show a list including an HDC-8223.
2. Double-click the node for a card to display its menus in the **Device View** of DashBoard (right-side of the DashBoard window).



Example of an HDC-8223 in DashBoard

Checking Card Information

The operating status and software version the HDC-8223(-S) can be checked using DashBoard or the card-edge control user interface.

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

Ancillary Data Line Number Locations and Ranges

Table 4.1 lists typical default output video VANC line number locations for various ancillary data items that may be passed or handled by the HDC-8223(-S).

Table 4.1 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 4.2** shows an example of improper VANC allocation within an HD-SDI stream.

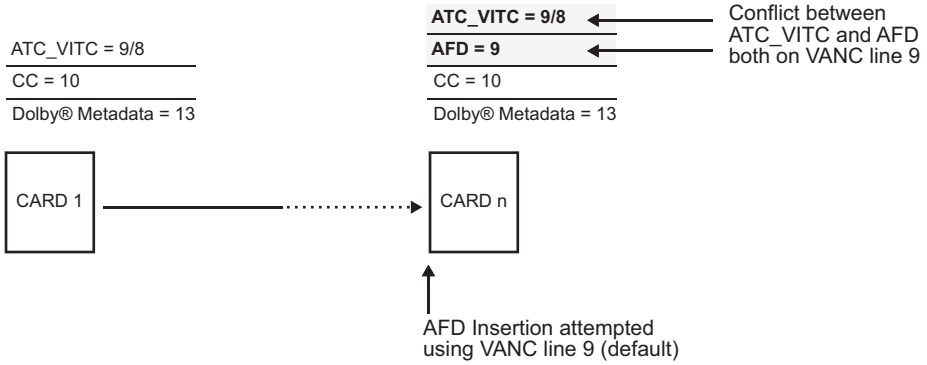


***Figure 4.2** Example VANC Line Number Allocation — Improper*

Figure 4.3 shows an example of corrected VANC allocation within an HD-SDI stream.

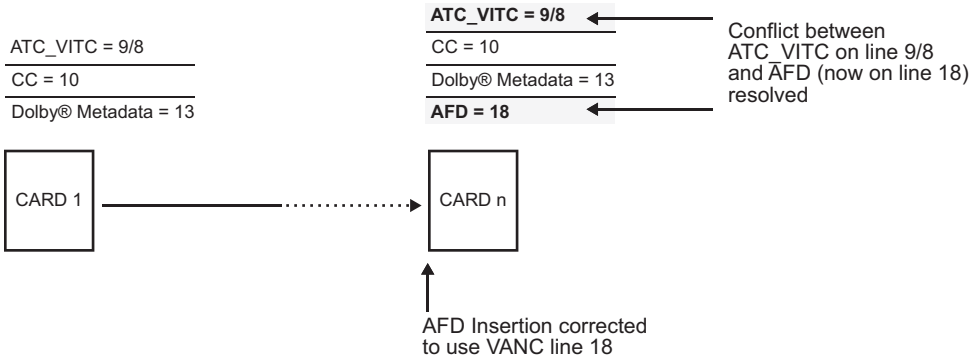


***Figure 4.3** Example VANC Line Number Allocation — Corrected*

Timecode

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

For More Information on...

- the timecode menus and parameters, refer to the section "**Timecode Tab**" on page 5-4.

Examples Cases A, B

Figure 4.4 is an example (**A**) in which received 720p 59.94 SDI video is down-converted to 525i 59.94.

***Figure 4.4** Down Converting 720p to 525i*

If the incoming video contains ATC_LTC timecode data (as indicated in the status fields in DashBoard), set the **Source Priority** drop-down lists to include ATC_LTC timecode data as a choice. This extracts ATC_LTC timecode data from the incoming video.

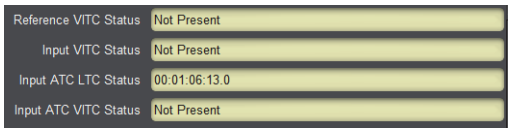


***Figure 4.5** Status Fields*

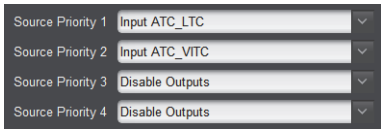


***Figure 4.6** Source Priority Settings*

Figure 4.7 is an example (**B**) of providing both SDI ATC_VITC and VITC waveform timecode data in the converted SD output video.

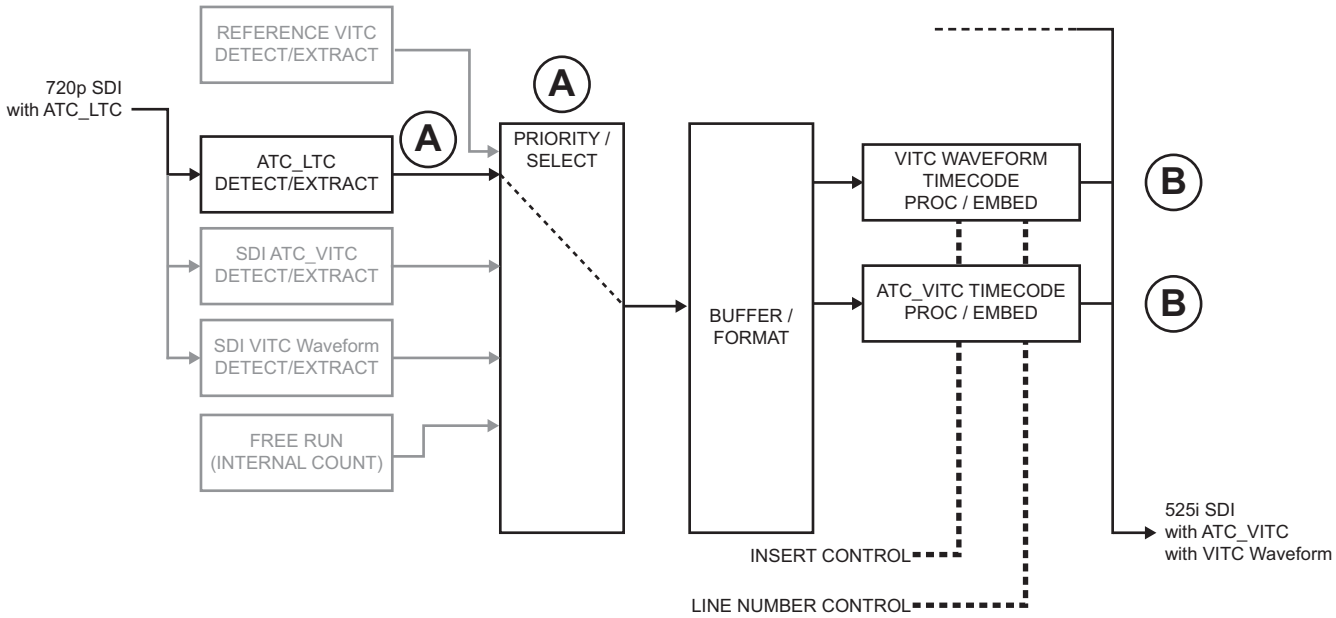


***Figure 4.7** Using SDI ATC_VITC and VITC Waveform Timecode Data*

As such set both **SD ATC VITC Insertion** and **SD VITC Waveform Insertion** to **Enabled**. In **Figure 4.7**, the line numbers are set to the default SMPTE 12M-2-2008 recommended values.

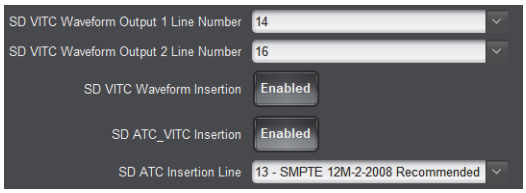


Figure 4.8 *Insertion Settings*

Example Case C

In this example, even though an ATC_LTC could be available to substitute for ATC_VITC not being present, the HDC-8223 will refer to no timecode output since the choice of Disable Output "out-prioritizes" ATC_LTC with the settings seen in **Figure 4.9**. The choices shown in **Figure 4.10** will allow ATC_LTC to "out-prioritize" Disable Output if ATC_VITC is not available.

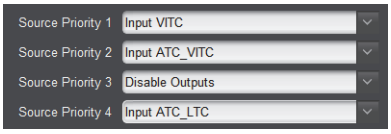


Figure 4.9 *No Timecode Output*

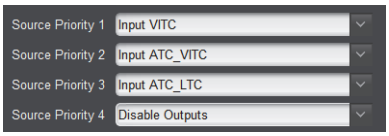


Figure 4.10 *ATC_LTC Priority Set*

Closed Captioning

The Closed Captioning feature provides support for closed captioning setup. Note that this feature does not support PAL closed captioning standards.

Note — *When receiving HD-SDI, both CEA-608 and CEA-708 are supported, with CEA-608 and CEA-708 (containing CEA-608 packets) converted to Line 21 closed captioning on outputs down-converted to SD.*

For More Information on...

- the menus and parameters available for the closed captioning feature, refer to the section "**Closed Captioning Tab**" on page 5-15.

Troubleshooting

The message "`Captioning Rejected Due to`" is displayed 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 in **Table 4.2**. Refer to ***CEA-708-B*** for more information.

Table 4.2 Captioning Rejected Messages

Message	Description
Unsupported Frame Rate	Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the HDC-8223(-S)
Data Not Present	Packet is marked from closed captioning source external to the HDC-8223(-S) that no data is present
No Data ID	Packet from closed captioning source external to the HDC-8223(-S) is not properly identified with 0x9669 as the first word of the header (unidentified packet).

Reticules

The Reticules feature allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image.

For More Information on...

- reticules and overlay marker setup options, refer to the section "**Reticules Tabs**" on page 5-7.

Overview

The HDC-8223 allows any combination of the reticule/overlay markers to be applied to the output video. Sizing and other characteristics for each type of marker can be set.

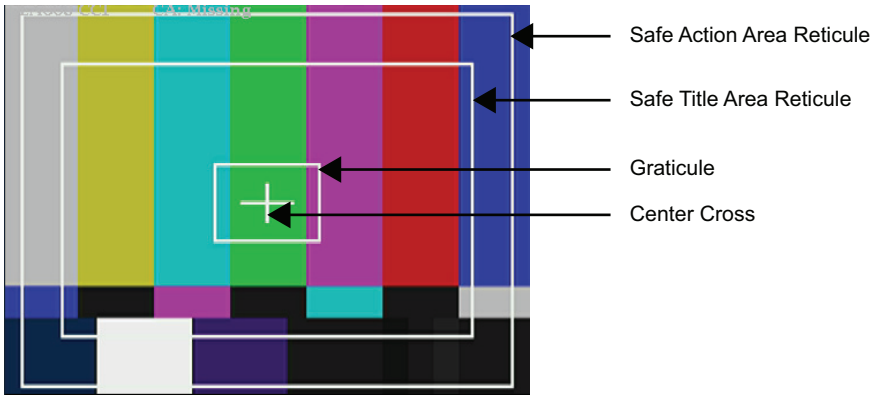


Figure 4.11 *Typical Reticule/Overlay Marker Insertions*

Overlay markers using this function are for setup only. When enabled, these markers are embedded in the output video and will appear in the image. Use this function only on preview video and not on-air video. Make certain any overlay tools are turned off when no longer needed.

Output Audio Routing Controls

The Output Audio Routing feature includes the following options in DashBoard:

- **Embedded Output** — This sub-tab provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. This sub-tab also provides gain, phase invert, muting controls, and peak level meters for each output channel.
- **Analog Output** — This sub-tab provides an audio crosspoint allowing the audio source selection for each analog audio output channel. This sub-tab also provides gain, phase invert, and muting controls, and peak level meters for each output channel.
- **Downmixer** — This sub-tab provides audio down-mix audio routing selections that multiplexes any five embedded audio channel sources into a stereo pair.
- **Audio Delay** — This sub-tab provides a bulk audio delay control.

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

Group/Enable Disable Controls

Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content.

Selecting the Embedded output channel source

Using the source drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the choices in **Table 5.13** on page 5-17.

Channel Mute, Invert, and Gain Controls

Provides mute and phase invert channel controls as well as peak level meter for each output channel. Meter shows level as affected by level control.

Note — *Although the HDC-8223(-S) can pass non-PCM data, such as Dolby® E® or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby® data.*

Center Mix Ratio Control

The default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.

The -0dB setting 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.

The maximum attenuation setting (-80dB) applies a -80dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel content at a -80dB ratio relative to overall level, making center-channel content less predominate in the overall mix.

Surround Mix Ratio Control

The default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.

The -0 dB setting applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix.

The maximum attenuation setting (-80dB) 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.

Audio Delay Controls

Delay control adds bulk (all four groups) audio delay from any video delay (net audio delay offset setting adds 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.

Note — *Delay settings are applied to embedded as well as analog audio outputs.*

Adding an Overlay

You can choose to add an overlay that includes specific text or the timecode from the output signal using the options in the Character Burner tab.

Adding a Text Overlay

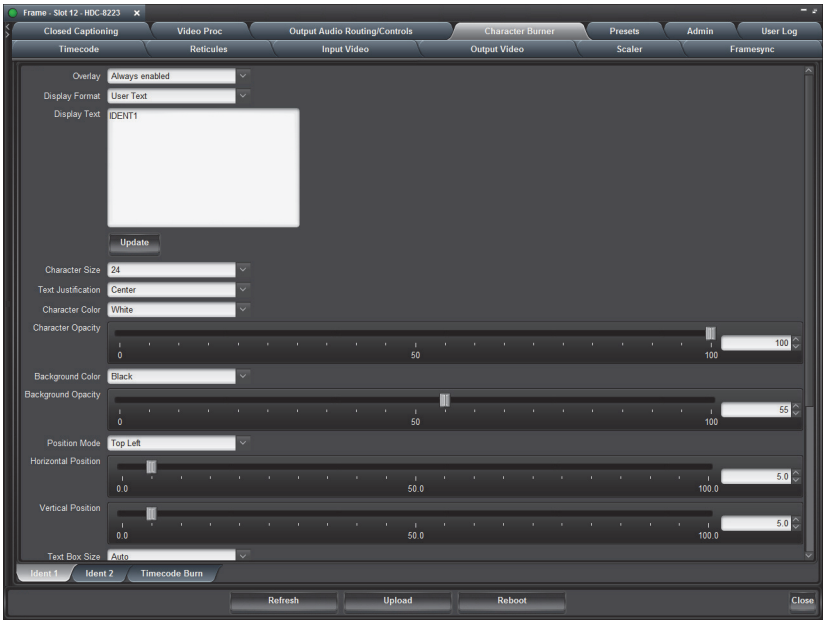
A text overlay displays the content specified by the user, and you can customize the text appearance, add a background, and position the overlay anywhere on the active picture area. You can configure up to two text overlays independently.

For More Information on...

- the menus and parameters available in the **Ident** sub-tabs, refer to the section "**Ident Tabs**" on page 5-20.

To add a text overlay

1. Select the **Character Burner** tab.
2. Select the **Ident 1** sub-tab located at the bottom of the **Character Burner** tab.



Character Burner — Ident 1 Tab

3. From the **Overlay** menu, select one of the following:
   - **Always enabled** — The text overlay always displays on the output.
   - **Enabled on loss of video** — The text overlay only displays when the card detects a loss of the input video signal. This option requires the HDC-8223-S.
4. From the **Display Format** menu, select **User Text**.
5. Use the **Display Text** field to type the content you want to display in the overlay.
6. To customize the text:
   - Use the **Character Size**, **Text Justification**, **Character Color**, and **Character Opacity** fields to specify the appearance of the text within the overlay.
   - Use the **Text Box Size** menu to configure the dimensions of the overlay.

- If the **Text Box Size** is set to **Custom**, use the **Text Box Width**, and **Text Box Height** sliders to adjust the dimensions of the overlay.
- Use the **Horizontal Padding** and **Vertical Padding** sliders to nudge the overlay position along the x or y axis respectively.

7. Use the **Position Mode** to specify where on the display to anchor the overlay text box.
   - If you set the Position Mode to a Custom option, use the **Horizontal** and **Vertical Position** sliders to specify a location for the overlay on the display.
8. Use the **Background Color**, and **Background Opacity** fields to configure a background to the overlay.
9. Use the **Border** menu to add a border to the overlay. Note that the border color is determined by the **Character Color** setting.
10. Click **Update** to apply your settings.
11. Repeat steps 2 to 10 for **Ident 2** if you wish to configure a second text overlay.

Adding a Timecode Overlay

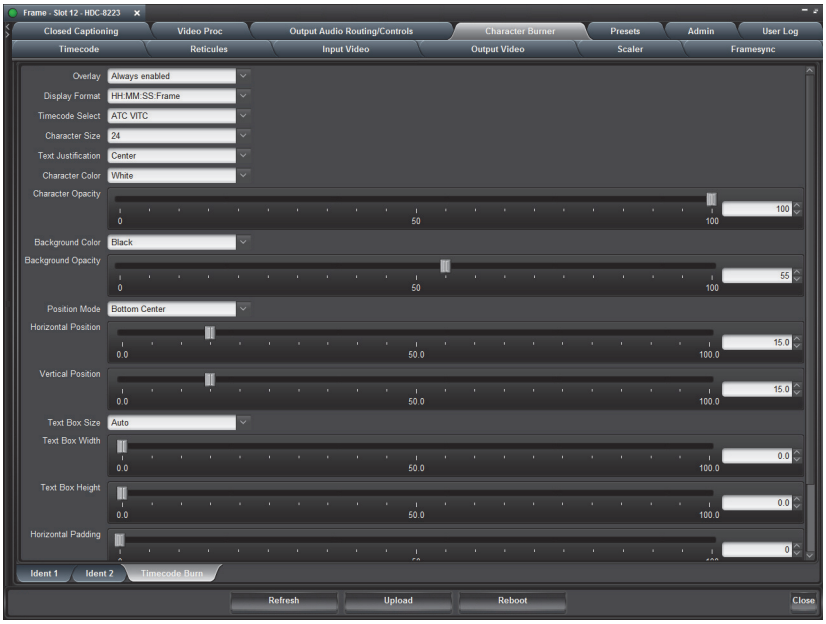
A timecode overlay displays the timecode data as reported by the output video signal. You can still customize the timecode format and appearance, add a background, and position the overlay anywhere on the active picture area.

For More Information on...

- the menus and parameters available in the **Timecode Burn** sub-tab, refer to the section "**Timecode Burn Tab**" on page 5-22.

To add a timecode overlay

1. Select the **Character Burner** tab.
2. Select the **Timecode Burn** sub-tab located at the bottom of the **Character Burner** tab.



Character Burner — Timecode Burn Tab

3. From the **Overlay** menu, select one of the following:
    - **Always enabled** — The timecode overlay always displays on the output.
    - **Enabled on loss of video** — The timecode overlay only displays when the card detects a loss of the input video signal. This option requires the HDC-8223-S.
4. From the **Display Format** menu, select how the timecode will be represented in the overlay.
5. Use the **Timecode Select** menu to specify the source (from the output video signal) for the timecode.
6. To customize the text:
    - Use the **Character Size**, **Text Justification**, **Character Color**, and **Character Opacity** fields to specify the appearance of the timecode within the overlay.
    - Use the **Text Box Size** menu to configure the dimensions of the overlay.
    - If the **Text Box Size** is set to **Custom**, use the **Text Box Width**, and **Text Box Height** sliders to adjust the dimensions of the overlay.
    - Use the **Horizontal Padding** and **Vertical Padding** sliders to nudge the overlay position along the x or y axis respectively.
7. Use the **Position Mode** to specify where on the display to anchor the overlay text box.
    - If you set the Position Mode to a Custom option, use the **Horizontal** and **Vertical Position** sliders to specify a location for the overlay on the display.
8. Use the **Background Color**, and **Background Opacity** fields to configure a background to the overlay.
9. Use the **Border** menu to add a border to the overlay. Note that the border color is determined by the **Character Color** setting.

Scaler

The Scaler feature provides aspect ratio controls including Horizontal and Vertical pan controls. Each Scaler control is fully described in the section "**Scaler Tab**" on page 5-11.

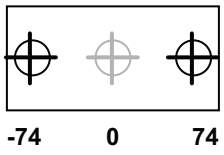


Figure 4.12 *H Pan Control*

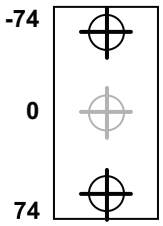


Figure 4.13 *V Pan Control*

Firmware Upgrades

The **Admin** tab provides controls for selecting and loading card firmware upgrade files. This section outlines the firmware upgrade controls for your HDC-8223(-S).

Important — *You cannot downgrade a card from version 1.75 to an earlier version.*

Firmware Upgrade Controls

Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the card's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next card reboot (thereby allowing card upgrade downtime to be controlled at a scheduled point in time). This 'deferred upload' allows scheduling a firmware upgrade downtime event until when it is convenient to experience to downtime (uploads typically take about 60 seconds).

Note — *Version 1.75 is not DataSafe compatible with prior versions of the firmware. Saved configurations from versions prior to 1.75 cannot be loaded onto cards running version 1.75.*

To perform an immediate firmware upload

1. Access a firmware upgrade file from a network computer by clicking **Upload** at the bottom of DashBoard.
2. Browse to the location of the firmware upgrade file.
3. Select the desired file and click **Open** to upload the file to the card.
4. Select the **Automatically Reboot After Upgrade** box.
5. Click **Firmware To Load**.
6. Select the desired upgrade file to be loaded.
7. Click **Load Selected Firmware**.
8. The card now reboots and the selected firmware is loaded.

To perform a deferred firmware upload

1. Access a firmware upgrade file from a network computer by clicking **Upload** at the bottom of DashBoard.
2. Browse to the location of the firmware upgrade file.
3. Clear the **Automatically Reboot After Upgrade** box.
4. Click **Firmware To Load.**
5. Select the desired upgrade file to be loaded. The field reports "`Installs on Next Reboot`".
6. Click **Load Selected Firmware**. The HDC-8223(-S) holds directions to proceed with the upload, and performs the upload only when the card is manually rebooted (by pressing the **Reboot** button).
7. To cancel a deferred upload, click **Cancel Pending Upgrade**. The HDC-8223(-S) reverts to the default settings that allow an immediate upload/upgrade.

DashBoard Menus

In This Chapter

This chapter briefly summarizes the menus, items, and parameters available from DashBoard for your card. Default parameters are noted with an asterisk (*).

This chapter contains the following information:

Status Tabs

This section summarizes the read-only information displayed in the **Status** tabs. The fields in the **Status** tabs can vary in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

Status Tab

Table 5.1 summarizes the read-only information displayed in the **Status** tab.

Table 5.1 Status Tab Items

Tab Title	Item	Parameters	Description
Status	Input Video	FF, hh:mm:ss, # Errors	Reports the status of the input where: • **FF** represents the input video format • **hh:mm:ss** represents the time since the input changed • **# Errors** represents the provided CRC error counter
	Output Video	#	Reports the current output format
	SDI Input #	#	Indicates the format of the specified input signal
	Reference	#	Indicates the reference signal used by the HDC-8223(-S)
	Card Voltage	##.##V	Measured input voltage
	Card Power	#.# W	Calculated power of the HDC-8223(-S)
	Card Temp Front	##.## C	Current temperature of board
	Card Temp Rear	##.## C	
	Card Temp FPGA	##.## C	Indicates the FPGA Core temperature
	Card Up Time	D hh:mm:ss	Reports running time elapsed since last card power-cycle or reboot
	Preset Engaged	#	
	Card Time	hh:mm:ss mm/dd/yy	Reports the NTP time being served by the Network Controller card in the openGear frame. Note that this requires the Network Controller card to be configured for NTP.

Product Info Tab

Table 5.2 summarizes the read-only information displayed in the **Product Info** tab.

Table 5.2 Product Info Tab Items

Tab Title	Item	Parameters	Description
Product Info	Product	HDC-8223	This field reports HDC-8223 even if the Frame Sync option is installed
	Product Options	#	Indicates which licensed features are installed on the HDC-8223(-S)
	Supplier	Ross Video Ltd.	Indicates the provider of the HDC-8223(-S)
	Revision	#.##.#	Indicates the software version
	Build Date	#	Indicates the build date of the software
	FPGA Revision	#.##.#	Provides information on the FPGA version
	FPGA Build Date	#	
	Kernel Revision	#	
	Flash Storage	# MB free	
	RAM Usage	#.#%	
	CPU Usage	#.#%	
	Serial Number	#	Indicates the assigned serial number
	Rear Module	#	Indicates rear module the HDC-8223(-S) is installed in

Timecode Tab

Table 5.3 summarizes the options available in the **Timecode** tab.

Table 5.3 Timecode Tab Items

Tab Title	Item	Parameters	Description
	Reference VITC Status (read-only)	#	Displays the current status and contents of the four supported external timecode formats. • If a format is receiving timecode data, the current content (timecode running count and line number) is displayed. • If a format is not receiving timecode data, '`Not Present`' is displayed.
	Input VITC Status (read-only)	#	
	Input ATC LTC Status (read-only)	#	
	Input ATC VITC Status (read-only)	#	
	Incoming ATC Packet Removal	Enabled	
		Disabled	
	Source Priority #	#	Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable. Selects the preferred format to be used in descending order (i.e. Source Priority 2 selects the second-most preferred format, and so on.)
		Disable Outputs	Use with care. When 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 used to remove all timecode data.
	Offset	Delayed	Allows the current timecode count to be delayed on the output video
		Advanced	Allows the current timecode count to be advanced on the output video
	Offset Field	0*-1	Delays/advances or delays timecode by one field
	Offset Frame	0*-1	Delays/advances or delays timecode by up to five frames

Table 5.3 Timecode Tab Items

Tab Title	Item	Parameters	Description
	Output Status (read-only)	#	Displays the current content and source used for the timecode data; output status is valid.
		Insertion Disabled	Timecode insertion button is set to Disabled; output insertion is disabled. If timecode is unavailable from Source Priority selection 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
	SD VITC Waveform Output # Line Number	#	For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers (6-22) 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	Only affects VITC waveform 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	Enables SD ATC_VITC timecode insertion into the output video
		Disabled	Disables ATC_VITC timecode insertion into the output video
	SD ATC Insertion Line	#	Selects the line number for the ATC_VITC
	ATC_VITC Legacy Support	Enabled	Accommodates equipment requiring ATC_VITC packet in both fields as a "Field 1" packet (non-toggling). Note that 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

Table 5.3 Timecode Tab Items

Tab Title	Item	Parameters	Description
	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 card is outputting Free Run timecode (as reported by the Output Status field 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	

Reticules Tabs

This section summarizes the options in the **Reticules** sub-tabs.

Reticules Basic Tab

The **Reticules Basic** tab allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image. **Table 5.4** summarizes the options in the **Basic** sub-tab.

Table 5.4 Reticules Basic Tab Items

Tab Title	Item	Parameters	Description
Reticules Basic	SDI Out Reticule	Disable	Insertion of all reticules or other markers is disabled
		Enable	Provides independent master enable/disable for card SDI outputs. Any combination of reticules or other markers described below can be inserted.
	Analog Out Reticule	Disable	Insertion of all reticules or other markers is disabled
		Enable	Provides independent master enable/disable for card CVBS outputs. Any combination of reticules or other markers described below can be inserted.
	Reticule Size	Custom	Safe Action Area control is customized using the options in this tab
	SAA	Disable	Disables safe action area graticule insertion
		Enable	Enables safe action area graticule insertion
	SAA Height	0-100	Controls height of insertion; percentage of 4:3 outputted image area
	SAA Width	0-100	Controls width of insertion; percentage of 4:3 outputted image area
	STA	Disable	Disables Safe Title area graticule insertion
		Enable	Enables Safe Title area graticule insertion
	STA Height	0-100	Controls height of insertion; percentage of 4:3 outputted image area
	STA Width	0-100	Controls width of insertion; percentage of 4:3 outputted image area
	Overlay Color	White	Selects white overlay color
		Black	Selects black overlay color
	Inverse Color	Disable	Leaves the reticule at the set value
		Enable	Sets the reticule to automatically change to a contrasting color based on the background color

Table 5.4 Reticules Basic Tab Items

Tab Title	Item	Parameters	Description
	Opacity	0 -100	
	Thickness	1-12	

Reticules Advanced Tab

The **Reticules Advanced** sub-tab provides insertion and sizing controls for custom graticules and other markers. **Table 5.5** summarizes the options in the **Reticules Advanced** sub-tab.

Table 5.5 Reticules Advanced Tab Items

Tab Title	Item	Parameters	Description
Advanced	Graticule	Disable	Disables user graticule insertion
		Enable	Enables user graticule insertion
	Graticule Height	0-100	Controls height of insertion; percentage of 4:3 outputted image area
	Graticule Width	0-100	Controls width of insertion; percentage of 4:3 outputted image area
	Center Cross	Disable	Disables center cross insertion
		Enable	Enables center cross insertion
	Center Height	0-100	Controls height of vertical line; percentage of 4:3 outputted image area
	Center Width	0-100	Controls width of horizontal line; percentage of 4:3 outputted image area
	Horizontal Line	Disable	Disables horizontal line insertion
		Enable	Enables horizontal line insertion
	Hor Line Size	0-100	Controls the width of the horizontal line; percentage of 4:3 outputted image area
	Hor Line Pos	0-100	Controls the vertical positioning of the horizontal line; percentage of 4:3 outputted image area
	Vertical Line	Disable	Disables vertical line insertion
		Enable	Enables vertical line insertion
	Ver Line Size	0-100	Controls the height of the vertical line; percentage of 4:3 outputted image area
	Ver Line Pos	0-100	Controls the horizontal positioning of the line; percentage of 4:3 outputted image area
	NTSC Legacy	Disable	This menu item is not implemented.
		Enable	

Input Video Tab

The **Input Video** tab allows manual or failover selection of card SDI inputs and displays the status, raster format, and embedded group status of received SDI video. **Table 5.6** summarizes the options and ready-only information available in the **Input Video** tab.

Table 5.6 Input Video Tab Items

Tab Title	Item	Parameters	Description
	Input Video Source[a]	SDI A	Allow forced manual selection of correspondingly SDI IN A or SDI IN B
		SDI B	
		Failover A to B	Sets main path preference of SDI IN A: • If SDI IN A goes invalid, SDI IN B is used • If SDI IN A goes valid again, failover automatically reverts to SDI IN A
		Failover B to A	Sets main path preference of SDI IN B: • If SDI IN B goes invalid, SDI IN A is used • If SDI IN B goes valid again, failover automatically reverts to SDI IN B
	Input Video (read-only)	FF, hh:mm:ss, # Errors	Reports the status of the input where: • **FF** represents the input video format • **hh:mm:ss** represents the time since the input changed • **# Errors** represents the provided CRC error counter
	SDI # Status (read-only)	#	Reports the input status and audio group presence, along with elapsed time of signal acquire. Displays raster/format for both card inputs.
		Unlocked	Signal is not present or is invalid.
	SDI Error Count / OK Time	Press to Clear	
	Emb Audio Status (Groups 1-4) (read-only)	#	Reports the presence of each embedded audio group for actively selected input

a. Failover criteria is simple signal presence.

Output Video Tab

This section outlines the sub-tabs available in the **Output Video** tab.

Output Routing Tab

The **Output Routing** tab allows selection of each of the four video output coaxial connectors as SD-SDI or CVBS output mode. **Table 5.7** summarizes the options available in the **Output Routing** tab.

Table 5.7 Output Routing Tab Items

Tab Title	Item	Parameters	Description
Output Routing	Output #	CVBS	For each of the four coaxial video output connections, provides independent selection of setting the port as an SD-SDI video output or CVBS analog SD output. The output numbers correlate to the output port numbers as labeled on the rear module being used.
		SD-SDI	

Analog Video Tab

The **Analog Video** tab provides CVBS parameter controls and test pattern output controls.**Table 5.8** summarizes the options available in the **Analog Video** tab.

Table 5.8 Analog Video Tab Items

Tab Title	Item	Parameters	Description
Analog Video	Oversampling	Enable	Enables video DAC oversampling. Oversampling can improve rendering of motion for down-conversions to the CVBS SD analog output.
		Disable	Disables this feature
	Color	Enable	Enables chroma content in the CVBS output
		Disable	Disables this feature
	Test Pattern	Enable	Enables manual insertion (replacement) of CVBS output video to instead output 75% color bars
		Disable	Disables this feature
	DAC Gain Calibration	-7.500 to 7.500	
	Cb Calibration	-6.00 to 6.00	
	Calibration to EEPROM	Save	

Scaler Tab

The Scaler tab provides down-converter, aspect ratio controls, and horizontal/vertical controls. **Table 5.9** summarizes the options available in the **Scaler** tab.

Table 5.9 Scaler Tab Items

Tab Title	Item	Parameters	Description
	Input Video (read-only)	#	Displays signal format/status sent to scaler (as a function of the Input Video source setting)
		None	An invalid or unavailable signal is detected
	Output Video (read-only)	#	Displays output signal format/status
		None	An invalid or unavailable signal is detected
	Unity 1.0HV	Apply	Selects between the standard preset Aspect Ratio Conversions (ARC) as well as User Defined settings. Buttons allow standard ARC presets to be applied to output video. For any setting, using the Horizontal or Vertical controls allow user custom settings. Pressing any of the preset buttons restores the ARC to the selected setting and overrides any previous custom settings. (50% to 150% user range in 0.1% steps; null = 100.0)
	Pillar Box 0.75H	Apply	
	Center Cut 1.33H	Apply	
	Letter Box 0.75V	Apply	
	Vertical Center Cut 1.33V	Apply	
	Aspect Ratio Horizontal	50-150	
	Aspect Ratio Vertical	50-150	
	H Pan	-74 to 74	Shifts horizontal center of image left (negative value) or right (positive value); values in percentage; range in 0.1% steps; null = 0.0
	V Pan	-74 to 74	Shifts vertical center of image down (negative value) or up (positive value); values in percentage; range in 0.1% steps; null = 0.0
	Downscale Filtering	0.50 to 1.50	Decreasing the value softens the picture and increasing the value sharpens it

Framesync Tab

The **Framesync** tab is only available when using the HDC-8223-S. When displayed, this tab provides video frame sync/delay offset control and output control/loss of program failover selection controls. The frame sync provides H and V timing adjustments that affect both the CVBS and the down-converted SDI outputs simultaneously. Color framing of the analog composite output is not supported. **Table 5.10** summarizes the options available in the **Framesync** tab.

Note — *Audio timing offset from video is performed using the delay controls on the Output Audio Routing tab. Refer to the section "**Output Audio Routing/Controls Tab**" on page 5-17 for details.*

Table 5.10 Framesync Tab Items

Tab Title	Item	Parameters	Description
	Framesync Enable	Framesync Bypassed	Select this option for minimal delay and no frame sync processing of the output
		Framesync Enabled	Select this option to route the down-converted video through the frame synchronizer
	Lock Mode	Reference # Lock to Input	Output video is locked to external reference received on the frame reference bus. External reference signal Reference 1 is distributed to the card and other cards via the **REF 1** BNC on the openGear frame. If a valid reference is not received, the Card State field displays the message "`Reference Invalid`", indicating that an invalid frame sync reference error is occurring.
		Lock to Input else Free Run	Uses the program video input video signal as the reference standard. If this is selected for framesync, any timing instability on the input video will results in corresponding instability on the output video.
		Free Run	Output video is locked to the card's internal clock. Output video is not locked to external reference.
	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 smoothest frame sync locking. This control also sets the card test pattern format where the card's initial output from power-up is the internal pattern instead of program video.

Table 5.10 Framesync Tab Items

Tab Title	Item	Parameters	Description
	Output Mode	Input Video	Card outputs program video (or loss of signal selection in the On Loss of Video menu)
		Flat Field	Card outputs black flat field
		Freeze	Card outputs last frame having valid SAV and EAV codes
		Test Pattern	Card outputs a test pattern. The test pattern is defined by the Pattern Select menu.
		Snow	Card outputs synthesized snow multi-color pattern.
	On Loss of Video	Disable Outputs	Disables program video SDI outputs in the event of program input video loss of signal
		Flat Field	Black flat field on program video output in the event of program input video loss of signal
		Freeze	Output goes to last frame having a valid SAV and EAV codes on the program video output in the event of program input video loss of signal
		Test Pattern	Go to test pattern on program video output in the event of program input video loss of signal. The test pattern is defined by the Pattern Select menu.
		Snow	Output synthesized snow multi-color pattern in the event of program input video loss of signal.
	Test Pattern	#	Select a pattern when Test Pattern is invoked (either by a Loss of Signal failover or directly by selecting Test Pattern on the Program Video Output Mode menu)
	Flat Field Color	#	
	Vertical Lines[a]	-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 (µs)[a]	-64 to 64	Sets horizontal delay (in µs of output video) between the output video and the frame sync reference. Positive values provide delay; negative values provide advance.

Table 5.10 Framesync Tab Items

Tab Title	Item	Parameters	Description
	Frame Delay	#	When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer. The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field). Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. When using this control, be sure to check the Report Delay field to make certain the desired amount of frames are delayed.
	Video Delay (read-only)	#ms / # frames # lines Scaler: #ms	Reports the delay where: • **#ms** represents the total video delay (frame sync delay + scaler delay) • **# frames # lines** represents the delay in the frame sync • **Scaler: #ms** represents the delay in the scaler
	Lock Status (read-only)	#	Displays the current framesync status reference source.

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.

Closed Captioning Tab

Table 5.11 summarizes the options in the **Closed Captioning** tab

Table 5.11 Closed Captioning Tab Items

Tab Title	Item	Parameters	Description
	Input Status (read-only)	# Packet on Line #	Indicates that closed captioning is present; this message includes the VANC line number of the incoming closed captioning packet (or SD waveform-based VANC Line number)
		Not Present	Indicates that no closed captioning is present in the video signal
		Disabled	
		Captioning Rejected Due to x	Refer to the section "**Troubleshooting**" on page 4-8 for details.
		Caption Service is Marked as Inactive	Indicates bit in packet from upstream source may inadvertently be set as inactive. In this case, closed captioning data (if present) is still processed and passed by the HDC-8223(-S) as normal.
	Incoming Packet Removal	Disabled	
		Enabled	
	Closed Captioning	Enabled	Enables the closed captioning insertion on the output. Closed captioning is set to standard default line number (Line 21).
		Disabled	Disables the closed captioning insertion on the output. Note that closed captioning line may contain active unintended data even if closed captioning is set to Off.
	Regenerate Closed Captioning	Enabled	
		Disabled	

Video Proc Tab

The **Video Proc** tab provides video proc parametric controls. **Table 5.12** summarizes the options in the **Video Proc** tab.

Table 5.12 Video Proc Tab Items

Tab Title	Item	Parameters	Description
	Video Proc	Enabled	Currently displayed Video Proc settings take effect
		Disabled	Video Proc is bypassed.
	Reset to Unity	Confirm	Provides unity reset control of all Video Proc functions. In the **Confirm** dialog, choose one of the following: • **Yes** — proceed with the unity reset • **No** — reject unity reset
Basic Video Proc	Luma Gain	0-200	Adjusts gain percentage applied to Luma (Y channel). Range in 1% steps. Unity is at 100%.
	Luma Lift	-100 to 100	Adjusts lift applied to Luma (Y channel). Range in 1% steps. Null is at 0.0%.
	Color Gain	0-200	Adjusts gain percentage applied to Chroma channels. Range in 1% steps. Unity at 100%.
	Color Phase	-360 to 360	Adjusts phase angle applied to Chroma. Range in 1° steps. Null is at 0°.
	Gang Luma/Color Gain	On	Changing either the Luma Gain or Color gain controls increases/decreases both the Luma and Color gain levels by equal amounts
		Off	Disables this feature.

Output Audio Routing/Controls Tab

This section summarizes the options in the **Output Audio Routing/Controls** sub-tabs.

Embedded Output Tab

Table 5.13 summarizes the options in the **Embedded Output** sub-tab.

Table 5.13 Embedded Output Tab Items

Tab Title	Item	Parameters	Description
Group #		Enabled	Allows the specified embedded audio group on card program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups
		Disabled	Disables this feature
Embed Out Ch#	Embed Out Ch#	Audio Bus Ch #	Selects the specified audio input source to be embedded in the corresponding embedded output channel
		Tone #	
		Downmixer #	
		Flex Bus #	
	Mute		Mutes the corresponding channel
	Invert		Inverts the corresponding channel
	Gain	-80 to 20[a]	Allows relative gain (in dB) control for each corresponding destination Embedded Audio Group channel. Range is in 1.0dB steps where unity is 0dB.

a. The default value is 0dB.

Downmixer Tab

Table 5.14 summarizes the options available in the **Downmixer** sub-tab.

Table 5.14 Downmixer Tab Items

Tab Title	Item	Parameters	Description
	Left Channel Input	Silence	Left Channel Input thru Right Surround Channel Input select the five embedded source channels to be used for the downmix. Downmix channels Downmixer L and Downmixer R are available as sources for embedded and/or analog audio outputs using the Channel Source controls described above.
		Audio Bus Ch #	
	Right Channel Input	Silence	
		Audio Bus Ch #	
	Center Channel Input	Silence	
		Audio Bus Ch #	
	Left Surround Channel Input	Silence	
		Audio Bus Ch #	
	Right Surround Channel Input	Silence	
		Audio Bus Ch #	
	Center Mix Ratio	-80 to 20[a]	Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix. Range is in 0dB steps.
	Surround Mix Ratio	-80 to 20[a]	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. Range is in 0dB steps.

a. The default value is 0.

Audio Delay Tab

Table 5.15 summarizes the options available in the **Audio Delay** tab.

Table 5.15 Audio Delay Tab Items

Tab Title	Item	Parameters	Description
	Audio Bulk Delay (msec)	-33 to 3000	Adds bulk (all four groups) audio delay from any video delay (net audio delay offset setting adds delay in addition to any delay included by other actions). Range is in -1msec steps. Null is at 0msec. Note that delay settings are applied to embedded as well as analog audio outputs.
	Absolute Audio Delay (read-only)	# samples / # ms	

Flex Mix Tab

Table 5.16 summarizes the options in the **Flex Mix** sub-tab.

Table 5.16 Flex Mix Tab Items

Tab Title	Item	Parameters	Description
Flex Mix Input #	Flex Bus	Flex Bus #	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.
	Source	Silence	Selects the input source to be directed to the corresponding bus channel.
		Audio Bus Ch #	
		Tone #	
		Downmixer #	
	Mute		Mutes the specified channel
	Gain	-80 to 20	Provides relative gain (in dB) control

Analog Output Tab

Table 5.17 summarizes the options in the **Analog Output** sub-tab.

Table 5.17 Analog Output Tab Items

Tab Title	Item	Parameters	Description
AN Out Ch #	AN Out Ch #	Audio Bus Ch #	Selects the audio input source to be routed to the corresponding analog audio output channel
		Tone #	
		Downmixer #	
		Flex Bus #	
	Mute		Mutes the corresponding channel
	Invert		Inverts the corresponding channel
	Gain	-80 to 20	Allows relative gain (in dB) control for each corresponding destination analog audio output channel. Range is in 1.0dB steps where unity is 0dB.

Character Burner Tab

The Character Burner tab includes three sub-tabs: two Ident tabs, and a Timecode Burn tab.

Ident Tabs

Table 5.18 summarizes the options in the **Ident 1** and **Ident 2** sub-tabs.

Table 5.18 Ident Tab Items

Tab Title	Item	Parameters	Description
	Overlay	Always disabled	The overlay is not displayed
		Always enabled	The overlay is always displayed
		Enabled on loss of video[a]	The overlay is only displayed when the card detects a loss of video input signal
	Display Format	User Text	The overlay displays the text specified in the Display Text field
		Video Type	This option is not implemented
	Display Text	<text>	Type the text to include in the overlay display
		Update	Click this button to apply the changes made to the Display Text field and any options in the tab
	Character Size	#	Specifies the font size of the text overlay. Ross Video recommends selecting a size of 40 or greater.
	Text Justification	#	Specifies how to align the text in the overlay
	Character Color	#	Specifies the color in the overlay text
	Character Opacity	0 to 100	Specifies the transparency level of the text in the overlay where: • A value of 0 sets the overlay to completely transparent. • A value of 100 sets the overlay to completely opaque.
	Background Color	#	Specifies the overlay background color
	Background Opacity	0 to 100	Specifies the transparency level of the overlay background where: • A value of 0 sets the background to completely transparent. • A value of 100 sets the background to completely opaque.

Table 5.18 Ident Tab Items

Tab Title	Item	Parameters	Description
	Position Mode	Custom #	Selecting a custom option enables you to customize the position of the overlay using the applicable sliders
		#	Selecting a non-custom option specifies where the anchor point of the overlay is positioned
	Horizontal Position	0 to 100	When the Position Mode is set to Custom, this slider adjusts the position of the overlay along the X-axis
	Vertical Position	0 to 100	When the Position Mode is set to Custom, this slider adjusts the position of the overlay along the Y-axis
	Text Box Size	Auto	The overlay automatically re-sizes to fit the text specified in the Display Text field
		Custom	Enables you to customize the size of the overlay box using the applicable sliders
	Text Box Width	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the horizontal margins of the text box
	Text Box Height	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the vertical margins of the text box
	Horizontal Padding	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the position of the text along the X-axis
	Vertical Padding	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the position of the text along the Y-axis
	Border	Disabled	The overlay does not display a border
		Enabled	The overlay includes a border. The border color matches the text color.

a. This option requires the HDC-8223-S.

Timecode Burn Tab

Table 5.19 summarizes the options in the **Timecode Burn** sub-tab.

Table 5.19 Timecode Burn Tab Items

Tab Title	Item	Parameters	Description
	Overlay	Always disabled	The timecode overlay is not displayed
		Always enabled	The timecode overlay is always displayed
		Enabled on loss of video[a]	The timecode overlay is only displayed when the card detects a loss of video input signal
	Display Format	HH	The timecode overlay displays only the hour value as reported by the timecode source
		HH:MM	The timecode overlay displays only the hour and minutes values as reported by the timecode source
		HH:MM:SS	The timecode overlay displays the hour, minutes, and seconds values as reported by the timecode source
		HH:MM:SS:Frame	The timecode overlay displays the hour, minutes, seconds, and frames value as reported by the timecode source
		HH:MM:SS:Frame:Field	The timecode overlay displays the hours, minutes, seconds, frames, and field value as reported by the timecode source
	Timecode Select	ATC VITC	The overlay content is sourced from the timecode detected in the ATC (HD), and VITC (SD) of the output video
		VITC Wave	
	Character Size	#	Specifies the font size of the timecode overlay. Ross Video recommends selecting a size of 40 or greater.
	Text Justification		Specifies how to align the text in the overlay
	Character Color		Specifies the color the timecode displays in
	Character Opacity	0 to 100	Specifies transparency level of the overlay • A value of 0 sets the overlay to completely transparent. • A value of 100 sets the overlay to completely opaque.
	Background Color		Specifies the overlay background color

Table 5.19 Timecode Burn Tab Items

Tab Title	Item	Parameters	Description
	Background Opacity	0 to 100	Specifies transparency level of the overlay background where: • A value of 0 sets the background to completely transparent. • A value of 100 sets the background to completely opaque.
	Position Mode	Custom #	Selecting a custom option enables you to customize the position of the overlay using the applicable sliders
		#	Selecting a non-custom option specifies where the anchor point of the overlay is positioned
	Horizontal Position	0 to 100	When the Position Mode is set to Custom, this slider adjusts the position of the overlay along the X-axis
	Vertical Position	0 to 100	When the Position Mode is set to Custom, this slider adjusts the position of the overlay along the Y-axis
	Text Box Size	Auto	The overlay automatically re-sizes to fit the timecode data
		Custom	Enables you to customize the size of the overlay box using the applicable sliders
	Text Box Width	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the horizontal margins of the text box
	Text Box Height	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the vertical margins of the text box
	Horizontal Padding	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the position of the text along the X-axis
	Vertical Padding	0 to 100	When the Text Box Size is set to Custom, this slider adjusts the position of the text along the Y-axis
	Border	Disabled	The overlay does not display a border
		Enabled	The overlay includes a border. The border color matches the text color.

a. Requires the HDC-8223-S.

Presets Tab

The Presets tab allows user control settings to be saved in a Preset and then loaded (recalled) as desired. There is also the option to configure a one-button restore of factory default settings. **Table 5.20** summarizes the options available in the **Presets** tab.

Table 5.20 Presets Tab Items

Tab Title	Item	Parameters	Description
Presets Controls	Save/Delete	Protect	Allows preset Save/Delete button to save or delete current card settings to the selected preset. Use this setting when writing or editing a preset.
		Protected	Toggle to this setting to lock all presets from being inadvertently re-saved or deleted. Use this setting when all presets are as intended.
Save Preset	Create New Preset:	<text>	Field for entering user-defined name for the preset being saved.
		Save	Saves the current card settings under the preset name defined above
	Layers	All	Allows selecting a functional layer (or "area of concern") that the preset is concerned with. Limiting presets to a layer or area of concern allows for highly specific presets, and masks changing card settings in areas outside of the layer or area of concern. The default All setting will "look" at all device settings, and save and invoke all settings w hen the preset is recalled. For example, selecting the Out Audio Routing layer sets the preset to only remember audio routing settings and save these settings under the preset. When the preset is recalled, only the audio routing layer is affected.
		Input Video	
		Video Proc	
		Framesync[a]	
		Scaler	
		Out Audio Routing	
		Timecode	
		Closed Caption	
		Output Video	
		Log/Firmware	
Load/Delete Existing Preset	Select Preset	No Presets Saved	Selects a preset to be loaded or deleted.
		#	
	Load Selected Preset	Confirm	Allows recalling the selected preset. When this button is selected, the changes captured in the preset are immediately applied.
	Update Selected Preset	Confirm	
	Delete Selected Preset	Confirm	Deletes the currently selected preset

Table 5.20 Presets Tab Items

Tab Title	Item	Parameters	Description
Load/Delete Existing Preset	Load Factory Defaults	Confirm	Allows recalling the factory default preset. When this button is selected, the changes captured in the preset are immediately applied. **Note:** This feature functions with no masking. The Preset Layer Select controls have no effect on this control and will reset all layers to factory default.
	Download Presets	*.bin	Saves the preset files to a specified location on your network or DashBoard client computer.
		Save	

a. Only available when using the HDC-8223-S.

Notes on Uploading Presets

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 preset file, engagement of a desired preset is only assured by selecting and loading a desired preset.

You can upload (open) card presets from a network computer by:

1. Selecting the **Upload** button located at the bottom of the Device View in DashBoard.
2. Browsing to the location where the preset file was saved to.
3. Select the desired file from the provided list.
4. Click **Open** to load the file to the card.

Admin Tab

The **Admin** tab provides a global card operating status and allows a log download for factory engineering support. You can also selecting and load card firmware upgrade files. **Table 5.21** summarizes the options available in the **Admin** tab.

Caution — *The HDC-8223(-S) FPGA is designed for a normal-range operating temperature around 85°C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting the Thermal Shutdown control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.*

Table 5.21 Admin Tab Items

Tab Title	Item	Parameters	Description
	Display Name	<text>	Assigns a unique identifier to the card
	Display Name Mode	Append to Product Name	Adds the text in the Display Name field to the standard card name
		Replace Product Name	Replaces the standard card name with the text in the Display Name field
	Log Status (read-only)	#	Indicates overall card internal operating status
	Download Log File	*.tar.gz	Allows a card operational log file to be saved to a host computer. This log file can be useful in case of a card error or in the case of an operational error or condition.
		Save	
	Delete Log File	Confirm	
	Thermal Shutdown	Enable	Allows the built-in thermal failover to be defeated.
		Disable	
Firmware Upgrade Controls	Automatically Reboot After Upgrade	Selected	Allows a selected firmware version to be immediately uploaded as outlined in the section "**Firmware Upgrades**" on page 4-16.
		Cleared	Firmware upgrade loading is held off until the card is manually rebooted.
	Firmware To Load	v#	Selects the desired upgrade file to be loaded
		v# (Currently Installed)	
	Load Selected Firmware	Install	Loads firmware as specified by the **Automatically Reboot After Upgrade** setting
	Cancel Pending Upgrade	Cancel	Cancels the upgrade
	Delete Previous Firmware	Confirm	

Table 5.21 Admin Tab Items

Tab Title	Item	Parameters	Description
Memory Test	Restore From SD Card	Confirm	Do not configure these settings without the guidance of Ross Technical Support
	FPGA Memory Test	Test	
	Memory Test Status (read-only)	#	

User Log Tab

Table 5.22 summarizes the options in the **User Log** tab.

Table 5.22 User Log Tab Items

Tab Title	Item	Parameters	Description
	Time (read-only)	HH:MM:SS MM/DD/YY	Specifies the time and date of the log file entry
	Type (read-only)	Info	Specifies the type of message
		Warning	
	Event (read-only)	#	Provides a textual description of the log file entry
	Clear User Log	Confirm	Clears the five read-only fields in the User Log tab
	Download Log File	*.tar.gz	Allows a card operational log file to be saved to a host computer. This log file can be useful in case of a card error or in the case of an operational error or condition.
		Save	

Troubleshooting

In This Chapter

This chapter provides general troubleshooting information and specific symptom/corrective action for the HDC-8223(-S) and its remote control interface. The HDC-8223(-S) card requires no periodic maintenance in its normal operation; if any error indication occurs, use this chapter to correct the condition.

The following topics are discussed:

- Error and Failure Indicator Overview
- DashBoard Status/Error Indicators and Displays
- Basic Troubleshooting Checks
- Processing Error Troubleshooting
- Troubleshooting Network/Remote Control Errors

Error and Failure Indicator Overview

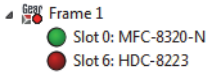
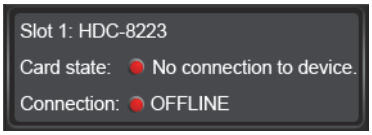
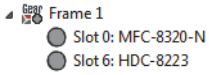
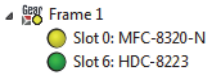
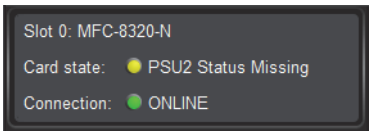
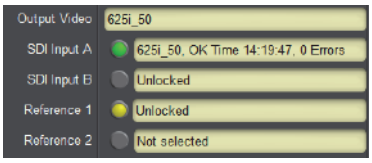
The HDC-8223(-S) card itself and its DashBoard menus (to varying degrees) provide error and failure indications. Depending on how the HDC-8223(-S) card is being used (i.e, standalone or network controlled through DashBoard), check all available indications in the event of an error or failure condition.

The descriptions in the following sections provide general information for the various status and error indicators. For specific failures, also use the appropriate subsection listed below.

DashBoard Status/Error Indicators and Displays

Table 6.1 shows and describes the DashBoard status indicators and displays. These indicator icons and displays show status and error conditions relating to the HDC-8223(-S) card itself and remote (network) communications.

Table 6.1 DashBoard Status Indicators Icons and Displays

Indicator Icon or Display	Error Description
	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 HDC-8223 card in slot 6).
	Specific errors are displayed in the Card Info pane. In this example "`No connection to device`" indicating HDC-8223 card is not connecting to frame/LAN. If the HDC-8223(-S) card is not connecting to the frame or LAN, all controls are grayed-out in the Device View (right-hand side of window).
	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 HDC-8223 in slot 6 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen.
	Yellow indicator icon in Card Access/Navigation Tree pane shows card with an alert condition. In this example, the Card Access/Navigation Tree pane shows a general alert issued by the MFC-8320-N Network Controller Card.
	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 message of "`PSU2 Status Missing`" is displayed.
	Yellow indicator icon in the HDC-8223 Card Info pane shows error alert, along with cause for alert. In this example, the HDC-8223 is not receiving an enabled framesync source.

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 6.2** 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 chapter.

Table 6.2 Basic Troubleshooting Checks

Item	Checks
Verify power presence and characteristics	On both the frame Network Controller Card and the HDC-8223(-S), 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 the **Power Consumed** indication for the HDC-8223(-S) card. This can be observed using the DashBoard Card Info pane. • If display shows **no** power being consumed, either the frame power supply, connections, or the HDC-8223(-S) card itself is defective. • If display shows **excessive** power being consumed (refer to the chapter "**Specifications**" on page 7-1), the HDC-8223(-S) card may be defective.
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 rear 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 HDC-8223(-S) 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

This section provides HDC-8223(-S) processing troubleshooting information. If the HDC-8223(-S) card exhibits any of the symptoms listed in **Table 6.3**, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the HDC-8223(-S) is not appropriately set for the type of signal being received by the card.

The error indications described below are typical for the corresponding error conditions listed. Other error indications not specified here may also be displayed on DashBoard and/or the HDC-8223(-S) card-edge status indicators.

Where errors are displayed on both the HDC-8223(-S) card and network remote controls, the respective indicators and displays are individually described in this section.

Table 6.3 Troubleshooting Processing Errors by Symptom

Symptom	Error/Condition	Corrective Action
DashBoard shows `Unlocked` message in the Card Info panel. Card-edge **Input Format** LEDs show continuous cycling.	No video input present	Ensure intended video source is connected to appropriate HDC-8223(-S) video input. Make certain BNC cable connections between frame rear module for the HDC-8223(-S) and signal source are OK. The HDC-8223(-S) shows yellow indicator for input channel set up to receive expected input. If an input is not selected as an active input, it does not propagate a yellow indicator.
Ancillary data (closed captioning, timecode) not transferred through HDC-8223(-S)	Control(s) not enabled	Ensure respective control is set to **On** or **Enabled** (as appropriate).
	VANC line number conflict between two or more ancillary data items	Ensure 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 4-4.
Audio not processed or passed through card	Enable control not turned on	On the **Output Audio Routing/Controls** tab, the **Audio Group Enable** control for group 1 thru 4 must be enabled for sources to be embedded into respective embedded channel groups.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	On the **Presets/Firmware Upgrade** tab, the **Automatically Reboot After Upgrade** box is cleared (not checked). Either reboot the card manually, or leave this box selected (includes a check mark) to allow automatic reboot to engage an upgrade upon selecting the upgrade.

Troubleshooting Network/Remote Control Errors

Should any problem arise with this product that was not solved by the information in this section, please contact Ross Video Technical Support.

Refer to the section "**Contact Us**", located on the back cover of this manual, for contact information.

Specifications

In This Chapter

This chapter provides the technical specification information for the HDC-8223(-S). Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section includes the technical specifications for the HDC-8223(-S).

Table 7.1 HDC-8223(-S) Technical Specifications

Category	Parameter	Specification
Serial Digital Video Inputs	Number of Inputs	2 with manual select or failover
	Data Rates Supported	SMPTE 259M, SMPTE 292M
	Impedance	75Ω terminating
	Equalization (using Belden 1694A cable)	SD: 360m (1180ft) HD: 180m (590ft)
	Return Loss	> 15dB up to 1.485GHz
Post-Processor Serial Digital Video Outputs	Number of Outputs	Up to four SD-SDI outputs via selector mux
	Impedance	75Ω
	Return Loss	> 15dB at 5MHz – 270MHz
	Signal Level	800mV ± 10%
	DC Offset	0V ± 50mV
	Jitter (SD)	< 0.2UI (all outputs)
	Overshoot	< 0.2% of amplitude
Pre-Processor (Reclocked) Serial Digital Video Outputs	Number of Outputs	Four HD/SD-SDI BNC
	Impedance	75Ω
Analog Video Outputs	Number of Outputs	Up to four SD analog CVBS via selector mux
	Impedance	75Ω
Analog Audio Outputs	Number of Outputs	Four balanced using 3-wire removable Phoenix connectors; 0dBFS = +24dBu
Environmental	Operating temperature	0°C – 40°C (32°F – 104°F)
	Relative humidity (operating or storage)	< 95%, non-condensing
Power	Power Consumption	< 18W maximum

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 card, 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 at the end of the manual.

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. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
4. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
5. **Card Exchange** — Exchanging a suspect card with a card that is known to be working correctly is an efficient method for localizing problems to individual cards.

Warranty and Repair Policy

The HDC-8223(-S) 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 HDC-8223(-S) 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 HDC-8223(-S) 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 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 HDC-8223(-S) 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 HDC-8223(-S), 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 HDC-8223(-S). 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	Telephone:	+1 613 • 652 • 4886
	After Hours Emergency:	+1 613 • 349 • 0006
	Email:	techsupport@rossvideo.com
General Information	Telephone:	+1 613 • 652 • 4886
	Fax:	+1 613 • 652 • 4425
	Email:	solutions@rossvideo.com
	Website:	http://www.rossvideo.com

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