



HDC-8223A(-S) User Guide

Thank You for Choosing Ross

You've made a great choice. We expect you will be very happy with your purchase of Ross Technology.

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
dross@rossvideo.com

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-8223A(-S) · User Guide

- Ross Part Number: **8223ADR-004-04**
- Release Date: January 20, 2023.

The information contained in this Guide is subject to change without notice or obligation.

Copyright

©2023 Ross Video Limited, Ross®, and any related marks are trademarks or registered trademarks of Ross Video Limited. All other trademarks are the property of their respective companies. PATENTS ISSUED and PENDING. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording or otherwise, without the prior written permission of Ross Video. While every precaution has been taken in the preparation of this document, Ross Video assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

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.

Notice

The material in this manual is furnished for informational use only. It is subject to change without notice and should not be construed as commitment by Ross Video Limited. Ross Video Limited assumes no responsibility or liability for errors or inaccuracies that may appear in this manual.

Safety Notices

Refer to the “**Important Regulatory and Safety Notices**” document that accompanied your product.

Statement of Compliance

This product has been determined to be compliant with the applicable standards, regulations, and directives for the countries where the product is marketed.

Compliance documentation, such as certification or Declaration of Compliance for the product is available upon request by contacting techsupport@rossvideo.com. Please include the product; model number identifiers and serial number and country that compliance information is needed in request.

EMC Notices

US 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 his own expense.



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

Canada

This Class "A" digital apparatus complies with Canadian ICES-003 and part 15 of the FCC Rules.

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

European Union

This equipment is in compliance with the essential requirements and other relevant provisions established under regulation (EC) No 765/2008 and Decision No 768/2008/EC referred to as the "New Legislative Framework".



Warning — *This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.*

Australia/New Zealand

This equipment is in compliance with the provisions established under the Radiocommunications Act 1992 and Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2008.

Korea

This equipment is in compliance with the provisions established under the Radio Waves Act.

Class A equipment (Broadcasting and communications service for business use)

This device is a business-use (Class A) EMC-compliant device. The seller and user are advised to be aware of this fact. This device is intended for use in areas outside home.

Type of Equipment	User's Guide
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Class A Equipment (Industrial Broadcasting & Communication Equipment)	This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home.

International

This equipment has been tested under the requirements of CISPR 22:2008 or CISPR 32:2015 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 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 "**Warranty and Repair Policy**" in this manual for details.

Environmental Information

The equipment 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 wheeled 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 performances of our products.

Company Address



Ross Video Limited

8 John Street
Iroquois, Ontario, K0E 1K0
Canada

Ross Video Incorporated

P.O. Box 880
Ogdensburg, New York
USA 13669-0880

General Business Office: (+1) 613 • 652 • 4886

Fax: (+1) 613 • 652 • 4425

Technical Support: (+1) 613 • 652 • 4886

After Hours Emergency: (+1) 613 • 349 • 0006

E-mail (Technical Support): techsupport@rossvideo.com

E-mail (General Information): solutions@rossvideo.com

Website: <http://www.rossvideo.com>

Contents

Introduction	11
Related Publications	11
Documentation Conventions	11
Interface Elements	11
User Entered Text	11
Referenced Guides	12
Menu Sequences	12
Important Instructions	12
Contacting Technical Support	12
Before You Begin	13
Overview	13
Video Subsystem Overview	13
Rear Modules	13
Input Select	13
Video Processor	13
Scaler Function	14
Frame Sync (HDC-8223A-S Only)	14
Timecode Processor	14
Closed Captioning Processor	15
Ancillary Data Processor	15
Color Corrector	15
AFD ARC Processor	15
Character Burn-in Functions	15
Audio Overview	15
Audio Down Mix Function	16
Workflow with the R2-8223A Rear Module	17
Workflow with the R2C-8223A Rear Module	18
Hardware Overview	19
Control and Monitoring Features	19
Physical Installation	21
Before You Begin	21
Static Discharge	21
Unpacking	21
Installing a Rear Module	21
Installing the Card	22
Cabling Overview	22
R2-8223A Cabling Overview	23
R2C-8223A Cabling Overview	23
Audio Cabling	24
Cabling	25
R2-8223A Cabling Overview	25
R2C-8223A Cabling Overview	25
Audio Cabling	26
Using DashBoard	27
Control and Display Descriptions	27

Function Sub-menu/Parameter Sub-menu Overview	27
Using DashBoard	27
Checking Card Information	28
Operation	29
Ancillary Data Line Number Locations and Ranges	29
Timecode	30
Examples Cases A, B	30
Example Case C	31
Closed Captioning	31
Troubleshooting	32
Reticules	32
Overview	32
Output Audio Routing Controls	33
Adding an Overlay	34
Adding a Text Overlay	34
Adding a Timecode Overlay	35
Scaler	37
DashBoard Menus	39
Status Tabs	39
Status Tab	39
Product Info Tab	40
Timecode Tab	40
Reticules Tabs	43
Reticules Basic Tab	43
Reticules Advanced Tab	44
Input Video Tab	45
Output Video Tab	46
Output Routing Tab	47
Analog Video Tab	47
Scaler Tab	47
Framesync Tab	49
Closed Captioning Tab	51
Video Proc Tab	52
Output Audio Routing/Controls Tab	53
Embedded Output Tab	53
Downmixer Tab	53
Audio Delay Tab	54
Flex Mix Tab	54
Analog Output Tab	55
AFD Tabs	55
AFD/WSS/VI Sub-tab	56
AFD Map Sub-tab	58
Character Burner Tab	59
Ident Tabs	59
Timecode Tab	60
Ancillary Data Processing Tab	62
Presets Tab	63
Notes on Uploading Presets	64
Admin Tab	64
User Log Tab	65
Troubleshooting	67
Error and Failure Indicator Overview	67

DashBoard Status/Error Indicators and Displays	67
Basic Troubleshooting Checks	68
Processing Error Troubleshooting	69
Troubleshooting Network/Remote Control Errors	69
Firmware Upgrades	71
Before You Begin	71
Firmware Upgrade Controls	71
Technical Specifications	73
SDI Inputs Specifications	73
Post-Processor Serial Digital Video Outputs	73
Pre-Processor (Reclocked) Serial Digital Video Outputs	73
Analog Composite Video Outputs	74
Analog Audio Outputs Specifications	74
openGear Frame Communications Specifications	74
Environment Specifications	74
Power Specifications	74
Service Information	75
Troubleshooting Checklist	75
Bootload Button	75
Warranty and Repair Policy	75
Glossary	77

Introduction

This guide covers the installation, configuration, and use of the HDC-8223A(-S) 3G/HD Down-Converter and Distribution Amplifier. The following chapters are included:

- “**Introduction**” summarizes the guide and provides important terms, and conventions.
- “**Before You Begin**” provides general information to keep in mind before installing and configuring your card.
- “**Hardware Overview**” provides a general overview of the user controls available on the card.
- “**Physical Installation**” provides instructions for the physical installation of the card into an openGear frame.
- “**Cabling**” provides an overview of connecting input and output devices to the rear modules.
- “**Using DashBoard**” provides an overview of using DashBoard with your card.
- “**Operation**” provides instructions for configuring the card.
- “**DashBoard Menus**” summarizes the menus and parameters of the tabs in DashBoard.
- “**Troubleshooting**” provides general troubleshooting information and specific symptom/corrective action for the HDC-8223A(-S).
- “**Firmware Upgrades**” provides instructions for upgrading the software running on the card.
- “**Technical Specifications**” provides the specifications for the HDC-8223A(-S).
- “**Service Information**” provides information on the warranty and repair policy for your card.
- “**Glossary**” provides a list of terms used throughout this guide.

Related Publications

It is recommended to consult the following Ross documentation before installing and configuring your HDC-8223A(-S):

- ***DashBoard User Manual***, Ross Part Number: 8351DR-004
- ***MFC-OG3-N User Manual***, Ross Part Number: 8322DR-004
- ***OGX-FR Series User Manual***, Ross Part Number: 8323DR-004

Documentation Conventions

Special text formats are used in this guide to identify parts of the user interface, text that a user must enter, or a sequence of menus and sub-menus that must be followed to reach a particular command.

Interface Elements

Bold text is used to identify a user interface element such as a dialog box, menu item, or button. For example:

In the **Network** tab, click **Apply**.

User Entered Text

Courier text is used to identify text that a user must enter. For example:

In the **Language** box, enter `English`.

Referenced Guides

Text set in bold and italic represent the titles of referenced guides, manuals, or documents. For example:

For more information, refer to the ***DashBoard User Manual***.

Menu Sequences

Menu arrows are used in procedures to identify a sequence of menu items that you must follow. For example, if a step reads "**File** > **Save As**," you would click the **File** menu and then click **Save As**.

Important Instructions

Star icons are used to identify important instructions or features. For example:

- ★ Contact your IT department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for your device.

Contacting Technical Support

At Ross Video, we take pride in the quality of our products, but if problems occur, help is as close as the nearest telephone.

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross Video personnel. During business hours (Eastern Time), technical support personnel are available by telephone. After hours and on weekends, a direct emergency technical support phone line is available. If the technical support person who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. This team of highly trained staff is available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

- **Technical Support:** (+1) 613-652-4886
- **After Hours Emergency:** (+1) 613-349-0006
- **E-mail:** techsupport@rossvideo.com
- **Website:** <http://www.rossvideo.com>

Before You Begin

The HDC-8223A(-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-8223A full rear module, four analog audio channels are available.

Overview

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

- **3G/HD/SD SDI IN A / SDI IN B** – two dual-rate 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 SDI or analog composite (CVBS) outputs
- **RLCK OUT (1-4)** – four 3G/HD/SD-SDI reclocked buffered video outputs
- **AN-AUD OUT (1-4)** – four balanced analog audio outputs (*R2C-8223A rear module only*)

Video Subsystem Overview

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

Rear Modules

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

All inputs and outputs shown in **Figure 3** enter and exit the card via the card edge backplane connector. The rear module breaks out the HDC-8223A(-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 supported rear modules, refer to “**Installing a Rear Module**”.

Input Select

The HDC-8223A(-S) can select from either of two 3G/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.) An input **Allowed Rasters** and **Allowed Frame Rates** filter allows inputs to be filtered (screened) for only user-allowed raster sizes and frame rates, with disallowed raster/rates being rejected as an input (input unlock). Reclocked copies of the selected program video SDI input can be outputted by the card.

Video Processor

The HDC-8223A(-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 3G/HD video formats and multiple frame rates, with auto-format detect/down-conversion of SMPTE 424M/292M/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-8223A-S Only)

This option provides for frame sync control using either one of two external **REF IN 1**, **REF IN 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.

Timecode Processor

As illustrated in **Figure 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.

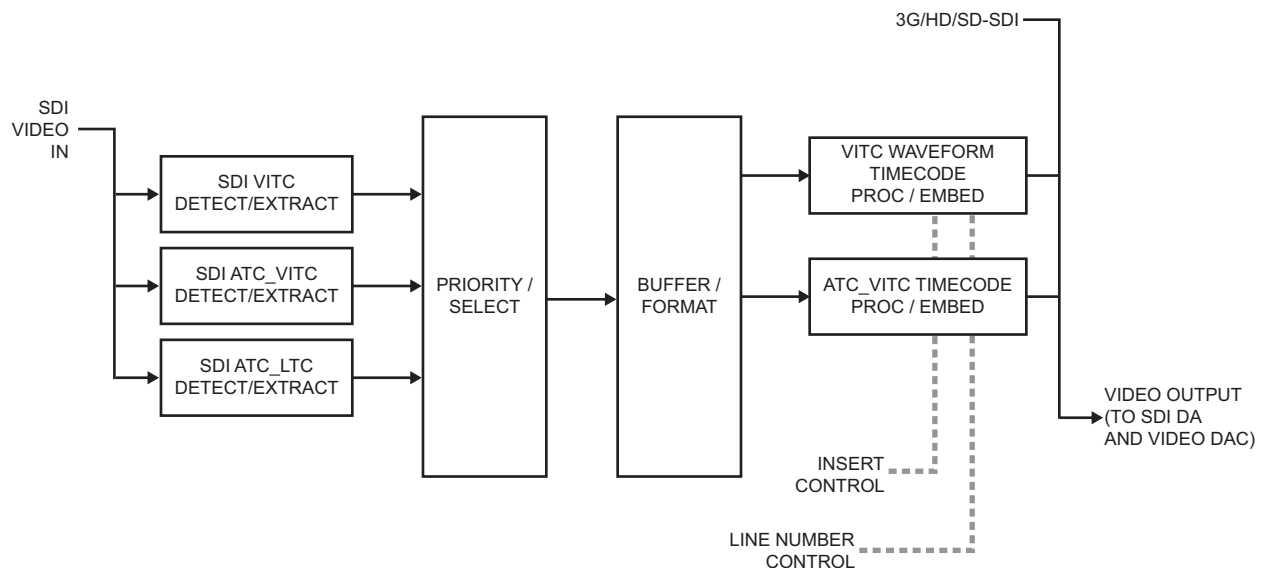


Figure 1 Timecode Processor

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.

Ancillary Data Processor

This function provides VANC/HANC ancillary data “bridging” to extract ATC packet data from the incoming SDI signal, preserve the ANC data packets, and re-embed the packets post-scaler in the SDI signal. User DID/SDID locations can be specified and then extracted and preserved for bridge reinsertion. Insertion controls provide for inserting the ANC data in VANC, HANC, or C-space.

Color Corrector

This option converts the YCbCr SDI input video to the 4:4:4 RGB color space (where the color correction is applied), and then back to YCbCr SDI on the output. Controls are available to adjust each RGB level independently for both white levels (gain) and black levels (offset). Gamma can also be independently adjusted for each RGB channels. Various controls can be ganged to provide adjustment for all three color channels simultaneously.

AFD ARC Processor

The AFD processor allows extracted Aspect Ratio Control (ARC) data from the input video and provides:

- H/V cross-conversion matrix in which a received code directs a same or other user-selectable alternate H/V ratio on the output for any of several H/V ratios.
- Directs scaler automatic active ARC in response to received and/or converted ARC code (Scaler Follows ARC).

The input video is checked for ARC formats and can be set to provide a trigger upon when a selected ARC format is received. Received H/V codes can also be applied through an H/V conversion matrix that allows alternate H/V ratios for a given received input code. In conjunction with a user-accessible cross-matrix table, the received code then in turn directs any of several user-selectable H/V settings to be inserted on the output video.

AFD can be rejected for input consideration. The selected output H/V ratio can be set to automatically apply this aspect ratio to the program video via the card ARC scaler.

Character Burn-in Functions

User text and timecode (as selected using the timecode function) can be burned into the output video. Burn-in attributes such as size, position, background, color, and opacity are user-configurable. Two discrete character burn strings can be inserted on the output video, with each string inserted as static text and/or insert only upon loss of signal.

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 2.**)

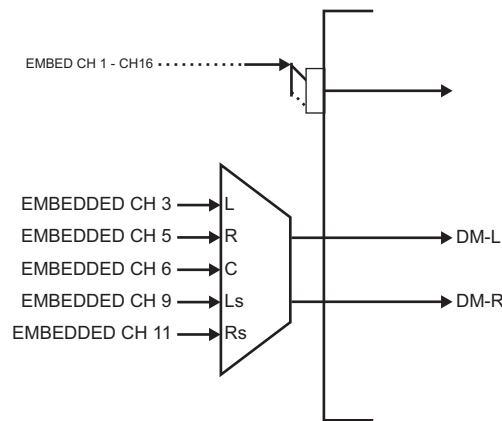
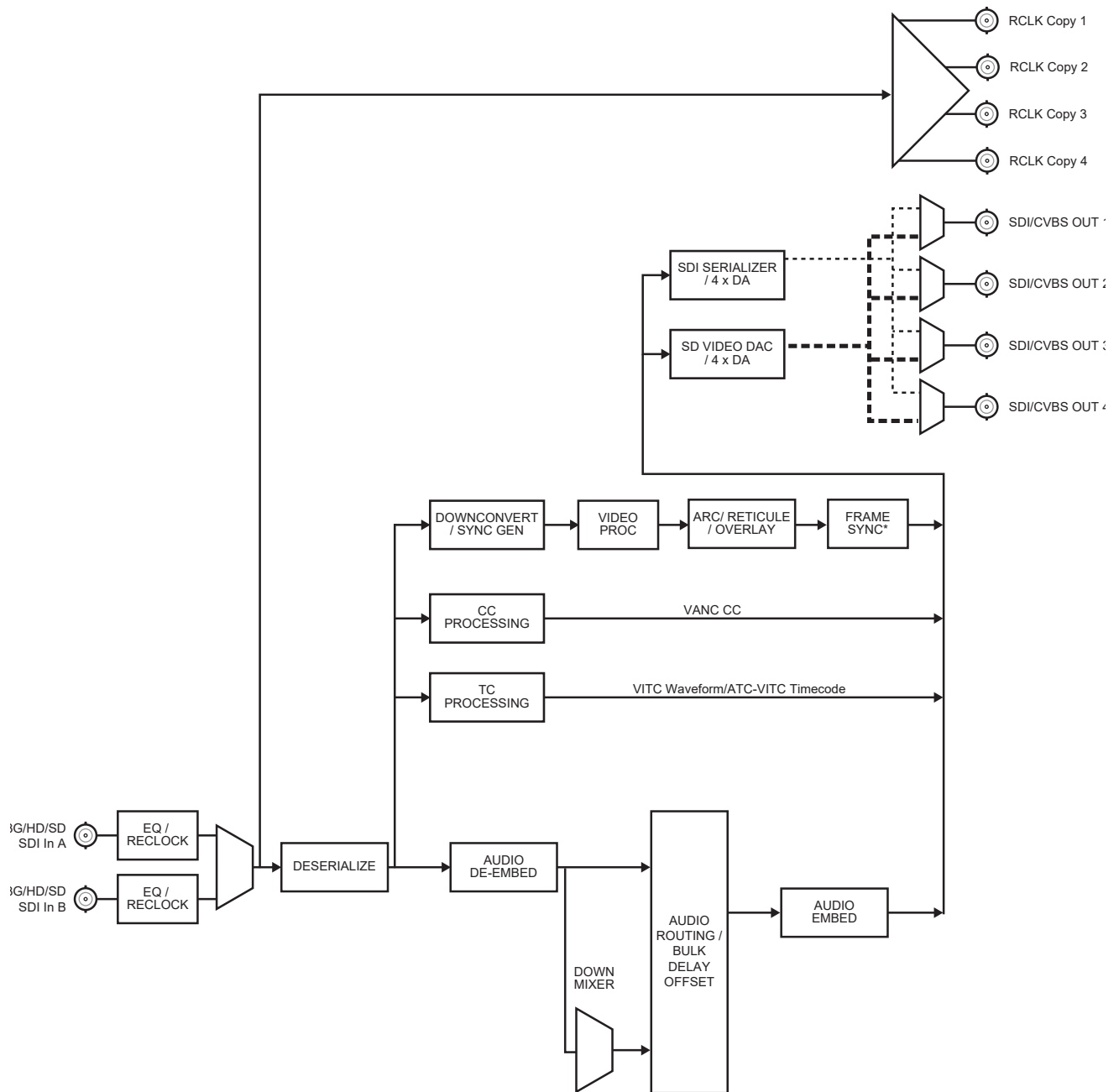


Figure 2 Audio Down Mix Functional Block Diagram with Example Sources

Workflow with the R2-8223A Rear Module

Figure 3 outlines the workflow of the HDC-8223A(-S) when installed with the R2-8223A full rear module.

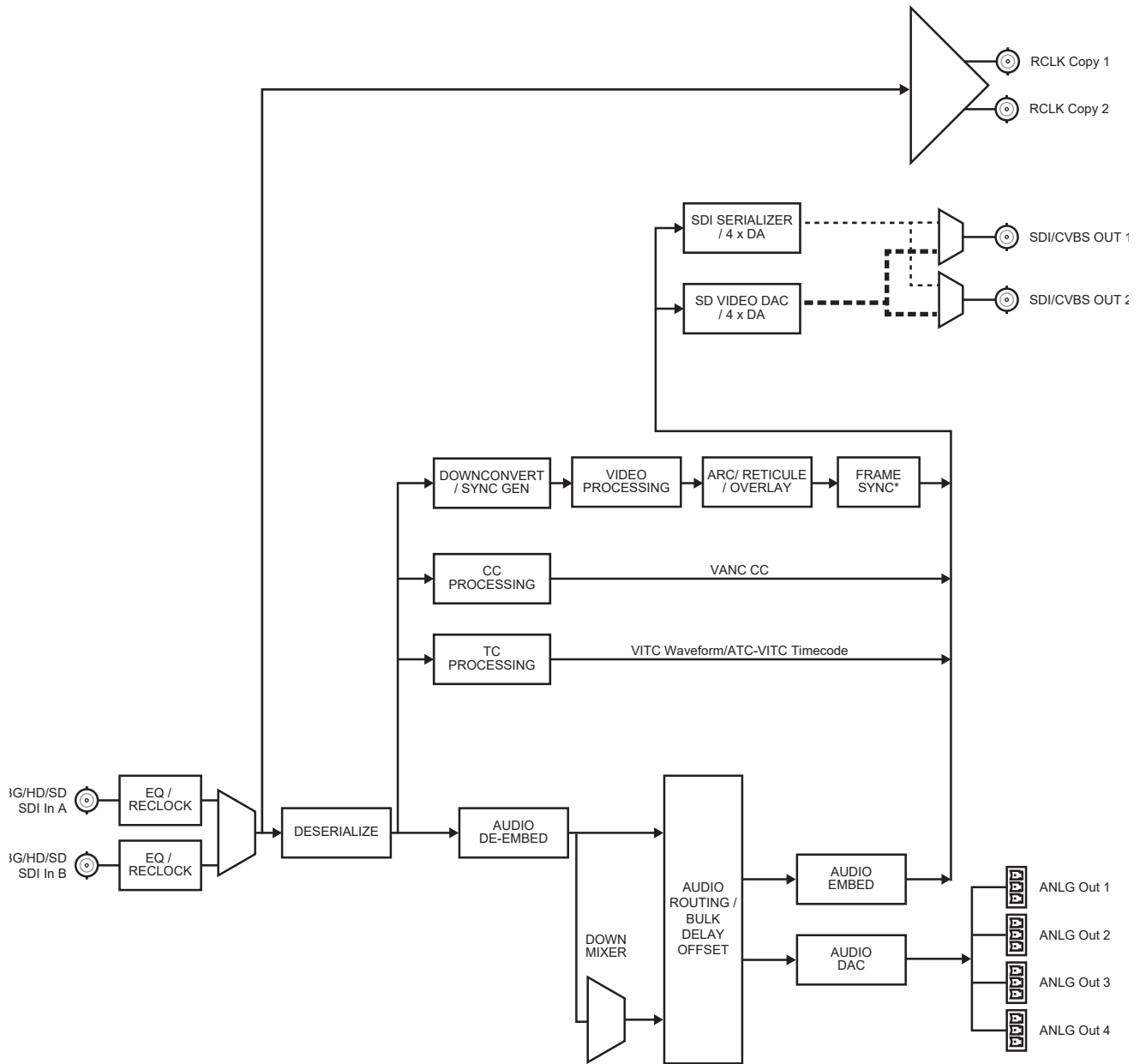


* Only available for the HDC-8223A-S.

Figure 3 Functional Block Diagram — R2-8223A Rear Module

Workflow with the R2C-8223A Rear Module

Figure 4 outlines the workflow of the HDC-8223A(-S) when installed with the R2C-8223A full rear module.



* Only available for the HDC-8223A-S.

Figure 4 Functional Block Diagram — R2C-8223A Rear Module

Hardware Overview

This chapter provides a general overview of the user controls available on your HDC-8223A.

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 5** for the location of the LEDs.

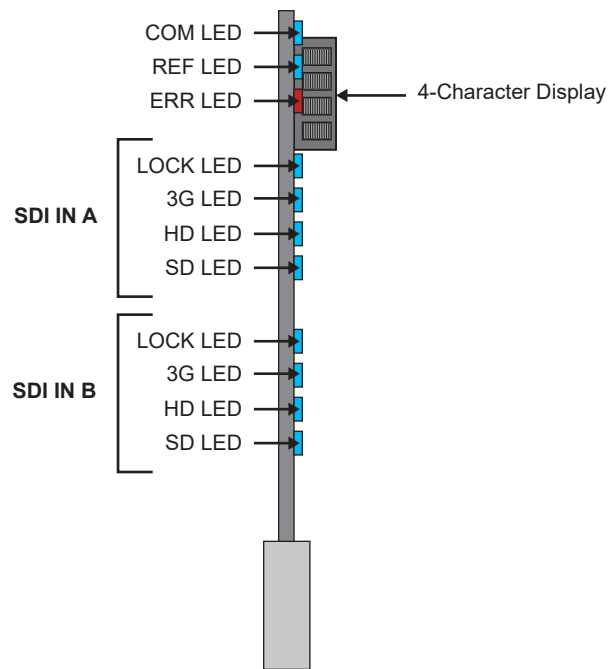


Figure 5 HDC-8223A(-S) Card-edge Controls

Table 1 provides basic LED descriptions.

Table 1 LEDs on the HDC-8223A

LED	Color	Display and Description
COM	Flashing Blue	When flashing, this LED indicates that the HDC-8223A is receiving control message from DashBoard.
REF	Blue	When lit, this LED indicates that the HDC-8223A is receiving valid reference.
ERR	Red	When lit, this LED indicates an internal error.
SDI IN #	Blue	Four blue LEDs for each SDI input (A and B) indicate the input signal raster format being received and locked onto by the HDC-8223A(-S) (LOCK, 3G, HD, SD). Continuous cycling of the LEDs indicates the HDC-8223A(-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-8223A(-S) is receiving a signal which cannot be processed.

Physical Installation

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

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

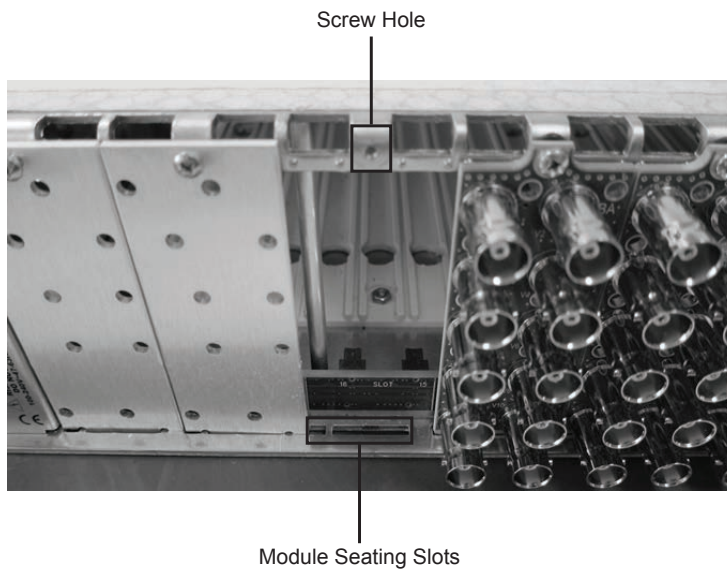
Unpack each card you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Installing a Rear Module

The R2-8223A Full Rear Module or the R2C-8223A Full Rear Module can be used. If the Rear Module is already installed, proceed to “**Installing the Card**”.

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.



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 "**Installing a Rear Module**".



Caution — *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 pins are 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 the input and output cables to the installed rear modules on the openGear frames. 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.

R2-8223A 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 6**)

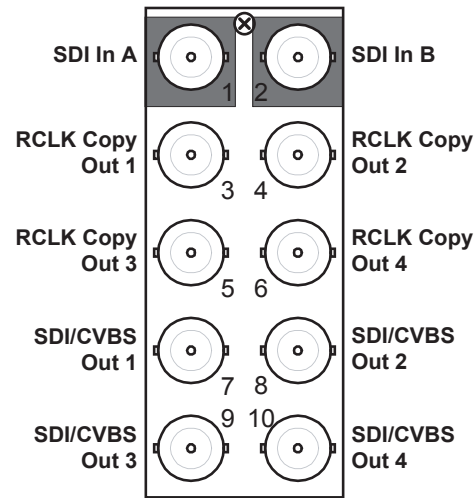


Figure 6 Cable Connections for the R2-8223A Rear Modules

R2C-8223A 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 7**)

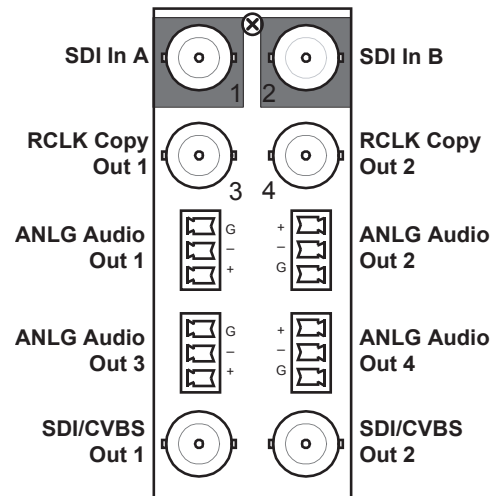


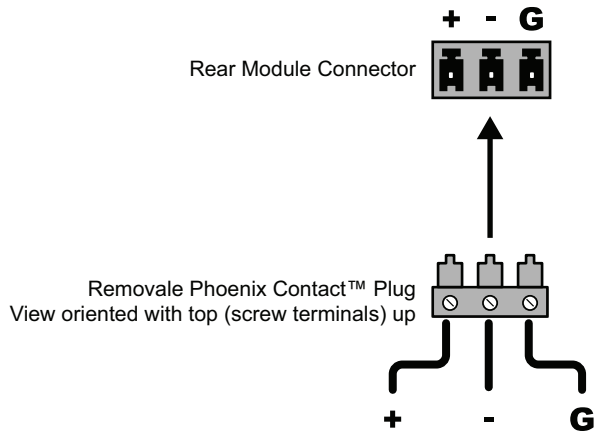
Figure 7 Cable Connections for the R2C-8223A Rear Modules

Audio Cabling

The R2C-8223A rear module also 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.



- ★ 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.

Cabling

This chapter provides information for connecting the input and output cables to the installed rear modules on the openGear frames. 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.

R2-8223A 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 8**)

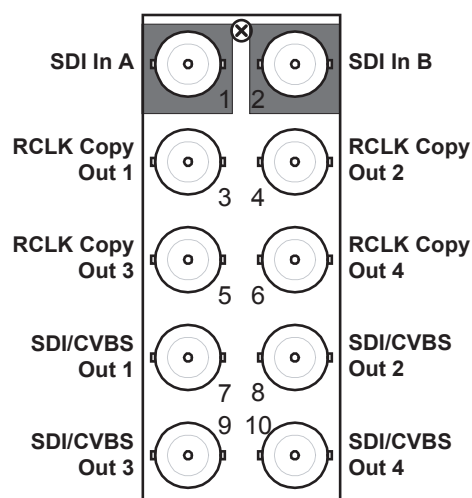


Figure 8 Cable Connections for the R2-8223A Rear Modules

R2C-8223A 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 9**)

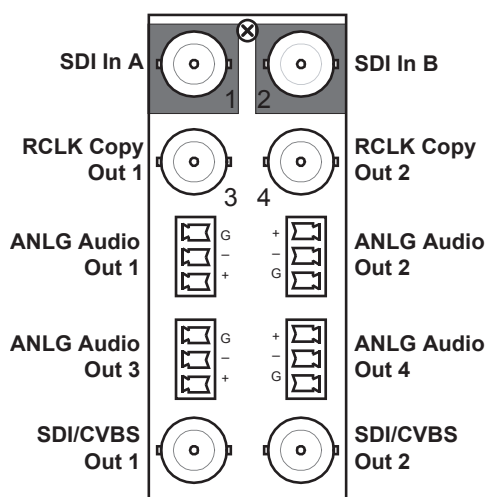


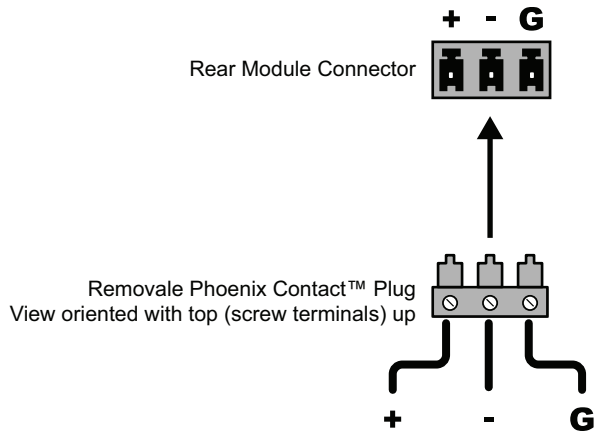
Figure 9 Cable Connections for the R2C-8223A Rear Modules

Audio Cabling

The R2C-8223A rear module also 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.



- ★ 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.

Using DashBoard

This chapter provides an overview of using DashBoard with your HDC-8223A(-S).

Control and Display Descriptions

The HDC-8223A(-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 10** shows how the HDC-8223A and its sub-menus are organized, and also provides an overview of how navigation is performed between cards, function sub-menus, and parameters.

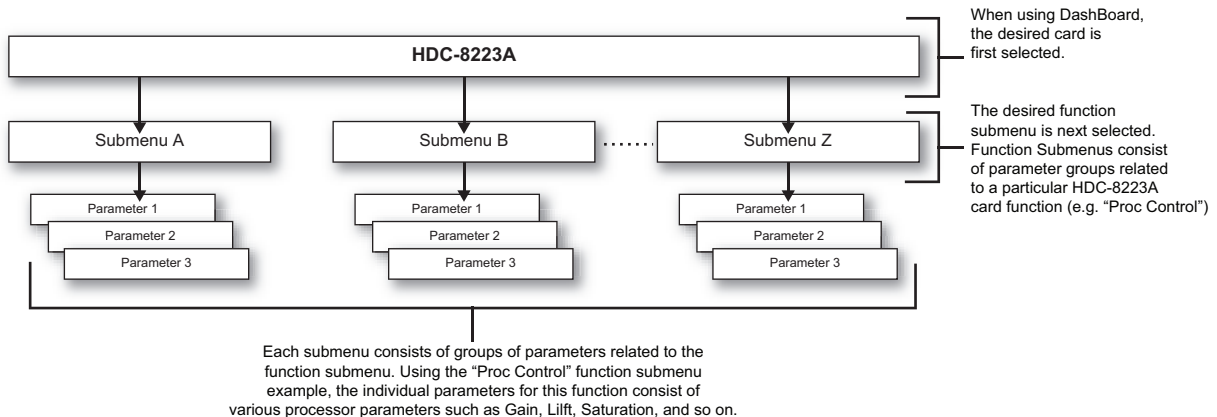


Figure 10 Function Sub-menu/Parameter Sub-menu Overview — HDC-8223A

Using DashBoard

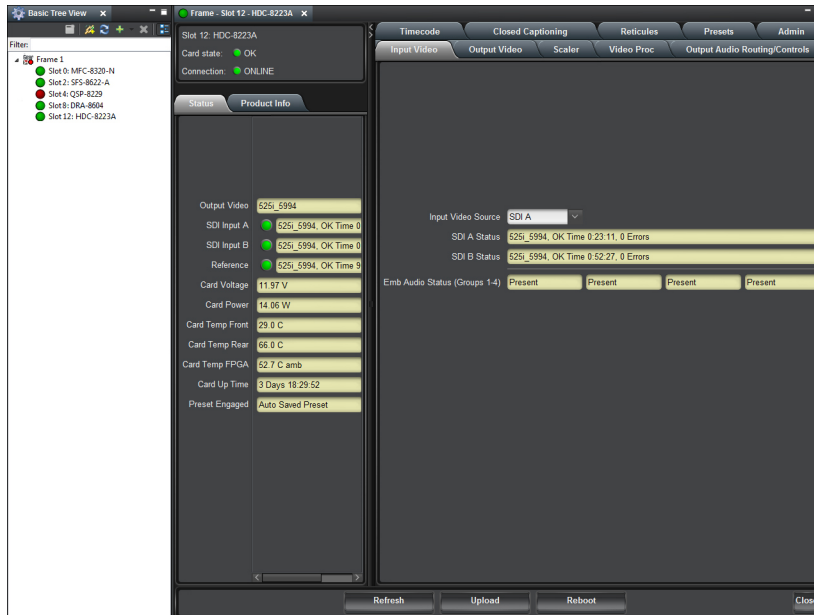
Before proceeding, ensure that the DashBoard Control System is installed on a PC connected to your facility network. The DashBoard software and user manual are available from the Ross Video website.

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-8223A(-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-8223A.
2. Double-click the node for a card to display its menus in the right-side of the DashBoard window.



Checking Card Information

The operating status and software version the HDC-8223A(-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 **“Troubleshooting”** for corrective action.

Operation

This chapter provides instructions for configuring the HDC-8223A(-S).

Ancillary Data Line Number Locations and Ranges

Table 2 lists typical default output video VANC line number locations for various ancillary data items that may be passed or handled by the HDC-8223A(-S).

Table 2 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 11** shows an example of improper VANC allocation within an HD-SDI stream.

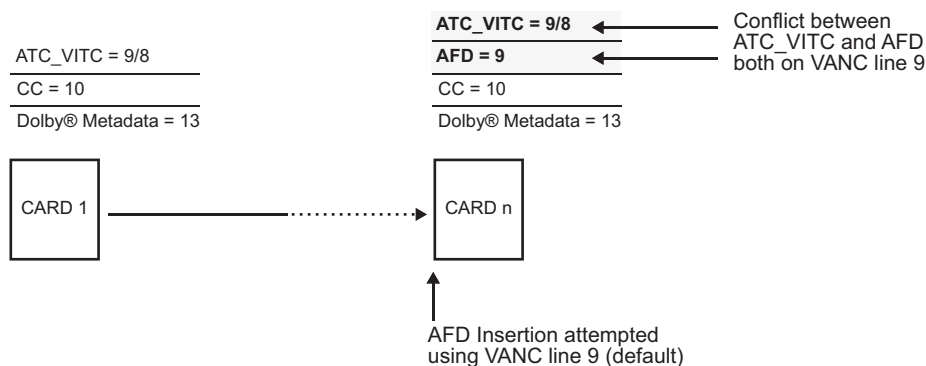


Figure 11 Example VANC Line Number Allocation — Improper

Figure 12 shows an example of corrected VANC allocation within an HD-SDI stream.

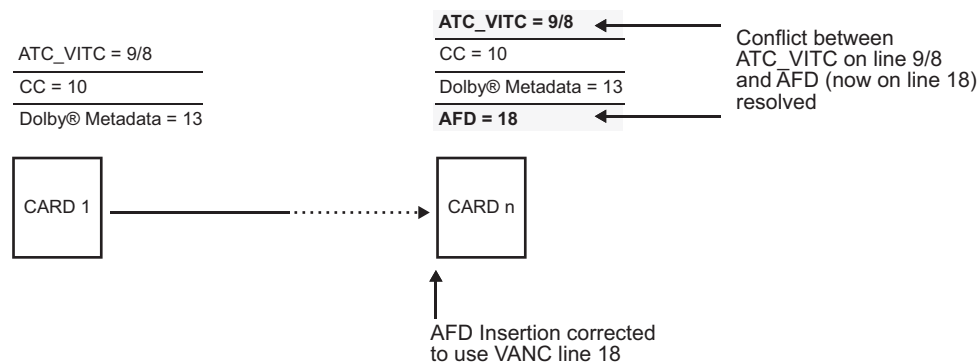


Figure 12 Example VANC Line Number Allocation — Corrected

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 “**Timecode Tab**”.

Examples Cases A, B

Figure 13 is an example (A) in which received 720p 59.94 SDI video is down-converted to 525i 59.94.

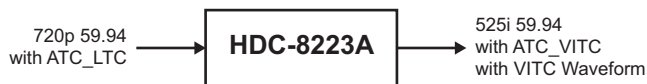


Figure 13 Down Converting 720p to 525i

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.

Reference VITC Status	Not Present
Input VITC Status	Not Present
Input ATC LTC Status	00:01:06:13.0
Input ATC VITC Status	Not Present

Figure 14 Status Fields

Source Priority 1	Input ATC_LTC
Source Priority 2	Input ATC_VITC
Source Priority 3	Disable Outputs
Source Priority 4	Disable Outputs

Figure 15 Source Priority Settings

Figure 16 is an example (B) of providing both SDI ATC_VITC and VITC waveform timecode data in the converted SD output video.

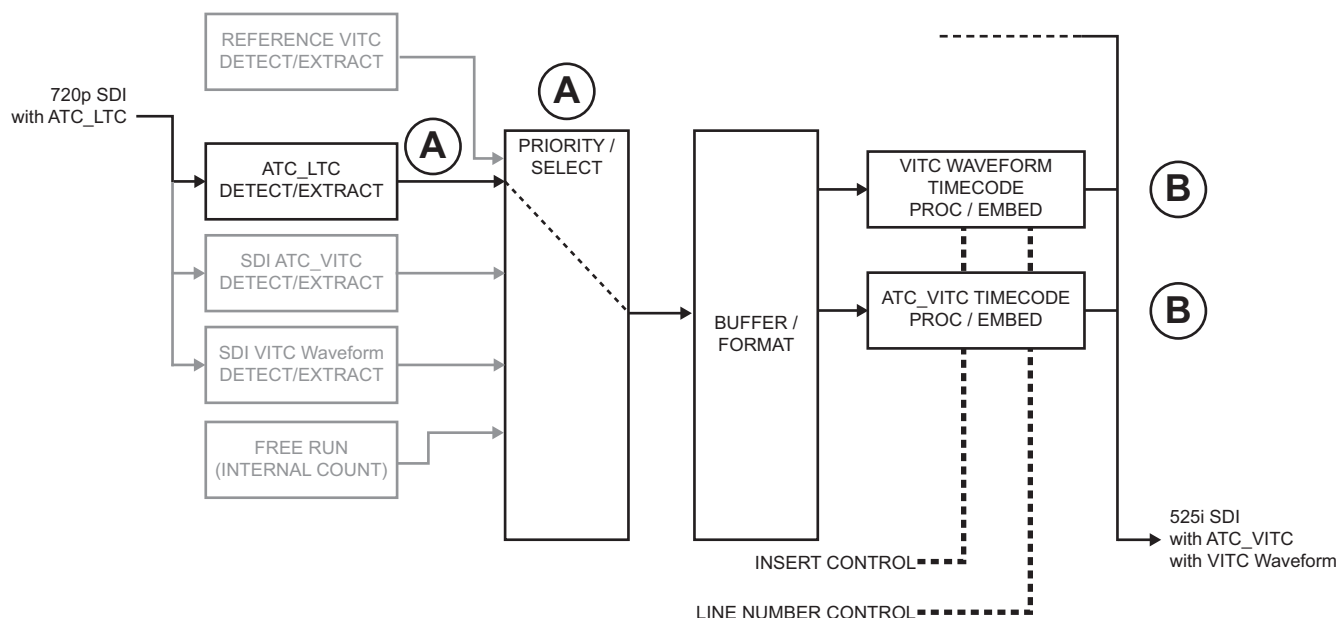


Figure 16 Using SDI ATC_VITC and VITC Waveform Timecode Data

As such set both **SD ATC VITC Insertion** and **SD VITC Waveform Insertion** to **Enabled**. In **Figure 16**, the line numbers are set to the default SMPTE 12M-2-2008 recommended values.

SD VITC Waveform Output 1 Line Number	14
SD VITC Waveform Output 2 Line Number	16
SD VITC Waveform Insertion	Enabled
SD ATC_VITC Insertion	Enabled
SD ATC Insertion Line	13 - SMPTE 12M-2-2008 Recommended

Figure 17 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-8223A will refer to no timecode output since the choice of Disable Output “out-prioritizes” ATC_LTC with the settings seen in **Figure 18**. The choices shown in **Figure 19** will allow ATC_LTC to “out-prioritize” Disable Output if ATC_VITC is not available.

Source Priority 1	Input VITC
Source Priority 2	Input ATC_VITC
Source Priority 3	Disable Outputs
Source Priority 4	Input ATC_LTC

Figure 18 No Timecode Output

Source Priority 1	Input VITC
Source Priority 2	Input ATC_VITC
Source Priority 3	Input ATC_LTC
Source Priority 4	Disable Outputs

Figure 19 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.

- ★ 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 “**Closed Captioning Tab**”.

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 3**. Refer to **CEA-708-B** for more information.

Table 3 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-8223A(-S)
Data Not Present	Packet is marked from closed captioning source external to the HDC-8223A(-S) that no data is present
No Data ID	Packet from closed captioning source external to the HDC-8223A(-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 “**Reticules Tabs**”.

Overview

The HDC-8223A 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.

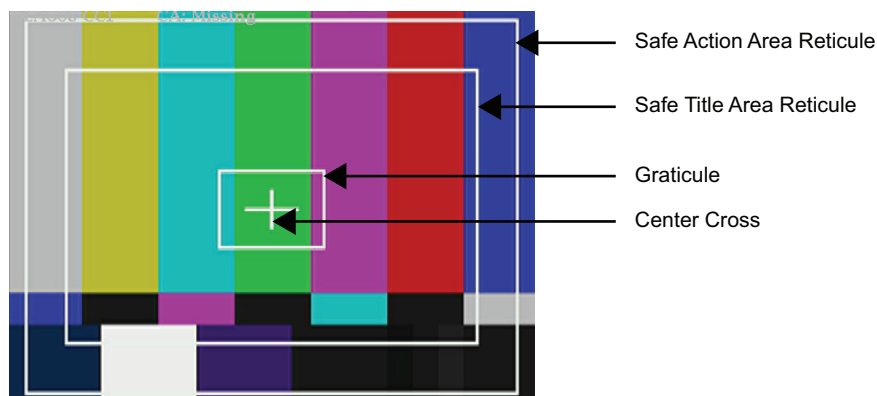


Figure 20 Typical Reticule/Overlay Marker Insertions

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 16**.

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.

- ★ Although the HDC-8223A(-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.

★ 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

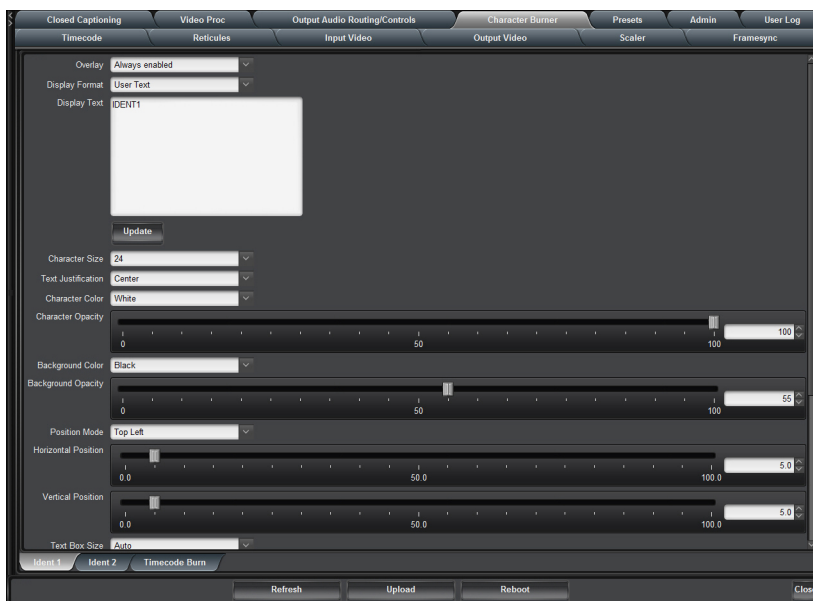
A text overlay displays the content specified by the user, and you can customize the text appearance, add a background, and position the overlay anywhere on the active picture area. You can configure up to two text overlays independently.

For More Information on...

- the menus and parameters available in the **Ident** sub-tabs, refer to “**Ident Tabs**”.

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.



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-8223A-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

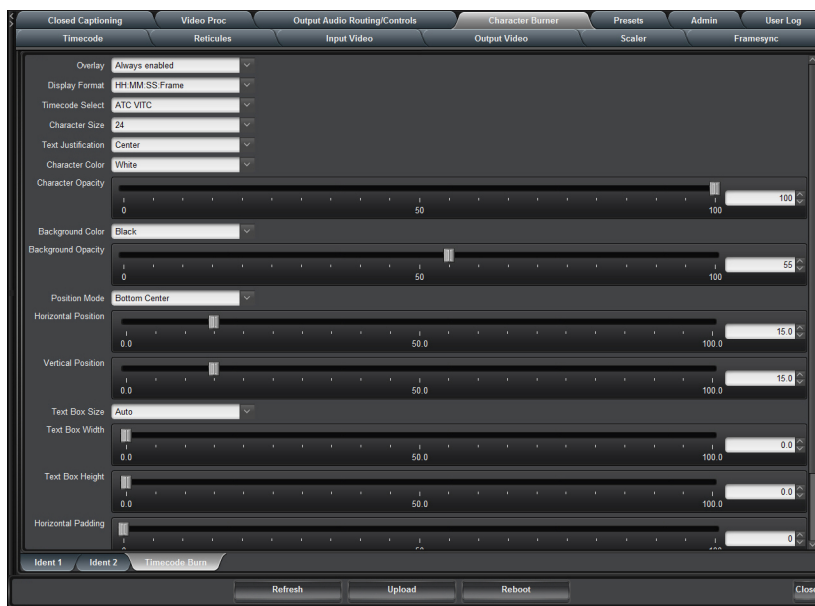
A timecode overlay displays the timecode data as reported by the output video signal. You can still customize the timecode format and appearance, add a background, and position the overlay anywhere on the active picture area.

For More Information on...

- the **Timecode Burn** sub-tab, refer to “**Timecode Tab**”.

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.



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-8223A-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 “**Scaler Tab**”.

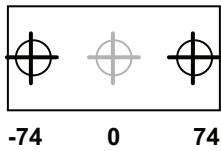


Figure 21 H Pan Control

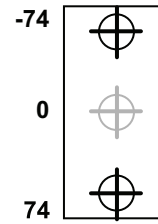


Figure 22 V Pan Control

DashBoard Menus

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

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

Table 4 Status Tab Items

Item	Parameters	Description
Input Video	FF, hh:mm:ss, # Errors	Reports the status of the input where: <ul style="list-style-type: none">• 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-8223A(-S)
Card Voltage	##.##V	Measured input voltage
Card Power	##.## W	Calculated power of the HDC-8223A(-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 summarizes the read-only information displayed in the **Product Info** tab.

Table 5 Product Info Tab Items

Item	Parameters	Description
Product	HDC-8223A	This field reports HDC-8223A even if the Frame Sync option is installed
Product Options	#	Indicates which licensed features are installed on the HDC-8223A(-S)
Supplier	Ross Video Ltd.	Indicates the provider of the HDC-8223A(-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-8223A(-S) is installed in

Timecode Tab

Table 6 summarizes the options available in the **Timecode** tab.

Table 6 Timecode Tab Items

Item	Parameters	Description
Reference VITC Status (read-only)	#	Displays the current status and contents of the four supported external timecode formats. <ul style="list-style-type: none">• 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	

Table 6 Timecode Tab Items

Item	Parameters	Description
Source Priority #	#	<p>Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable.</p> <p>Set Incoming ATC Packet Removal Control to Enabled if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.</p>
	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
Output Status (read-only)	#	Displays the current content and source used for the timecode data; output status is valid.
	Insertion Disabled	<p>Timecode insertion button is set to Disabled; output insertion is disabled.</p> <p>If timecode is unavailable from Source Priority selection performed, timecode on output reverts to Free Run (internal count) mode</p> <p>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:</p> <ul style="list-style-type: none"> • 0.0 Frame 0 • 0.1 Frame 1 • 1.0 Frame 2 • 1.1 Frame 3... • 29.1 Frame 59

Table 6 Timecode Tab Items

Item	Parameters	Description
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.
	Disabled	An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.
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
LTC Input	Embed Ch #	Selects the source to be used by card to receive LTC as audio LTC over Emb Ch 1 thru Ch 16
Mute LTC Audio on Input Loss	Enabled	Allows LTC audio or RS-485 output to mute upon loss of selected timecode inputs. When set to Enabled and the input timecode is lost, the audio LTC output is muted.
	Disabled	When set to Disabled and the input timecode is lost, audio LTC output is not muted, with count value being free-run count. If muting upon loss of a particular input format is desired, set all Source Priority 1 thru 4 to that particular input format. If this is not done, the card failover timecode selection may substitute another format choice for the format not being received.

Table 6 Timecode Tab Items

Item	Parameters	Description
Incoming ATC Packet Removal	Enabled	<p>Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here).</p> <p>When the Scaler is enabled, ATC packets are automatically removed. The Timecode function must be used to re-insert the timecode data into the output video.</p> <p>Set this option to Enabled if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.</p>
	Disabled	
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
Free Run Hours	#	Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled.
Free Run Minutes	#	Initialization can only be applied when card is outputting Free Run timecode (as reported by the Output Status field displaying “Free Run”).
Free Run Seconds	#	
Apply Free Run Values	Confirm	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.

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 7** summarizes the options in the **Basic** sub-tab.

Table 7 Reticules Basic Tab Items

Item	Parameters	Description
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 from white, various gray fills, or black colors
	Black	
Inverse Color	Disable	Selects inversion (negative) of current selection
	Enable	
Opacity	0 -100	Sets the opacity of the overlay for both white/black and inverse color modes
Thickness	1-12	Sets the thickness (in pixels)

Reticules Advanced Tab

The **Reticules Advanced** sub-tab provides insertion and sizing controls for custom graticules and other markers. **Table 8** summarizes the options in the **Reticules Advanced** sub-tab.

Table 8 Reticules Advanced Tab Items

Item	Parameters	Description
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 9** summarizes the options and ready-only information available in the **Input Video** tab.

Table 9 Input Video Tab Items

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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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
Input SDI Raster Size / Frame Rate Filtering		
Allowed Raster Sizes	#	<ul style="list-style-type: none"> • Allows user filtering to only include selected raster or rate formats to be used as card program video input. • Default settings have all raster sizes and frame rates selected, thereby providing no filtering (all are excluded). • Rates shown are frame rates and not field rates. • Reclocked outputs will pass input SDI regardless of Input SDI Raster Size / Frame Rate filtering. Input filtering applies only to the card program video path.
Allowed Frame Rates	#	

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 10** summarizes the options available in the **Output Routing** tab.

Table 10 Output Routing Tab Items

Item	Parameters	Description
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 11** summarizes the options available in the **Analog Video** tab.

Table 11 Analog Video Tab Items

Item	Parameters	Description
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 12** summarizes the options available in the **Scaler** tab.

Table 12 Scaler Tab Items

Item	Parameters	Description
Input Video (read-only)	#	Displays signal format/status sent to scaler (as a function of the Input Video source setting)
	Unlocked	An invalid or unavailable signal is detected
Output Video (read-only)	#	Displays output signal format/status
	Unlocked	An invalid or unavailable signal is detected
Unity 1.0HV	Apply	<p>Selects between the standard preset Aspect Ratio Conversions (ARC) or Scaler Follow AFD. The Scaler follow AFD control also appears on the AFD tab and is mutually ganged with the selection performed on either tab. This function is intended for aspect ratio adjustment of a particular signal without AFD considerations.</p> <ul style="list-style-type: none"> • If ARC is being used on a case-by-case basis for a particular signal, it is easier to use the Scaler ARC tools described here. • If AFD is to be used to set and apply a standard AFD code label for ARC, use Follow AFD Settings. Do not perform ARC here; instead, perform ARC as described in the AFD function description per AFD Controls.
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	<p>User-defined Aspect Ratio Controls Aspect Ratio Horizontal and Aspect Ratio Vertical controls adjust horizontal and vertical zoom percentage. Settings less than (<) 100% provide zoom-out; settings greater than (>) 100% provide zoom-in. Buttons allow standard ARC presets to be applied to output video. For any setting, using the Horizontal or Vertical controls allow user custom settings.</p> <p>Pressing any of the preset buttons restores the ARC to the selected setting and overrides any previous custom settings.</p>
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	<p>Adjusts the aggressiveness of sharpening or filtering applied to output video.</p> <p>Optimum setting results in overall perception of increased sharpness, while avoiding pattern noise artifacts.</p> <p>Range is 0.50 thru 1.50 in 0.01 steps; null = 1.00</p>

Framesync Tab

The **Framesync** tab is only available when using the HDC-8223A-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 13** summarizes the options available in the **Framesync** tab.

★ Audio timing offset from video is performed using the delay controls on the Output Audio Routing tab. Refer to “**Output Audio Routing/Controls Tab**” for details.

Table 13 Framesync Tab Items

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 selected 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 “ <i>Reference Invalid</i> ”, 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 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 13 Framesync Tab Items

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 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 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	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 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 Select menu)
Flat Field Color	#	Provides a choice of flat field colors when Flat Field is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select menu)
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 13 Framesync Tab Items

Item	Parameters	Description
Frame Delay	#	<p>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.</p> <p>The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).</p> <p>Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected.</p> <p>When using this control, be sure to check the Report Delay field to make certain the desired amount of frames are delayed.</p>
Video Delay (read-only)	#ms / # frames # lines Scaler: #ms	<p>Reports the delay where:</p> <ul style="list-style-type: none"> • #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 14 summarizes the options in the **Closed Captioning** tab

Table 14 Closed Captioning Tab Items

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 “Troubleshooting” 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-8223A(-S) as normal.

Table 14 Closed Captioning Tab Items

Item	Parameters	Description
Incoming Packet Removal	Disabled	Allows removal of closed captioning packets and regeneration of line 21 closed captioning. The Regenerate Source Select control on this card should only be set to Program Input since this model does not support a second analog video input.
	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 15** summarizes the options in the **Video Proc** tab.

Table 15 Video Proc Tab Items

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: <ul style="list-style-type: none"> • 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 16 summarizes the options in the **Embedded Output** sub-tab.

Table 16 Embedded Output Tab Items

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 17 summarizes the options available in the **Downmixer** sub-tab.

Table 17 Downmixer Tab Items

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 18 summarizes the options available in the **Audio Delay** tab.

Table 18 Audio Delay Tab Items

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

The Flex Mix tab provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. The input sources are the card processed audio bus channels. Each input channel has independent gain and mute controls.

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

Table 19 summarizes the options in the **Flex Mix** sub-tab.

Table 19 Flex Mix Tab Items

Item	Parameters	Description
Flex Mix Input #		
Flex Bus	Flex Bus #	Selects the bus (A thru P) to which the input is assigned to.
Source	Silence	Selects the audio input source to be directed to the corresponding bus channel
	Audio Bus Ch 1 - 6	
	Tone # (100Hz - 16kHz)	
	Downmixer #	
Mute	Mutes the specified channel	
Gain	-80 to 20	Provides relative gain (in dB) control

Analog Output Tab

Table 20 summarizes the options in the **Analog Output** sub-tab.

Table 20 Analog Output Tab Items

Item	Parameters	Description
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.

AFD Tabs

The AFD tabs allows assignment of AFD codes to the SDI output video, allows custom ARC settings to be applied for each code, and provides options for active ARC re-aspecting, resulting in a properly scaled and cropped image area.

AFD/WSS/VI Sub-tab

Table 21 summarizes the options in the **AFD/WSS/VI** sub-tab.

Table 21 AFD/WSS/VI Tab Items

Item	Parameters	Description
Inputs		
Input > AFD Status (read-only)	Detected	Displays the current status and contents of the three supported ARC formats. If a format is received, the current formatting code and description is displayed.
	Not Present	The format is not receiving data
Scaler Follow AFD	Enabled	<p>Enables scaler to apply ARC settings provided by ARC controls in this function.</p> <ul style="list-style-type: none"> • Enabled sets the output aspect ratio to track with AFD settings performed in this tab, overriding any other scaler manual ARC settings. • Disabled allows ARC coding processing performed in this tab, but does not apply ARC settings in scaler. • This control also appears on the Scaler tab and is mutually ganged with the selection performed on either tab. • Scaler follows AFD functions only when a valid AFD output format is being generated and enabled. The scaler only observes AFD code commands, with the controls on this tab set to generate an AFD-coded output.
	Disabled	
Force Input Mapping ^a	Follow Trigger	When received ARC code is received, the card uses the ARC coding inherent in the received triggering ARC.
	4x3 ARC Codes	For received triggering formats coded as 4x3, applies the H/V coding selected in this drop-down menu
	16x9 ARC Codes	For received triggering formats coded as 16x9, applies the H/V coding selected in this drop-down.
Trigger on AFD	AFD	Individual ARC format input controls allow accepting the received ARC formats and allows trigger on AFD
	Off	Rejects AFD-coded triggering
Outputs		

Table 21 AFD/WSS/VI Tab Items

Item	Parameters	Description
AFD Output	Enabled	Individual ARC format input controls allow accepting the received ARC formats and inserts AFD packet on output, and allows changing the line number.
	Disable	Turns off AFD format on the output
	Follow Input Line	Inserts AFD packet on same line as received AFD line number (where applicable)
AFD Status (read-only)	Enabled <code>	<ul style="list-style-type: none"> Displays the current output status, coding, and H/V ratio for AFD formats. If a format is active and enabled (as set with the Output Enable controls), the code and H/V description is displayed. The code displayed shows the outputted code. If the code is modified by user settings performed in the AFD Map sub-tab, these changes are shown here.
	Disabled	A format is not outputting data. Settings that result in invalid mapping across format translations will display Disabled. In these cases, no output is inserted for the format.
AFD Output Line Field #	#	<ul style="list-style-type: none"> Allows selecting the line location of the AFD data within the video signal Ancillary Data space. The card does not check for conflicts on a given line number. Verify that the selected line is available and carrying no other data. For progressive formats, the Field 1 control serves as the line number control.

- a. Settings performed here can be applied directly to the output video, or can be custom modified if desired for any of the 4x3 codes and 16x9 codes available here using the AFD Map sub-tab.

AFD Coding Matrix

Table 22 lists the valid AFD coding for both 4x3 and 16x9-coded frames.

★ Shaded cells indicate invalid translation which cannot be used.

Table 22 AFD Coding Matrix

	Input		Output	
	AFD	Description	AFD	Description
4:3 Coded	0010	4x3 Letterbox 16x9 Top	0010	4x3 Letterbox 16x9 Top
	0011	4x3 Letterbox 14x9 Top	0011	4x3 Letterbox 14x9 Top
	0100	4x3 Letterbox 16x9 Center	0100	4x3 Letterbox 16x9 Center
	0101 0110 0111	Undefined		
	1000	4x3 Coded Frame	1000	4x3 Coded Frame
	1001	4x3 Center	1001	4x3 Center
	1010	4x3 16x9 Center	1010	4x3 16x9 Center
	1011	4x3 14x9 Center	1011	4x3 14x9 Center
	1100	Reserved	1100	Reserved
	1101	4x3 Protect 14x9	1101	4x3 Protect 14x9
	1110	4x3 Letterbox 16x9; Protect 14x9 Center	1110	4x3 Letterbox 16x9; Protect 14x9 Center
	1111	4x3 Letterbox 16x9; Protect 4x3 Center	1111	4x3 Letterbox 16x9; Protect 4x3 Center
16:9 Coded	0010	16x9 Letterbox 16x9 Top	0010	16x9 Letterbox 16x9 Top
	0011	16x9 Letterbox 14x9 Top	0011	16x9 Letterbox 14x9 Top
	0100	16x9 Letterbox 16x9 Center	0100	16x9 Letterbox 16x9 Center
	0101 0110 0111	Undefined		
	1000	16x9 Coded Frame	1000	16x9 Coded Frame
	1001	16x9 4x3 Center	1001	16x9 4x3 Center
	1010	16x9 Center Protect 16x9	1010	16x9 Center Protect 16x9
	1100	Reserved	1100	Reserved
	1101	16x9 4x3 Protect 14x9	1101	16x9 4x3 Protect 14x9
	1110	16x9 Protect 14x9	1110	16x9 Protect 14x9
	1111	16x9 Protect 4x3	1111	16x9 Protect 4x3

AFD Map Sub-tab

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

Separate control groups for 4x3 and 16x9 coded input frames allow custom ARC (as well as pan/tilt) for various coded frames.

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

Keep the following in mind:

- When the scaler is set to Scaler follow AFD any V, H, pan, or tilt custom changes made here are directly applied to the output video.
- To output an AFD code (without any re-aspecting to be done by the card) set the No Input row to the desired code to be outputted (For example, "16x9 Letterbox 16x9 Center; 0100").

Character Burner Tab

The Character Burner tab provides user-configurable burn-in of up to two text strings and timecode on output video. The Character Burner tab includes three sub-tabs: two Ident tabs, and a Timecode Burn tab.

Ident Tabs

Table 23 summarizes the options in the **Ident 1** and **Ident 2** sub-tabs.

★ The **Ident 1** and **Ident 2** sub-tabs provide identical, independent controls for inserting two independent text (identification) burn-in overlays on the output video.

Table 23 Ident Tab Items

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, up to 126 characters, to include in the overlay display. Supports typical keyboard alphanumeric characters and ASCII characters.
	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: <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">• A value of 0 sets the background to completely transparent.• A value of 100 sets the background to completely opaque.

Table 23 Ident Tab Items

Item	Parameters	Description
Position Mode ^b	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 ^c	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 ^c	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 Auto, 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 Auto, 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 thin, white border.

- a. This option requires the HDC-8223A-S.
- b. For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster.
- c. Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.

Timecode Tab

Table 24 summarizes the options in the **Timecode** sub-tab.

Table 24 Timecode Tab Items

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

Table 24 Timecode Tab Items

Item	Parameters	Description
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
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 <ul style="list-style-type: none"> 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 transparency level of the overlay background where: <ul style="list-style-type: none"> 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

Table 24 Timecode Tab Items

Item	Parameters	Description
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 Auto, 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 Auto, 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-8223A-S.

Ancillary Data Processing Tab

The **Ancillary Data Processing** tab provides controls for user VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the card, bypassing the scaler (Bridge mode) which preserves the packetized data when the program video is scaled.

★ DashBoard versions 4.1 and earlier display DID and SDID numbers in decimal; newer DashBoard versions display DID and SDID numbers in hexadecimal. Hexadecimal notation is denoted by the "0x" preceding the value.

Eight individual Ancillary Data Processors (ADPs) provide for bridging ancillary data from input SDI program video, bypassing the scaler, and inserting into card output program video SDI. **Table 25** summarizes the fields available in the **Ancillary Data Processing** tab.

Table 25 Ancillary Data Processing Tab Items

Item	Description
Mode	Select from Disable or Bridge (ANC extract/re-embed).
DID and SDID	Selects the desired packet to be handled by the corresponding ANC Data Processor
Line Number	Selects the VANC location of packet re-insertion
Insertion	Allows special insertions in HANC or the C-channel, as well as removal of incoming packets

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 26 summarizes the options available in the **Presets** tab.

Table 26 Presets Tab Items

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.
	Input Video	
	Video Proc	
	Framesync ^a	
	Scaler	The default All setting will “look” at all device settings, and save and invoke all settings when the preset is recalled.
	Out Audio Routing	
	Timecode	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.
	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 26 Presets Tab Items

Item	Parameters	Description
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-8223A-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 27** summarizes the options available in the **Admin** tab.



Caution — The HDC-8223A(-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 27 Admin Tab Items

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

Table 27 Admin Tab Items

Item	Parameters	Description
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 “ Firmware Upgrades ”.
	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	
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 28 summarizes the options in the **User Log** tab.

Table 28 User Log Tab Items

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

Table 28 User Log Tab Items

Item	Parameters	Description
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

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

Error and Failure Indicator Overview

The HDC-8223A(-S) card itself and its DashBoard menus (to varying degrees) provide error and failure indications. Depending on how the HDC-8223A(-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 29 shows and describes the DashBoard status indicators and displays. These indicator icons and displays show status and error conditions relating to the HDC-8223A(-S) card itself and remote (network) communications.

Table 29 DashBoard Status Indicators Icons and Displays

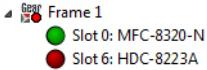
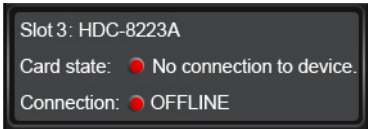
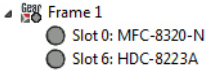
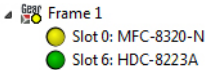
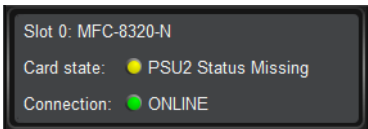

Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the HDC-8223A card in slot 6).
	Specific errors are displayed in the Card Info pane. In this example "No connection to device" indicating HDC-8223A card is not connecting to frame/LAN. If the HDC-8223A(-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-8223A 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.

Table 29 DashBoard Status Indicators Icons and Displays

Indicator Icon or Display	Error Description
 <p>The screenshot shows a list of status indicators. 'Output Video' is highlighted with a yellow background and a yellow alert icon. Below it, 'SDI Input A' shows a green icon and '625i_50, OK Time 14:19:47, 0 Errors'. 'SDI Input B' shows a grey icon and 'Unlocked'. 'Reference 1' shows a yellow icon and 'Unlocked'. 'Reference 2' shows a grey icon and 'Not selected'.</p>	<p>Yellow indicator icon in the HDC-8223A Card Info pane shows error alert, along with cause for alert.</p> <p>In this example, the HDC-8223A is not receiving an enabled framesync source.</p>

Basic Troubleshooting Checks

Failures of a general nature (affecting many cards and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. **Table 30** 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 30 Basic Troubleshooting Checks

Item	Checks
Verify power presence and characteristics	<p>On both the frame Network Controller Card and the HDC-8223A(-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.</p> <p>Check the Power Consumed indication for the HDC-8223A(-S) card. This can be observed using the DashBoard Card Info pane.</p> <ul style="list-style-type: none"> • If display shows no power being consumed, either the frame power supply, connections, or the HDC-8223A(-S) card itself is defective. • If display shows excessive power being consumed (refer to the chapter refer to the section “Technical Specifications” on page 73), the HDC-8223A(-S) card may be defective.
Check Cable connection secureness and connecting points	<p>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.</p> <p>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.</p>
Card seating within slots	<p>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.</p>
Check status indicators and displays	<p>On both DashBoard and the HDC-8223A(-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.</p>
Troubleshoot by substitution	<p>All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item.</p>

Processing Error Troubleshooting

This section provides HDC-8223A(-S) processing troubleshooting information. If the HDC-8223A(-S) card exhibits any of the symptoms listed in **Table 31**, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the HDC-8223A(-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-8223A(-S) card-edge status indicators.

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

Table 31 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-8223A(-S) video input. Make certain BNC cable connections between frame rear module for the HDC-8223A(-S) and signal source are OK. The HDC-8223A(-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-8223A(-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 “Ancillary Data Line Number Locations and Ranges” .
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, contact Ross Video Technical Support. Refer to **“Contacting Technical Support”**.

Firmware Upgrades

This chapter outlines the firmware upgrade controls for your HDC-8223A(-S).

Before You Begin

Keep the following in mind before beginning to upgrade the firmware:

- You cannot downgrade a card from version 1.75 to an earlier version.
- 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.

Firmware Upgrade Controls

The **Admin** tab provides controls for selecting and loading card firmware upgrade files. 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).

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-8223A(-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-8223A(-S) reverts to the default settings that allow an immediate upload/upgrade.

Technical Specifications

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

SDI Inputs Specifications

Table 32 Technical Specifications — SDI Inputs

Item	Specifications
Number of Inputs	2 with manual select or failover
Data Rates Supported	SMPTE 424M, 259M, SMPTE 292M
Impedance	75Ω terminating
Equalization (using Belden 1694A cable)	SD: 360m (1180ft) HD: 180m (590ft)
Return Loss	> 15dB up to 1.485GHz >10dB up to 2.970GHz

Post-Processor Serial Digital Video Outputs

Table 33 Technical Specifications — Post-Processor Serial Digital Video Outputs

Item	Specifications
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

Table 34 Technical Specifications — Pre-Processor (Reclocked) Serial Digital Video Outputs

Item	Specifications
Number of Outputs	Four 3G/HD/SD-SDI BNC
Impedance	75Ω

Analog Composite Video Outputs

Table 35 Technical Specifications — Analog Composite Video Outputs

Item	Specifications
Number of Outputs	Up to four SD analog CVBS via selector mux
Impedance	75Ω
Return Loss	-30dB to 10MHz
Frequency Response	NTSC: 4.8MHz +/- 0.2dB PAL: 5.8MHz +/- 0.2dB
S/N Ratio	50dB
Differential Gain	0.5%
Differential Phase	0.6°

Analog Audio Outputs Specifications

Table 36 Technical Specifications — Analog Audio Outputs

Item	Specifications
Number of Outputs	Four balanced using 3-wire removable connectors 0dBFS = +24dBu

openGear Frame Communications Specifications

Table 37 Technical Specifications — openGear Frame Communications

Item	Specifications
Frame Communication	10/100Mbps Ethernet with Auto-MDIX

Environment Specifications

Table 38 Technical Specifications — Environment

Item	Specifications
Operating temperature	0°C – 40°C (32°F – 104°F)
Relative humidity (operating or storage)	< 95%, non-condensing

Power Specifications

Table 39 Technical Specifications — Power

Item	Specifications
Power Consumption	< 18W maximum

Service Information

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your HDC-8223A, 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 in **"Contacting Technical Support"**.

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. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Bootload Button

In the unlikely event of a complete card failure, you may be instructed by a Ross Technical Support specialist to perform a complete software reload on the HDC-8223A.

To reload the software on a HDC-8223A

1. Eject the card from the frame.
2. Press and hold the **Bootload** button, while re-inserting the card into the frame.
3. Release the button.
 - The **OK/ERROR** LED flashes green while the card is waiting for a new software load.
 - If a new software load is not sent to the card within 60 seconds, the card will attempt to re-start with its last operational software load.
 - Software loads can be sent to the HDC-8223A via the connection on the rear of the frame.

Warranty and Repair Policy

The HDC-8223A 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-8223A 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-8223A 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 HDC-8223A 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-8223A 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-8223A, 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-8223A. 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.

Glossary

The following terms are used throughout this guide:

Active image — the portion of the video picture area (production aperture) that is being utilized for output content. Active image excludes letterbox bars and pillarbox bars.

Card — openGear terminal devices within openGear frames, including all components and switches.

DashBoard — the DashBoard Control System.

DTVCC captions — CEA-708 captions.

Frame — the OGX-FR frame that houses the HDC-8223A.

MIB — management information base.

Network Controller Card — the MFC-8320-N or MFC-OG3-N and any available options unless otherwise noted.

NTSC captions — the CEA-608-D: Line 21 Data Services captions.

openGear frame — refers to the OGX-FR series frames unless otherwise noted.

PAL — PAL-B and PAL-G unless otherwise stated.

System — the mix of interconnected production and terminal equipment in your environment.

User — the person who uses the HDC-8223A.

