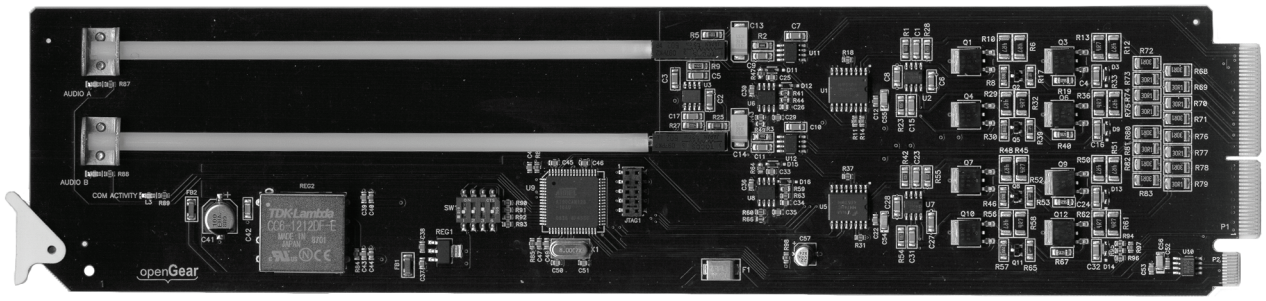
Ross Video Limited

ADA-8404-C
Universal Analog Audio Distribution Amplifier
User Manual



Live Production Technology™

ADA-8404-C • Universal Analog Audio Distribution Amplifier User Manual

- Ross Part Number: **8404CDR-004-02**
- Release Date: April 12, 2010. Printed in Canada.

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Important Regulatory and Safety Notices

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

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

Symbol Meanings

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

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

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

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

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

Important Safety Instructions

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

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

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

EMC Notices

United States of America
FCC Part 15

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

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

CANADA

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

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

EUROPE

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

INTERNATIONAL

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

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

Maintenance/User Serviceable Parts

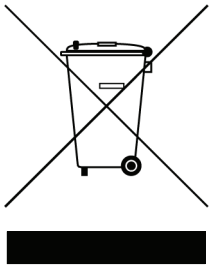
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Contact Us" section on the last page of this manual. All openGear products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

Environmental Information

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

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

The crossed-out 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.

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Contents

Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagram
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on choosing an openGear ADA-8404-C Universal Analog Audio Distribution Amplifier. Your ADA-8404-C is part of a full line of Digital Products within the openGear Terminal Equipment family of products, backed by Ross Video's experience in engineering and design expertise since 1974.

You will be pleased at how easily your new ADA-8404-C fits into your overall working environment. Equally pleasing is the product quality, reliability and functionality. Thank you for joining the group of worldwide satisfied Ross Video customers!

Should you have a question pertaining to the installation or operation of your ADA-8404-C, please contact us at the numbers listed on the back cover of this manual. Our technical support staff is always available for consultation, training, or service.

Overview

The ADA-8404-C is an analog audio distribution amplifier designed for broadcast use. It can be used as either a mono or two channel (stereo) audio DA. When used as a mono DA, it provides eight copies of the single (mono) input signal or four copies each of the two (stereo) inputs. For maximum output capability, the Split Mono Rear Module (R2CSM-8404) is used. For high density installations, the ADA-8404-C can be used with the Split Stereo Rear Module (R2CSS-8404) to provide up to 20 1x4 mono ADA-8404-C in a DFR-8321.

Features

The following features make the ADA-8404-C the best solution for distributing digital audio signals:

- Handles mono or stereo signals
- Summing capability
- Silence detection
- Distributes Linear Timecode (LTC) in Mono Mode only
- Higher density with up to 20 cards per frame in the DFR-8320 series frame when using a Split Mono Rear Module or a Split Stereo Rear Module
- Reports status and configuration remotely via the DashBoard Control System™
- Fits DFR-8300 series frames
- Fully compliant with openGear specifications
- 5-year transferable warranty

Functional Block Diagram

This section provides a functional block diagram that outlines the workflow of the ADA-8404-C.

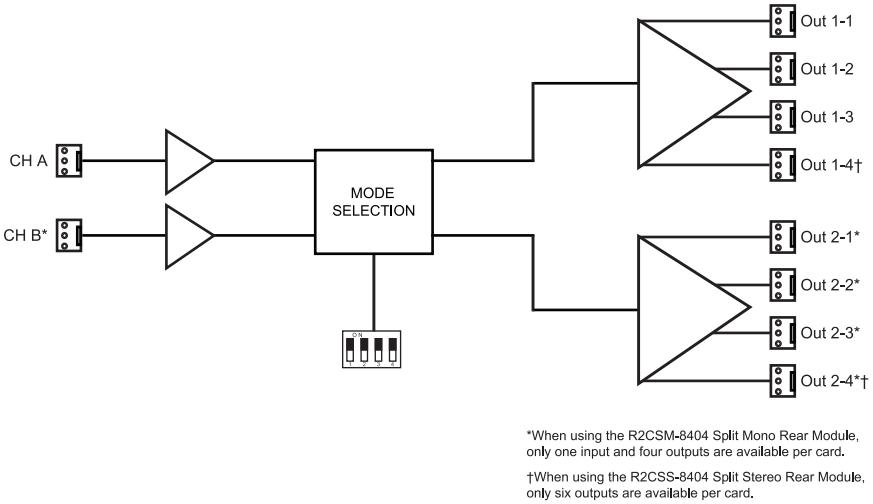

Figure 1.1 *ADA-8404-C — Simplified Block Diagram (Full Rear Module)*

Documentation Terms and Conventions

The following terms and conventions are used throughout this manual:

- "**Frame**" refers to DFR-8300 series frame that houses the ADA-8404-C card, as well as any openGear frames.
- All references to the **DFR-8300 series frame** also includes all version of the 10-slot (DFR-8310 series) and 20-slot (DFR-8321 series) frames and any available options unless otherwise noted.
- "**Operator**" and "**User**" refer to the person who uses ADA-8404-C.
- "**Board**", and "**Card**" refer to openGear terminal devices within openGear frames, including all components and switches.
- "**System**" and "**Video system**" refer to the mix of interconnected production and terminal equipment in your environment.
- "**525-line mode**" refers to broadcast situations using **NTSC** composite (analog) signal reference inputs.
- "**625-line mode**" refers to broadcast situations using **PAL-B** composite (analog) signal reference inputs.
- "**PAL**" refers to PAL-B unless otherwise stated.
- "**DashBoard**" refers to the DashBoard Control System™.
- The "**Operating Tips**" and "**Note**" boxes are used throughout this manual to provide additional user information.

Installation

In This Chapter

This chapter provides instructions for installing the Rear Module(s) for the ADA-8404-C, installing the card into the frame, cabling details, and updating the card software.

The following topics are discussed:

- Before You Begin
- Installing the ADA-8404-C
- Cabling for the ADA-8404-C

Before You Begin

Before proceeding with the instructions in this chapter, ensure that your DFR-8300 series frame is properly installed according to the instructions in the ***DFR-8300 Series User Manual***.

Static Discharge

Whenever handling the ADA-8404-C and other related equipment, please observe all static discharge precautions as described in the following 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 ADA-8404-C you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Installing the ADA-8404-C

This section outlines how to install a Rear Module in a DFR-8300 series frame. The same procedure applies regardless of the frame or card type. However, the specific Rear Module you need to install depends on the frame you are using.

Rear Modules for the ADA-8404-C

The Rear Module for the ADA-8404-C depends on the openGear frame you are installing the card into.

- **DFR-8310 series frame** — When installing the ADA-8404-C in the DFR-8310 series frames, the **8310AR-042** Rear Module (R1C-8404) is required.
- **DFR-8321 series frame** — When installing the ADA-8404-C in the DFR-8321 series frames, the **8320AR-042** Full Rear Module (R2C-8404), the **8320AR-043** or the **726-263R** Split Rear Modules (R2CSM-8404 or R2CSS-8404 respectively) can be used. When using a Full Rear Module in the DFR-8321 series frame, use the even numbered slots, such as 2 or 4, to ensure that the card aligns with the rear module.

Installing a Rear Module

If you are installing the ADA-8404-C in a DFR-8310-BNC frame, or the Rear Module is already installed, proceed to the section "**Installing the ADA-8404-C**" on page 2-4.

Use the following procedure to install a Rear Module in your DFR-8300 series 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 ADA-8404-C installation.
3. Install the bottom of the Rear Module in the **Module Seating Slot** at the base of the frame's back plane. (**Figure 2.1**)

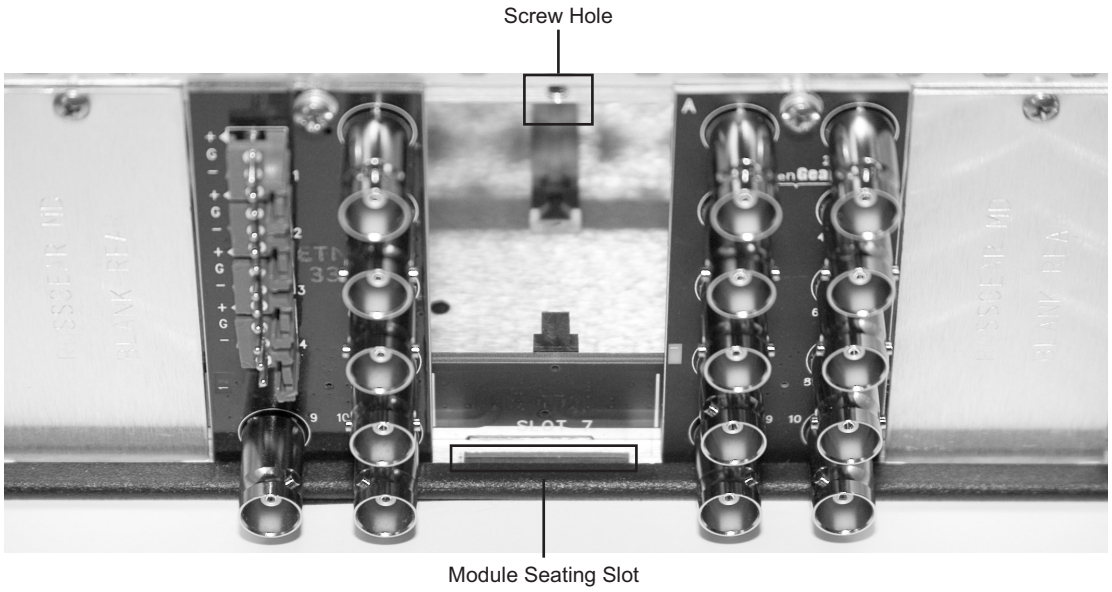

Figure 2.1 *Rear Module Installation in a DFR-8310 Series Frame (ADA-8404-C not shown)*

4. Align the top hole of the Rear Module with the screw on the top-edge of the frame back plane.

5. Using a Phillips screwdriver and the supplied screw, fasten the Rear Module to the back plane of the frame. Do not over tighten.
6. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Modules or Blank Plates.

This completes the procedure for installing a Rear Module in your DFR-8300 series frame.

Installing the ADA-8404-C

This section outlines how to install the ADA-8404-C in a DFR-8300 series frame.

Use the following procedure to install the ADA-8404-C in a DFR-8300 series frame:

1. Locate the Rear Module you installed in the procedure "**Installing a Rear Module**" on page 2-3.
2. Hold the ADA-8404-C by the edges and carefully align the card-edges with the slots in the frame.
3. Fully insert the card into the frame until the rear connection plus is properly seated in the Rear Module.
4. Verify whether your label is self-adhesive by checking the back of the label before applying the label to the rear module surface.
5. Affix the supplied **Rear Module Label** to the BNC area of the Rear Module.

This completes the procedure for installing the ADA-8404-C in a DFR-8300 series frame.

Cabling for the ADA-8404-C

This section provides information for connecting cables to the installed Rear Modules on the DFR-8300 series frames. Connect the input and output cables according to the following sections.

DFR-8310 Series Frame Cabling Overview

In the DFR-8310 series frames, the ADA-8404-C is used with the following Rear Modules:

- **8310AR-042** Rear Module — Each card occupies one slot and provides eight outputs. (**Figure 2.2**).

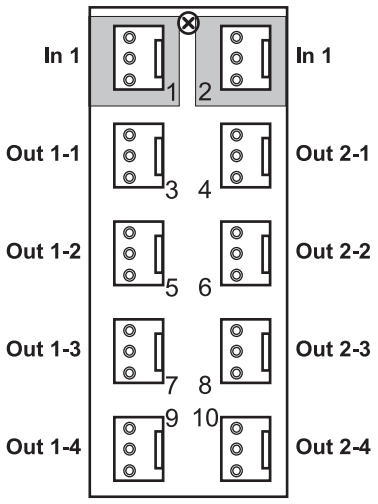

***Figure 2.2** Cable Connections for the **8310AR-042** and **8320AR-042** Rear Modules*

DFR-8321 Series Frame Cabling Overview

In the DFR-8321 series frames, the ADA-8404-C is used with the following Rear Modules:

- **8320AR-042** Full Rear Module — Each card occupies two slots and provides one input and eight outputs. (**Figure 2.2**)
- **8320AR-043** Split Mono Rear Module — Each card occupies one slot and provides one input and four outputs. Note that each Split Rear Module provides connections for two cards. (**Figure 2.3**)
- **726-263R** Split Stereo Rear Module — Each card occupies one slot and provides two inputs and six outputs. Note that this rear module includes Phoenix Contact™ style screw connectors. (**Figure 2.4**)

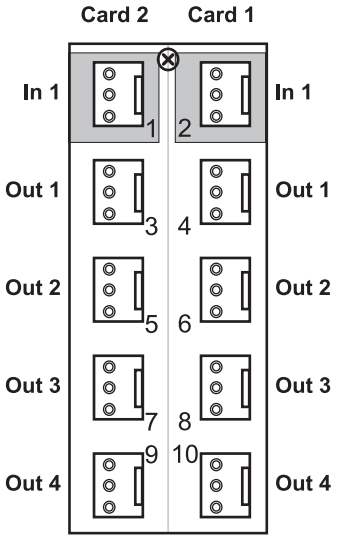

Figure 2.3 *Cable Connections for the* ***8320AR-043*** *Split Rear Module*

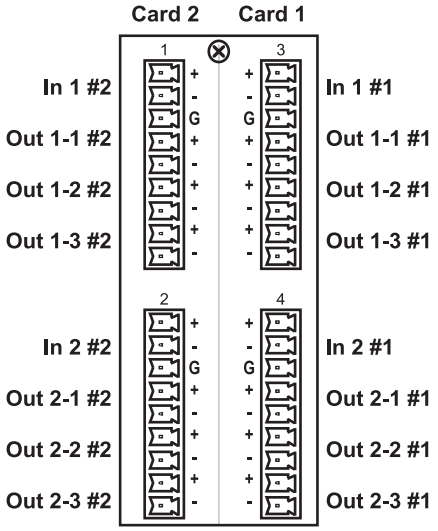

Figure 2.4 *Cable Connections for the* ***726-263R*** *Split Rear Module*

User Controls

In This Chapter

This chapter provides a general overview of the user controls available on the ADA-8404-C.

The following topics are discussed:

- Card Overview
- Control and Monitoring Features

Card Overview

This section provides a general overview of the ADA-8404-C components.

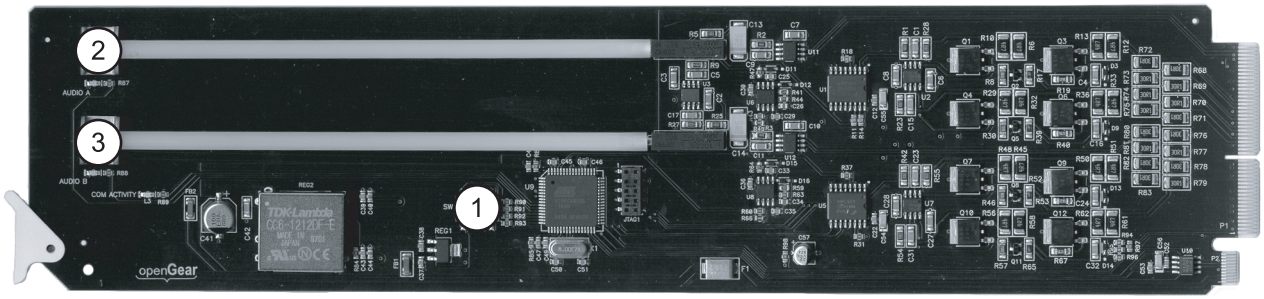

***Figure 3.1** ADA-8404-C — Components*

1) Mode Select Switch (**SW1**)	2) LVL A Potentiometer	3) LVL B Potentiometer

1. Mode Select Switch (SW1)

Use **SW1** to configure the operating modes ADA-8404-C. Refer to the section "**Configuring the ADA-8404-C**" on page 3-3 for details.

2. LVL A Potentiometer

Use this potentiometer to adjust the output levels of the ADA-8404-C when the card is operating in Mono mode. This potentiometer gives precise control of the output signal over a 30dB range.

3. LVL B Potentiometer

Use this potentiometer, in conjunction with the LVL A potentiometer, to adjust the output levels of the ADA-8404-C when the card is operating in Stereo mode. This potentiometer gives precise control of the output signal over a 30dB range.

Configuring the ADA-8404-C

Use **SW1** to configure the available features and functions available from the ADA-8404-C card-edge. This section describes the following functions of the ADA-8404-C:

- Selecting the Operation Mode
- Configuring the Non-Volatile Memory
- Configuring Communications with DashBoard
- Configuring Remote Control

Figure 3.2 shows all the DIP Switches in the **OFF** position.

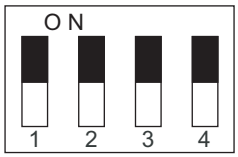

***Figure 3.2** DIP Switches - OFF Position*

Selecting the Operation Mode

Use **SW1-1** and **SW1-2** in conjunction to set the operation mode for the ADA-8404-C. Refer to **Table 3.1** for specific DIP Switch settings.

Table 3.1 DIP SW1-1 and SW1-2 Settings

SW1-1	SW1-2	Descriptions
OFF	**OFF**	Stereo Mode (Dual 1x4)
OFF	**ON**	Mono Mix Mode (Sum of Inputs 1 and 2)
ON	**OFF**	Mono Mode (1x8; Channel B input is not used)
ON	**ON**	Reserved for future use

Configuring the Non-Volatile Memory

Use **SW1-3** to configure the parameters set by the DIP Switches on the ADA-8404-C. Refer to **Table 3.2** for specific DIP Switch settings.

Table 3.2 DIP SW1-3 Settings

SW1-3	Descriptions
ON	Select this setting to retrieve the ADA-8404-C parameters from the non-volatile memory. The DIP Switch settings are ignored.
OFF	Select this setting to enable the ADA-8404-C to retrieve parameters from the DIP Switches.

Configuring Communications with DashBoard

Use **SW1-4** to enable or disable the parameters set by the DIP Switches on the ADA-8404-C. Refer to **Table 3.3** for specific DIP Switch settings.

Table 3.3 DIP SW1-4 Settings

SW1-4	Descriptions
ON	Select this setting to disable remote control from DashBoard. The parameters and settings cannot be changed via DashBoard and must be changed using the card-edge controls. You can still monitor the status of the card using DashBoard.
OFF	Select this setting to control the ADA-8404-C exclusively from DashBoard.

Configuring Remote Control

Use **SW1-3** and **SW1-4** in conjunction to configure the remote control options for the ADA-8404-C. Refer to **Table 3.4** for specific DIP Switch settings.

Table 3.4 DIP SW1-3 and SW1-4 Settings

Available Function	SW1-3 and SW1-4 Settings			
	SW1-3 ON SW1-4 ON	SW1-3 ON SW1-4 OFF	SW1-3 OFF SW1-4 ON	SW1-3 OFF SW1-4 OFF
Save Button is available in the Card Settings tab in DashBoard		✓		✓
Adjust the Mode in the Card Settings tab in DashBoard		✓		
Adjust the Notify on Card Fault in DashBoard	✓	✓	✓	✓
Adjust the Silence Detection Time interval in DashBoard	✓	✓	✓	✓
Adjust the Silence Detection Threshold in DashBoard	✓	✓	✓	✓
After power down, or reboot, settings from the Non-Volatile Memory are recalled and applied	✓	✓		
After power down, or reboot, the Mode setting is recalled from SW1-1 and SW1-2; all other settings are recalled from the Non-Volatile Memory and applied			✓	✓

Control and Monitoring Features

This section provides information on the jumpers, buttons and LEDs for the ADA-8404-C. Refer to **Figure 3.3** for the location of the LEDs and controls for fan, alarm, and communications.

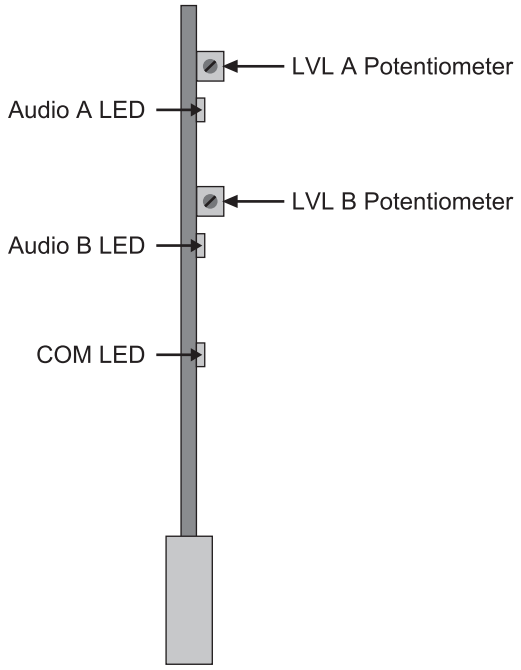

***Figure 3.3** ADA-8404-C Card-edge Controls*

Status and Selection LEDs on the ADA-8404-C

The front-edge of the ADA-8404-C has LEDs that display the status of the input signals. As selections are made in the menus, the LEDs display the status of the input signals. Basic LED displays and descriptions are provided in **Table 3.5**.

Table 3.5 LEDs on the ADA-8404-C

LED	Color	Display and Description
Audio A	Green	When lit, this LED indicates a valid analog input signal for Channel A.
Audio B	Green	When lit, this LED indicates a valid analog input signal for Channel B.
COM	Green	This LED is not yet implemented.

Menus

In This Chapter

This chapter provides a summary of the DashBoard menus available for the ADA-8404-C.

The following topic is discussed:

- DashBoard Menus for the ADA-8404-C

DashBoard Menus for the ADA-8404-C

This section briefly summarizes the menus, items, and parameters available from the DashBoard Control System™ for the ADA-8404-C. Parameters marked with an asterisk (*) are the factory default values.

The DashBoard Control System™ enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the DFR-8300 series frame through the Network Controller Card.

Status Tabs

The **Status** tabs provide read-only information such as software revision issue, signal status, and power consumption, for the ADA-8404-C.

Card Info Tab

Table 4.1 summarizes the read-only information, such as product name, and software revision of the **Card Info** tab.

Table 4.1 Card Info Tab Items

Tab Title	Item	Parameters	Description
Card Info (Read-only)	Product	ADA-8404-C	
	Name	Analog Audio Distribution Amplifier	
	Supplier	Ross Video Ltd.	
	Software Rev	#.##	Indicates the software version

Card Status Tab

Table 4.2 summarizes the read-only information, such as audio status, of the **Card Status** tab.

Table 4.2 Card Status Tab Items

Tab Title	Item	Parameters	Description
Card Status (Read-only)	Card Status	Green - OK	Card is functioning properly and appropriate signals are present
		Red - Silence Detected	Indicates audio signal (CHA, CHB, or both) is not present
	Input CH A	Audio detected	Audio signal is present on Channel A
		Silence detected	Audio signal is not present on Channel A
	Input CH B	Audio detected	Audio signal is present on Channel B
		Silence detected	Audio signal is not present on Channel B

Configuration Menus

Table 4.3 summarizes the **Configuration Menu** options available in DashBoard.

Table 4.3 Configuration Menu Items

Tab Title	Item	Parameters	Description
Card Settings	Mode	Stereo DA (Dual 1x4)	Card is set to Stereo mode; signals must be connected to both inputs
		Mono Mix ((CHA + CHB)/2)	Card is set to Mono Mix mode; signals must be connected to both inputs
		Mono (CHA - 1x8)	Card is set to Mono mode; an input signal is connected to CH A only
	Silence Detection Time Interval [a]	OFF* to 45 seconds	Sets the time interval allowed for no signal present or signal below threshold before alarm is activated.
	Silence Detection Threshold (dBu) [a]	-20 to -40dBu[b]	Sets the threshold below which the signal is considered lost

a. This menu does not have a corresponding card-edge control.
b. The default value is -45dBu.

Specifications

In This Chapter

This chapter provides the technical specification information for the ADA-8404-C. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section provides the technical specifications for the ADA-8404-C.

Table 5.1 ADA-8404-C Technical Specifications

Category	Parameter	Specification
Input	Common Mode Rejection	>70dB, 20Hz to 20kHz
	Input Impedance	>20Kohm, balanced
	Connector	8310AR-042: WECO®
		8320AR-042: WECO®
		8320AR-043: WECO®
		726-263R: Phoenix Contact™ type screw terminal
	Maximum Input Level	+27.5dBu
Performance	Gain	-14dB to +18dB continuously variable
	Frequency Response	±0.1dB from 20Hz to 20kHz
	Noise	Better than -95dBu, 20Hz at unity gain
	Harmonic Distortion	<0.01%
Outputs	Maximum Output Level	+27dBu
	Output Impedance	60ohm balanced
	OUtput Isolation	>60dB
Power	Total Power Consumption	2.6W

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your ADA-8404-C, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the "**Contact Us**" section.

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

Warranty and Repair Policy

The ADA-8404-C 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 ADA-8404-C 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 ADA-8404-C 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 ADA-8404-C 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 ADA-8404-C 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 ADA-8404-C, 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 ADA-8404-C. 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.

Notes:

Notes:

Contact Us

Contact our friendly and professional support representatives for the following:

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

PHONE	**General Business Office and Technical Support**	613 • 652 • 4886
	After Hours Emergency	613 • 349 • 0006
	Fax	613 • 652 • 4425
E-MAIL	**General Information**	solutions@rossvideo.com
	Technical Support	techsupport@rossvideo.com
POSTAL SERVICE	**Ross Video Limited**	8 John Street, Iroquois, Ontario, Canada K0E 1K0
	Ross Video Incorporated	P.O. Box 880, Ogdensburg, New York, USA 13669-0880

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Ross Part Number: 8404CDR-004-02