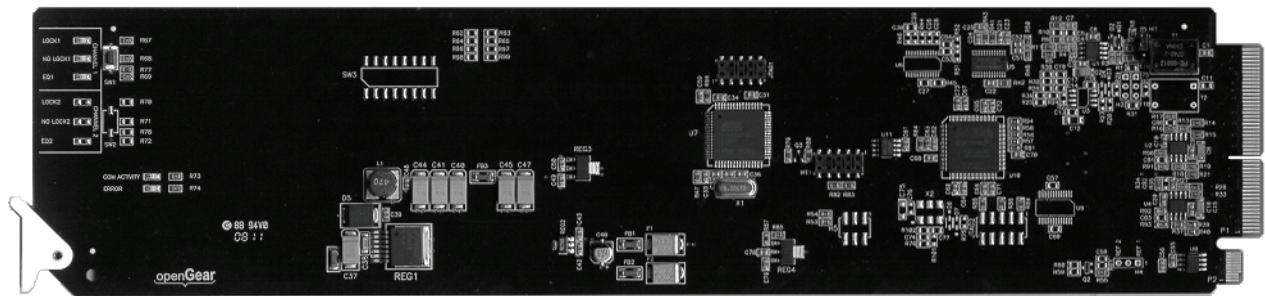


ADA-8401-A

AES/EBU Distribution Amplifier - 75Ω

User Manual



Live Production Technology™

Ross Part Number: 8401ADR-004

Issue: 01



ADA-8401-A • AES/EBU Distribution Amplifier - 75Ω User Manual

- Ross Part Number: **8401ADR-004**
- Document Issue: **01**
- Release Date: December 5, 2008
- Printed in Canada.

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

Copyright

© 2008 Ross Video Limited. All rights reserved.

Contents of this publication may not be reproduced in any form without the written permission of openGear. Reproduction or reverse engineering of copyrighted software is prohibited.

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 a commitment by Ross Video Limited. Ross Video Limited assumes no responsibility or liability for errors or inaccuracies that may appear in this manual.

Trademarks

-  is a registered trademark of Ross Video Limited.
-  is a registered trademark of Ross Video Limited.
- DashBoard Control System™ is a trademark of Ross Video Limited.
- Ross, ROSS, ROSS®, and MLE are registered trademarks of Ross Video Limited.
- Dolby® is a registered trademark of Dolby Laboratories.
- All other product names and any registered and unregistered trademarks mentioned in this manual are used for identification purposes only and remain the exclusive property of their respective owners.

Important Regulatory and Safety Notices

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

Products may require specific equipment, and /or installation procedures 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 openGear 8000 series frame. Refer to the openGear 8000 series frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as it's component products.



Warning

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



Warning

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within 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 type and rating. Only use attachments/accessories specified by the manufacturer.

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 users will be required to correct the interference at their 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.

Cet appareil numérique de classe "A" est conforme à 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

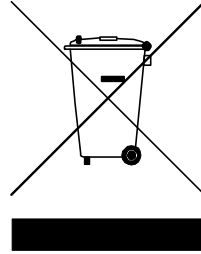
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Contact Us" section on the last page of this manual. All openGear products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

Contents

Introduction	1-1
In This Chapter	1-1
A Word of Thanks	1-1
Overview	1-1
Functional Block Diagram	1-2
Features	1-2
Documentation Terms	1-2
Installation and Setup	2-1
In This Chapter	2-1
Static Discharge	2-1
Unpacking	2-1
Rear Module Installation (Optional)	2-2
Board Installation	2-3
BNC Labels	2-3
Cable Connections	2-3
User Controls	3-1
In This Chapter	3-1
Jumper Locations	3-1
Card-edge User Controls	3-2
LEDs	3-3
Control and Monitoring	4-1
In This Chapter	4-1
DashBoard Control System	4-1
The Menu System	4-2
Specifications	5-1
In This Chapter	5-1
Service Information	6-1
In This Chapter	6-1
Troubleshooting Checklist	6-1
Power LED Conditions	6-2
Warranty and Repair Policy	6-2
Ordering Information	7-1
ADA-8401-A and Related Products	7-1

Introduction

In This Chapter

This chapter contains the following sections:

- A Word of Thanks
- Overview
- Functional Block Diagram
- Features
- Documentation Terms

A Word of Thanks

Congratulations on choosing the openGear **ADA-8401-A AES/EBU Distribution Amplifier - 75Ω**. The ADA-8401-A 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-8401-A 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-8401-A, 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.

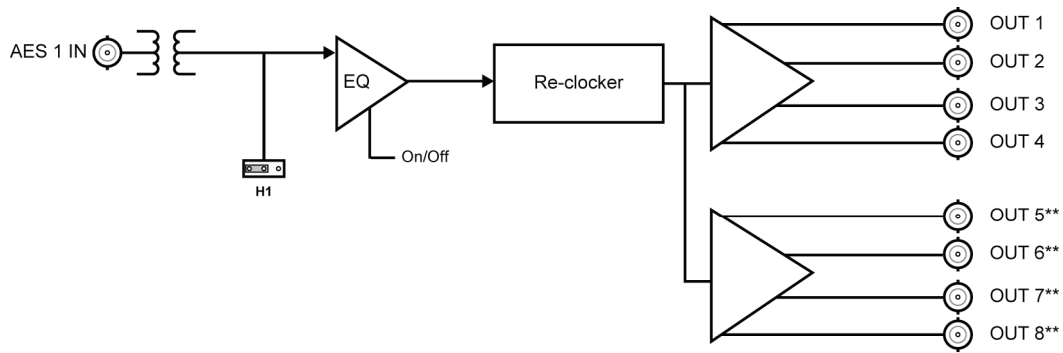
Overview

The ADA-8401-A is an AES/EBU distribution amplifier designed for broadcast use. It provides eight copies of the incoming signal when used with the R1A-8401 and R2A-8401 Rear Modules or four copies of the incoming signal when used with the R2AS-8401 Rear Module.

The ADA-8401-A supports audio sampling frequencies from 30kHz to 192 kHz. Cable equalization and reclocking techniques enable the ADA-8401-A to recover the incoming digital audio signal reliably.

The ADA-8401-A is fully compliant with all openGear technical specifications and supports remote monitoring via the DashBoard Control System™.

Functional Block Diagram



**Not available when using the R2AS-8401 Split Rear Module

Figure 1. Simplified Block Diagram of ADA-8401-A

Features

The following features make the ADA-8401-A the best solution for distributing digital audio signals:

- Ideal for distributing Dolby® E and Dolby Digital signals
- Cable equalization and data reclocking on the incoming AES/EBU signal
- Supports audio sampling frequencies from 30kHz to 192kHz
- Higher density with up to 20 cards per frame in the DFR-8320 series frame using the R2AS-8401 Rear Modules
- Fits DFR-8310 and DFR-8320 series frames
- Fully compliant with openGear specifications
- 5 year transferable warranty

Documentation Terms

The following terms are used throughout this guide:

- “**Frame**” refers to the DFR-8300 series frame that houses the ADA-8401-A card, as well as any openGear frames.
- All references to the **DFR-8300 series frames** also includes all version of the 10-slot (DFR-8310) and 20-slot (DFR-8320) frames and any available options.
- “**Operator**” and “**User**” refer to the person who uses the ADA-8401-A.
- “**Board**”, and “**Card**” refer to the ADA-8401-A card itself, including all components and switches.
- “**System**” and “**Video system**” refer to the mix of interconnected production and terminal equipment in which the ADA-8401-A operates.

Installation and Setup

In This Chapter

This chapter contains the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- BNC Labels
- Cable Connections

Static Discharge

Whenever handling the ADA-8401-A and other related equipment, please observe all static discharge precautions as described in the following note:



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

Unpacking

Unpack each ADA-8401-A you received from the shipping container, and check the contents to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Rear Module Installation (Optional)

The ADA-8401-A is compatible with the DFR-8310 and DFR-8320 series frames. The procedure for installing the Rear Module in your openGear frame is the same regardless of the frame.

If you received a Rear Module with your ADA-8401-A, you will need to install the module in your DFR-8300 series frame before you can install the ADA-8401-A in the frame, or connect cables to the card frame slot you have chosen for the ADA-8401-A.

Rear Modules for the ADA-8401-A

The Rear Module for the ADA-8401-A depends on the openGear frame you are installing the card into. Note that Slot 1 is the left most slot as you look into the openGear frame from the front.

- **DFR-8310 series frames** — When installing the ADA-8401-A in the DFR-8310 series frames, use the **R1A-8401** Rear Module.
- **DFR-8320 series frames** — When installing the ADA-8401-A in the DFR-8320 series frames, use the **R2A-8401** Full Rear Module or the **R2AS-8401** Split Rear Module. When using a Full Rear Module in the DFR-8320 frame, use the even numbered slots, such as 2,4,6 etc. to ensure that the card aligns with the rear module.

Installing the Rear Module

If the Rear Module is already installed, skip this section.

Use the following procedure to install a Rear Module in a DFR-8300 series frame:

1. Refer to the DFR-8300 series frame User Manual to ensure that the frame is properly installed according to instructions.
2. On the rear of the frame, locate the card frame slot.
3. Remove the Blank Plate from the rear of the selected card frame slot. If there is no Blank Plate installed, proceed to the next step.
4. As shown in **Figure 2**, seat the bottom of the rear module in the seating slot at the base of the back plane of the frame.

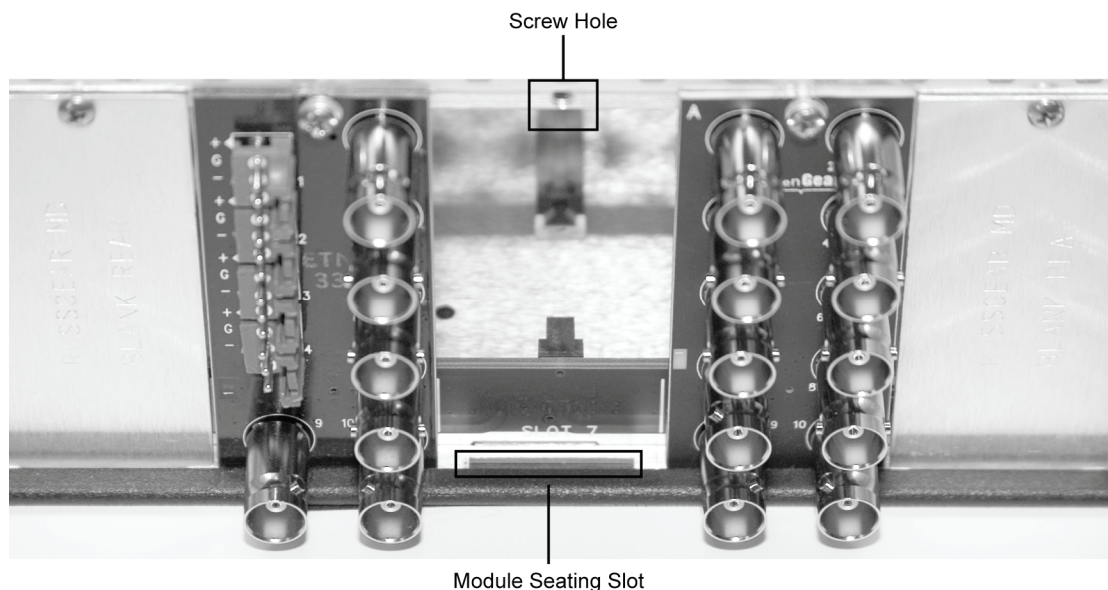


Figure 2. Rear Module Installation — DFR-8310 Series Frame (ADA-8401-A not shown)

5. Align the top hole of the rear module with the screw hole on the top edge of the back plane of the frame.
6. Using a Phillips screwdriver, and the supplied screw, fasten the rear module to the DFR-8300 series back plane. Do not over tighten.
7. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Modules or Blank (metal) Plates. If you need Blank Plates, contact your Ross Video sales representative.

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

Board Installation

Use the following procedure to install the ADA-8401-A in a DFR-8300 series frame:

1. Refer to the User Manual of your frame to ensure that the frame is properly installed according to instructions.
2. After selecting the desired card frame slot, hold the ADA-8401-A 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 plugs are properly seated on the midplane and rear module.

This completes the procedure for installing the ADA-8401-A in a DFR-8300 series frame.

BNC Labels

Affix the supplied BNC label, as per the included instructions, to the BNC area on the rear of the rack frame.

Cable Connections

This section provides information for connecting cables to the installed Rear Modules of your DFR-8300 series frame.

Connections for the DFR-8310 Series Frames

In the DFR-8310 series frames, the ADA-8401-A occupies one slot and provides 8 outputs. Connect the input and output cables according to **Figure 3**. The inputs are internally terminated in 75Ω. It is not necessary to terminate unused outputs.

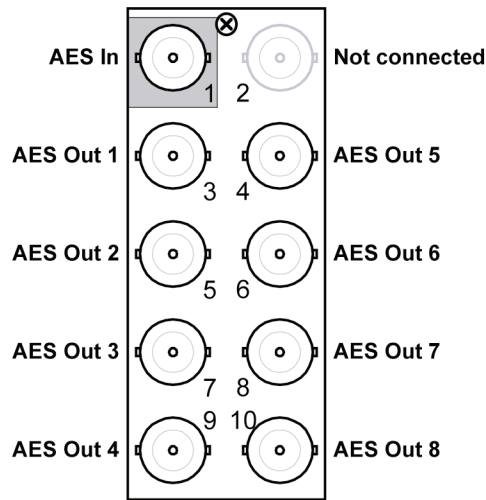


Figure 3. Cable Connections for the DFR-8310 frames with the R1A-8401 Rear Module

Connections for the DFR-8320 Series Frames

In the DFR-8320 series frames, the ADA-8401-A may be used with the following Rear Modules:

- **R2A-8401 Full Rear Module** — Each card occupies two slots and provides one AES input and eight outputs. Refer to **Figure 4** for cable connections.
- **R2AS-8401 Split Rear Module** — Each card occupies one slot and provides four outputs. Note that each Split Rear Module provides connections for two cards. Refer to **Figure 5** for cable connections.

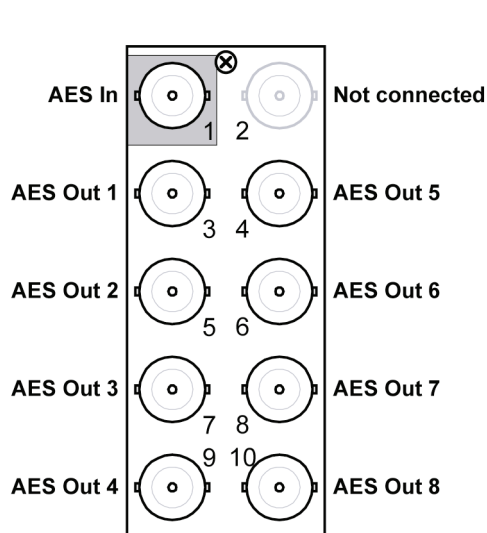


Figure 4. Cable Connections for the DFR-8320 frames with the R2A-8401 Rear Module

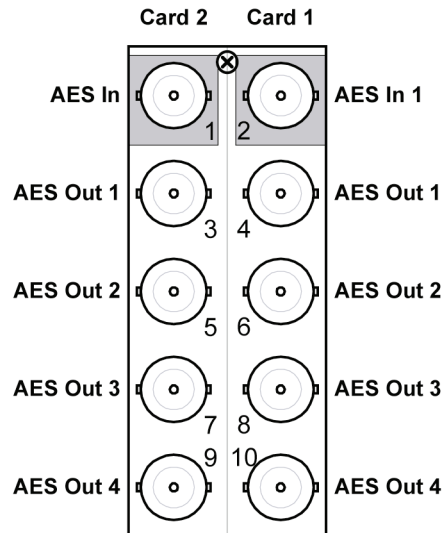


Figure 5. Cable Connections for the DFR-8320 frames with the R2AS-8401 Rear Module

User Controls

In This Chapter

This chapter contains a description of the ADA-8401-A user controls. The following topics are discussed:

- Jumper Locations
- Card-edge User Controls
- LEDs

Jumper Locations

The following diagram outlines the jumper locations on the ADA-8401-A.

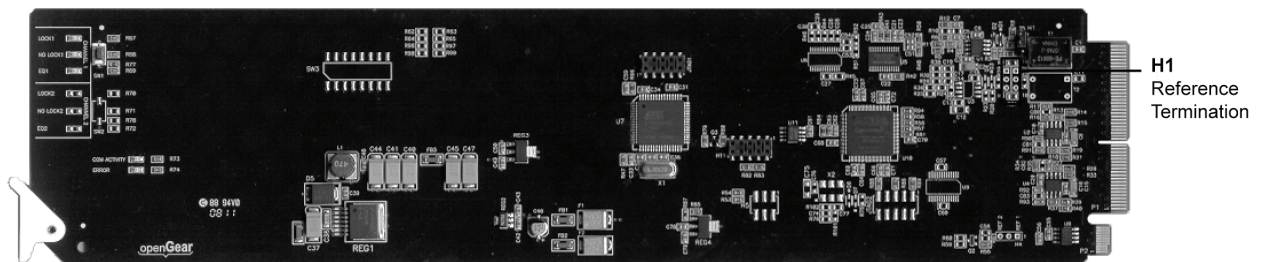


Figure 6. Jumper Locations

H1 –Termination Resistor

Use **H1** to set the input termination for the ADA-8401-A. Refer to **Figure 7** for pin positions.

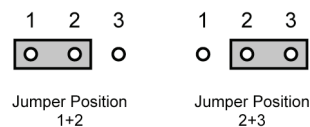


Figure 7. Jumper Pin Positions

Set **H1** as follows:

- **75Ω termination** — For 75 Ω termination, set **H1** into position 1+2 as illustrated in **Figure 7**. Ross Video strongly recommends leaving **H1** in this setting.
- **110 Ω termination** — For 110Ω termination, set **H1** into position 2+3 as illustrated in **Figure 7**.
- **HiZ** — For HiZ termination, set H1 into a floating position (not on any two pins).

Card-edge User Controls

The following are general descriptions of the user controls identified in **Figure 8**.

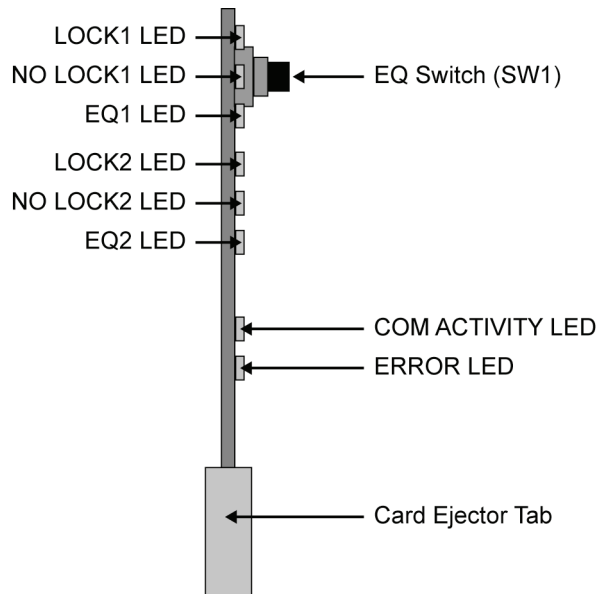


Figure 8. Card-edge User Controls

SW1 — EQ Switch

The **EQ Switch (SW1)** is used to insert the cable equalizer into the incoming AES/EBU signal. The ADA-8401-A can recover digital audio signals conforming to AES/EBU specifications and transmitted over 75Ω, coaxial cable, up to 600m (2000 ft) long without equalization. For cable lengths in excess of 600m, we recommend that the input equalization be activated. Note that switching the EQ in and out can cause audible artifacts.

- Pressing **SW1** activates the EQ LED to indicate the EQ feature is enabled.
- Pressing **SW1** again disables the feature

LEDs

The front-edge of the card features 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. Descriptions are provided in **Table 1**.

Table 1. Selection and Status LED Descriptions

LED	Color	Display and Description
Lock1	Green	When lit, this LED indicates a valid AES/EBU signal for Channel 1.
No Lock1	Red	When lit, this LED indicates an invalid AES/EBU input signal for Channel 1.
EQ1	Yellow	When lit, this LED indicates that the cable EQ has been inserted for Channel 1 by pressing SW1 or by enabling the feature via DashBoard.
Lock2	Green	This feature is not yet implemented.
No Lock2	Red	This feature is not yet implemented.
EQ2	Yellow	This feature is not yet implemented.
COM Activity	Green	When lit, this LED indicates that the ADA-8401-A is communicating with DashBoard.
Error	Red	When lit, this LED indicates an error in the communications between the ADA-8401-A and DashBoard.

Control and Monitoring

In This Chapter

This chapter provides a detailed explanation of controlling and monitoring your ADA-8401-A. The following topics are discussed:

- DashBoard Control System
- The Menu System

DashBoard Control System

The DashBoard Control System™ enables you to monitor and control openGear frames and controller cards from a computer. DashBoard communicates with other cards in the DFR-8300 series frame through the MFC-8310-N Network controller card. This card is required in order to use the DashBoard Control System to configure the ADA-8401-A.

The DashBoard Control System software and User Manual can be downloaded from the Ross Video website.

Using the DashBoard Menus

You must first install the DashBoard Control System software on your computer. Refer to the *DashBoard User Manual* for software installation procedures and using the DashBoard interface.

The Menu System

The following sections and tables describe the Configuration and Status menus, with items, and parameters available on the ADA-8401-A, accessed from the Heads-Up Display or the DashBoard Control System.

Status Menus

This section summarizes the **Status Menu** options available through DashBoard.

Table 2. Status Menu Functions

Menus	Items	Parameters	Description
Card Info (Read-only)	Product	ADA-8401-A	
	Name	Unbalanced AES Audio Distribution Amplifier	
	Supplier	Ross Video Ltd.	
	Software Rev	#.##	
Card Status (Read-only)	Card Status	Red - No AES Audio Lock	AES Audio signal is not present
		Green - AES Audio Locked	Card is functioning properly and a valid AES Audio signal is present
	AES Input	Unlocked	
		Locked	

Configuration Menus

This section summarizes the **Configuration Menu** options available through DashBoard.

Table 3. Configuration Menu Functions

Menus	Items	Parameters	Description
Card Settings	EQ	Disabled*	Disables this feature for the incoming signal
		Enabled	Inserts the cable equalizer into the incoming AES/EBU signal

* This is the default setting.

Specifications

In This Chapter

This chapter includes the Technical Specifications table for the ADA-8401-A card.

Table 4. ADC-8401-A Technical Specifications

Category	Parameter	Specification
AES Input	Number of Inputs	1
	Standards	AES-3id (SMPTE 276M)
	Sampling Rates	All rates from 30kHz to 192kHz
	Input Impedance (transformer balanced)	75Ω, 110Ω or HiZ
	Connector	BNC
	Equalization	>610m (2000ft) of Belden 8281
	Input Level	0.2-7V p-p
AES Outputs	Number of Outputs	8 when using Full Rear Modules 4 when using Split Rear Modules
	Standard	AES-3id (SMPTE 276M)
	Resolution	24Bit
	Output Impedance	75Ω
	Return Loss	>45dB (0.1 to 6MHz)
	Signal Level	1.0V p-p ±10%
	Rise and Fall Time	7ns Typical
	Output Jitter	<3ns peak @ 48kHz (18.4mUI)
	Output Level	2.5Vp-p nominal
Other	Maximum Power Consumption	2W MAX
	Warranty	5 year transferable

Specifications are subject to change without notice.

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Power LED Conditions
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to your card is not required. In the event of problems with your ADA-8401-A, the following basic troubleshooting checklist may help identify the source of the problem. If the module still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Ross Video Technical Support department at the numbers listed under the “**Contact Us**” section at the end of this manual.

1. **Visual Review** – Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, 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. **Reseat 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.

Power LED Conditions

The top front edge of the module has a Power LED which indicates card status. The Power LED displays the following conditions:

- **Off** — no power to the card.
- **Orange** — the card is running internal diagnostics while powering up.
- **Green** — normal operation.
- **Flashing Green** — the **Bootload** button is pressed, and the card is receiving a new software load from the frame.
- **Green/Flashing Orange** — signal or configuration problem, check signal status and settings.
- **Red** — solid or flashing means the card is not operational. Reseat card in frame, check the Rear Module connections, or call Ross Technical Support.

Warranty and Repair Policy

The ADA-8401-A 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-8401-A 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-8401-A has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

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

This User Manual provides all pertinent information for the safe installation and operation of your ADA-8401-A. Ross Video policy dictates that all repairs to the ADA-8401-A 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-8401-A, 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-8401-A. If required, a temporary replacement module 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.

Ordering Information

ADA-8401-A and Related Products

Your **ADA-8401-A AES/EBU Distribution Amplifier** is a part of the openGear family of products. Ross Video offers a full line of openGear terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, AES, keyers, switches, as well as analog audio and video products.

Standard Equipment

- **ADA-8401-A** AES/EBU Distribution Amplifier
- **8401ADR-004** AES/EBU Distribution Amplifier User Manual

Optional Equipment

- **8401ADR-004** AES/EBU Distribution Amplifier User Manual (additional)
- **R1A-8401** Rear Module for the ADA-8401-A (DFR-8310-C frames)
- **DFR-8310-N** Digital Products Frame and Power Supply with cooling fans, and MFC-8310-N card (2RU, holds up to 10 cards)
- **DFR-8320-CNS** Digital Products Frame, Power Supply, Cooling Fans, MFC-8310-N, COMM I/O Module and SNMP-8310 (2RU, holds up to 20 cards)
- **R2A-8401** Full Rear Module for the ADA-8401-A (DFR-8320 series frames)
- **R2AS-8401** Split Rear Module for the ADA-8401-A (DFR-8320 series frames)

Please contact your openGear sales representative for a complete list of the available options.

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 Support	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

Visit Us

Please visit us at our website for:

- Company information
- Related products and full product lines
- On-line catalog
- Trade show information
- News
- Testimonials

www.rossvideo.com
