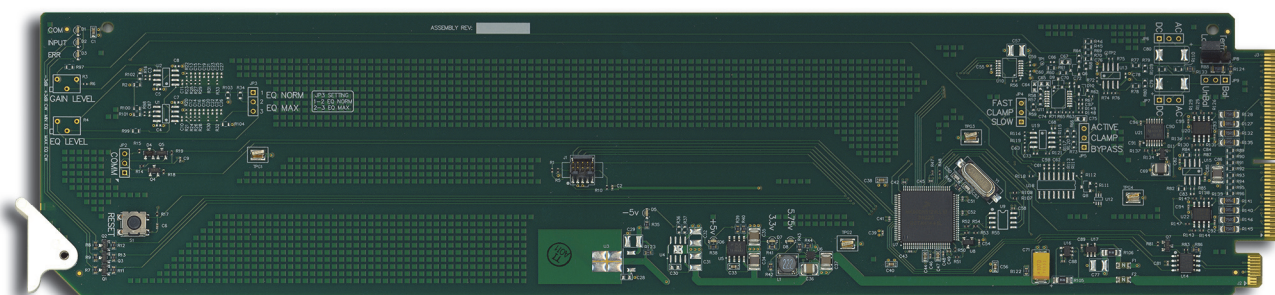


WDA-8409

Word Clock Distribution Amplifier User Manual



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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.

A handwritten signature in black ink that reads "David Ross". The signature is stylized, with the first letters of the first and last names being capitalized and prominent.

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.)*

WDA-8409 · User Manual

- Ross Part Number: 8409DR-004-02
- Release Date: February 26, 2018.

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

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Patents

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

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 numérique de la classe “A” est conforme à 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 the “**Warranty and Repair Policy**” section 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.

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Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on choosing an openGear WDA-8409 Word Clock Distribution Amplifier. Thank you for joining the group of worldwide satisfied Ross Video customers!

Should you have a question pertaining to the installation or operation of your WDA-8409, 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 WDA-8409 includes the following features:

- Looping or set terminating input
- Outputs up to eight copies of the word clock input signal
- Monitoring via DashBoard
- LED indicators for status presence
- Fits DFR-8321 and OG3-FR series frames
- Fully compliant with openGear specifications
- 5 year transferable warranty

Functional Block Diagram

Figure 1.1 describes the workflow of the WDA-8409 with the 8320AR-054 Full Rear module.

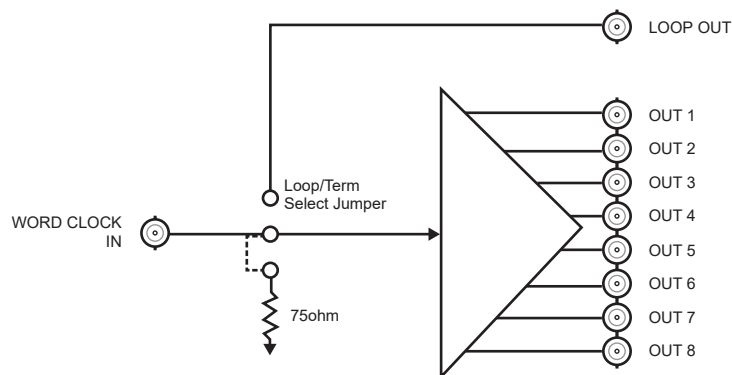


Figure 1.1 Simplified Diagram

User Interfaces

The following interfaces are available for control and monitoring of your WDA-8409.

DashBoard Control System

DashBoard enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the openGear frame through the Network Controller card.

For More Information on...

- the menus in DashBoard, refer to the chapter “**DashBoard Menus**” on page 4-1.
- installing and using DashBoard, refer to the ***DashBoard User Manual***.

Card-edge Monitoring

The card-edges provide LEDs for monitoring the status of the input signal.

For More Information on...

- the card-edge LEDs, refer to the section “**Monitoring via the Card-edge**” on page 3-3.

Documentation Terms and Conventions

The following terms and conventions are used throughout this manual.

Terms

The following terms are used:

- **“Board”** and **“Card”** both refer to the card, including all components and switches.
- **“DashBoard”** refers to the DashBoard Control System.
- **“DFR-8321 series”** refers to the DFR-8321 series frames and all available options unless otherwise indicated.
- **“Network Controller Card”** refers to the MFC-8320-N, MFC-8322-N, and MFC-OG3-N Series Network Controller Cards unless otherwise indicated.
- **“OG3-FR series”** refers to the OG3-FR series frames and all available options unless otherwise indicated.
- **“openGear frame”** refers to the DFR-8321 series and OG3-FR series frames and all available options unless otherwise indicated.
- **“Operator”** and **“User”** both refer to the person who uses the WDA-8409.
- **“System”** and **“Video system”** both refer to the mix of interconnected production and terminal equipment in which the card operates.

Conventions

The following conventions are used:

- The **“Operating Tips”** and **“Note”** boxes are used to provide additional user information.

Installation

In This Chapter

This chapter provides instructions for installing the rear module for your WDA-8409, installing the card in the frame, cabling details, and how to upgrade the software on your card(s).

The following topics are discussed:

- Before You Begin
- Installing the WDA-8409
- Cabling
- Software Upgrades

Before You Begin

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

Static Discharge

Throughout this chapter, please heed the following cautionary note:



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

Unpacking

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

Installing the WDA-8409

The WDA-8409 can be installed in the DFR-8321 series frames and the OG3-FR series frames using one of the supported rear modules. The procedure for installing the rear module and card in your openGear frame is the same regardless of the rear module used.

Supported Rear Modules

Notice — *Ensure that you install the WDA-8409 using one of the supported rear modules listed below. Installing the WDA-8409 with an unsupported rear module can damage the card, the rear module, or both.*

The **8320AR-032** Full Rear Module and the **8320AR-031** Split Rear Module are supported.

Installing a Card

You must first install the rear module in the frame and then install the card in the appropriate slot within an openGear frame. This section outlines how to perform both tasks.

To install the rear module in the openGear frame

1. Ensure that the frame is properly installed.
2. On the rear of the frame, locate the card frame slot.
3. Remove the Blank Plate from the rear of the slot you have chosen for card installation.
4. As shown in **Figure 2.1**, seat the bottom of the rear module in the seating slot at the base of the frame's back plane.

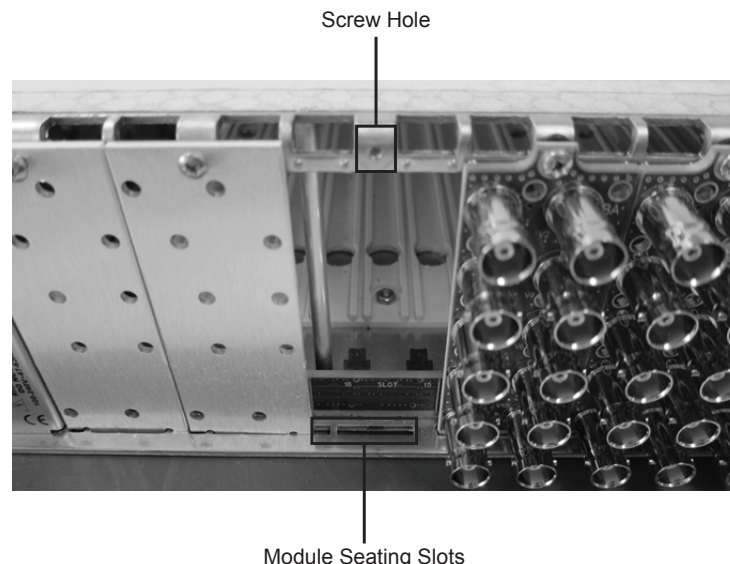


Figure 2.1 Rear Module Installation in an OG3-FR Series Frame (Cards not shown)

5. Align the top hole of the rear module with the screw hole on the top edge of the frame back plane.
6. Using a Phillips screwdriver and the supplied screw, fasten the rear module to the back plane. Do not over-tighten.

7. Verify whether your Rear Module Label is self-adhesive by checking the back of the label for a thin wax sheet. You must remove the wax sheet before affixing the label.
8. Affix the supplied Rear Module Label to the BNC area of the Rear Module.
9. Ensure proper frame cooling and ventilation by having all rear frame slots covered with rear modules or blank metal plates.

To install the card in the openGear frame

1. Locate the Rear Module you installed in the procedure “**To install the rear module in the openGear frame**” on page 2-3.
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 plugs are properly seated on the midplane and rear modules.

Cabling

The WDA-8409 can operate as a single 1x8, or as a single 1x4 depending on the rear module you are using. This section provides cabling details based on the supported rear module.

For More Information on...

- the **LOOP/TERM** jumper, refer to the section “**Card Overview**” on page 3-2.

8320AR-032 Cabling

Each 8320AR-032 Full Rear Module occupies two slots and accommodates one card. This rear module provides one Word Clock input, one input looping output, and eight outputs via BNC connections. Ensure the **LOOP/TERM** jumper is set to the **LOOP** position if you are cabling the **LOOP OUT** BNC.

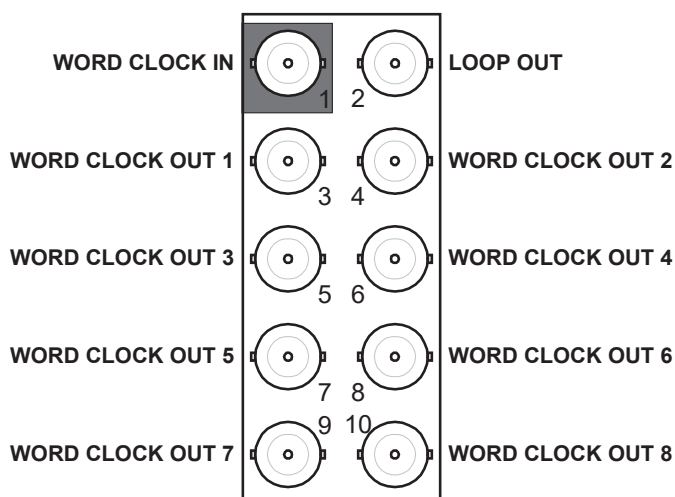


Figure 2.2 Cable Connections — 8320AR-032 Full Rear Module

8320AR-031 Cabling

Each 8320AR-031 Split Rear Module occupies two slots and accommodates two cards. This rear module provides one Word Clock input, and four outputs via BNC connections per card. Ensure the **LOOP/TERM** jumper is set to the **TERM** position.

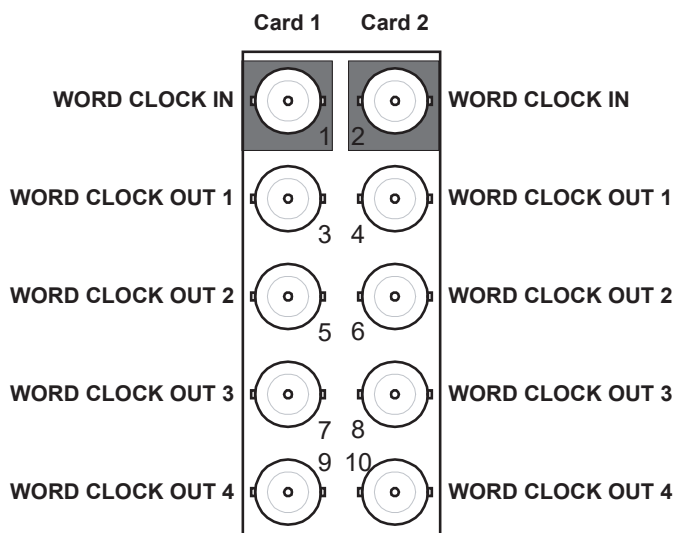


Figure 2.3 Cable Connections — 8320AR-031 Split Rear Module

Software Upgrades

The WDA-8409 can be upgraded in the field via the Network Controller Card in your openGear frame. Note that DashBoard version 8.0 or higher is required.

To upgrade the software on a card

1. Contact Ross Technical Support for the latest software version file.
2. Display the **Device View** of the card by double-clicking its status indicator in the **Basic Tree View**.
3. From the **Device View**, click **Upload** to display the **Select file for upload** dialog.
4. Navigate to the *.bin upload file you wish to upload.
5. Click **Open**.
6. If you are upgrading a single card, click **Finish** to display the **Uploading to Selected Devices** dialog. Proceed to step 8.
7. If you are upgrading multiple cards:
 - Click **Next >** to display the **Select Destination** menu. This menu provides a list of the compatible cards based on the card selected in step 2.
 - Specify the card(s) to upload the file to by selecting the check box(es) for the cards you wish to upload the file to.
 - Verify that the card(s) you wish to upload the file to. The **Error/Warning** fields indicate any errors, such as incompatible software or card type mismatch.
 - Click **Finish** to display the **Uploading to Selected Devices** dialog.
8. Monitor the upgrade.
 - The **Uploading to Selected Devices** dialog enables you to monitor the upgrade process.
 - Click **OK** to complete the upgrade.
 - The card(s) are temporarily taken off-line during the re-boot process. The process is complete once the status indicators for the **Card State** and **Connection** fields return to their previous status.

User Controls

In This Chapter

This chapter provides a general overview of the user controls available for your WDA-8409.

The following topics are discussed:

- Card Overview
- Monitoring via the Card-edge
- Using DashBoard
- Monitoring via DashBoard

Card Overview

This section describes the jumpers and **Bootload** button located on the card surface. There are no other card-edge controls as all configuration and setup is done using the menus in DashBoard. Refer to **Figure 3.1** for location of this button.

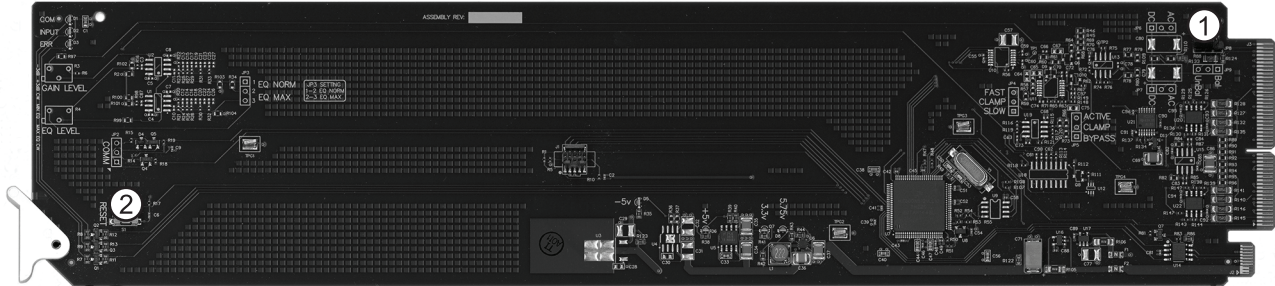


Figure 3.1 Card-edge Controls

1. LOOP/TERM Jumper

This jumper sets the input to terminate into a 75ohm non-looping termination or offers a hi-Z input with the input available as a looped output. The default is the **TERM** (terminated) position.



Note — The 8320AR-031 Split Rear Module does not provide a LOOP OUT connector. When used with this rear module, the jumper should be set to the default TERM position.

2. Bootload Button

This button is used for factory service in the unlikely event of a complete card failure. Do not use this button unless advised by Ross Technical Support.

Monitoring via the Card-edge

The following sections describe the card-edge LEDs. Refer to **Figure 3.2** for LED locations.

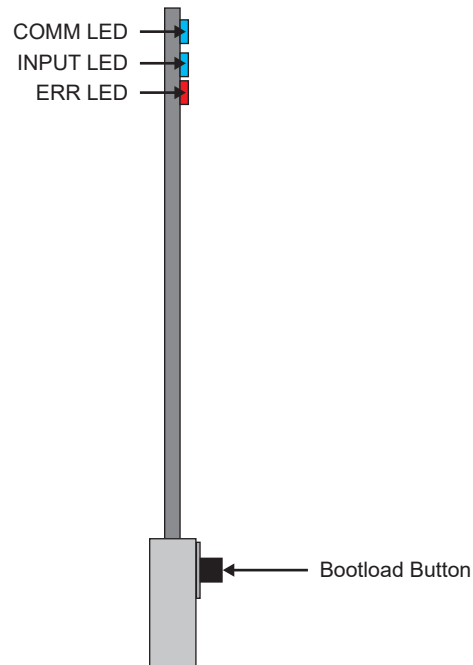


Figure 3.2 LED Locations

Status LEDs

Basic LED displays and descriptions are provided in **Table 3.1**.

Table 3.1 Status LEDs

LED	Color	Display and Description
COMM	Flashing Blue	When flashing, this LED indicates that the card is communicating with remote network control (e.g. DashBoard)
INPUT	Blue	When lit, this LED indicates an input is present.
ERR	Red	When lit, this LED indicates an internal card fault is occurring.

Using DashBoard

Before proceeding, ensure that the DashBoard client software is installed on a computer connected to your facility network. The DashBoard software and user manual area available from the Ross Video website.

For More Information on...

- installing DashBoard, refer to the *DashBoard User Manual*.

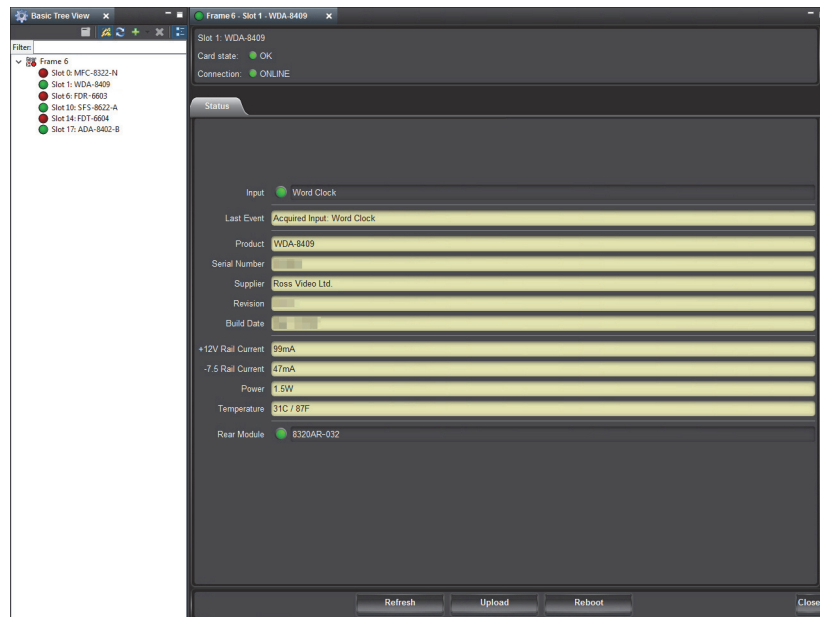
To launch DashBoard

- Ensure that you are running DashBoard software version 8.0 or higher.
- Launch DashBoard by double-clicking its icon on your desktop.
- Ensure that the openGear frame with your WDA-8409 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

- 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 6 is expanded to show a list of cards including the WDA-8409 in slot 1.
- Double-click the node for a card to display its menus in the **Device View** of DashBoard (right-side of the DashBoard window).



Example of a WDA-8409 in DashBoard

Monitoring via DashBoard

This section briefly outlines how to monitor the WDA-8409 using the options available in DashBoard.

Status Tab

The fields in the **Status** tab 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 table as text set in brackets next to the menu parameter name.

Table 3.2 outlines the read-only information displayed in the **Status** tab.

Table 3.2 Status Tab Items

Tab Title	Item	Parameters	Description
	Input	OK (Green)	A valid input signal is detected
		None (Yellow)	Input signal is not present
	Last Event	#	Indicates the last action the card performed
	Product	WDA-8409	Displays the card model
	Serial Number	#####	Indicates the card serial number
	Supplier	Ross Video Ltd.	Indicates the supplier of your card
	Revision	v#.#.#	
	Build Date	#	
	+12V Rail Current	#mA	
	-7.5 Rail Current	#mA	
	Power	#W	
	Temperature	#C / #F	
	Rear Module	8320AR-032 (Green)	Indicates the installed rear module is supported by the card
		8320AR-031 (Green)	
		Unknown (Red)	Indicates that the installed rear module is not recognized by the card

Specifications

In This Chapter

This chapter includes the technical specifications for the WDA-8409. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section lists the technical specifications for the WDA-8409.

Table 4.1 Technical Specifications

Category	Parameter		Specification
Word Clock Input	Number of Inputs	8320AR-032	1
		8320AR-031	1
	Impedance		User selectable as: • hi-Z looping; or • card-terminated 75ohm
	Sensitivity		200mV
Looping Output	Number of Looping Outputs	8320AR-032	1
		8320AR-031	0
Word Clock Outputs	Number of Outputs	8320AR-032	8
		8320AR-031	4
	Impedance		75ohm
	Level		10Vp-p square wave (unterminated) 5V p-p square wave (terminated into 75ohm)
Environment	Maximum Ambient Temperature		0° to 40°C (32°F to 104°F) <95%, non-condensing
Power	Total Power Consumption		<2W typical

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

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

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

Warranty and Repair Policy

The WDA-8409 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 WDA-8409 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 WDA-8409 has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

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

This User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the WDA-8409 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 WDA-8409, 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 WDA-8409. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

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

Contact Us

Contact our friendly and professional support representatives for the following:

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

Technical Support

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