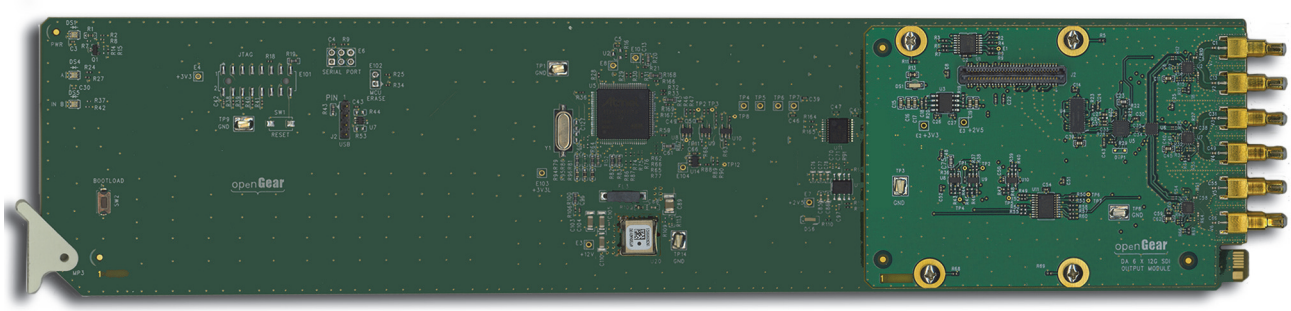
DRA-8902 Series

Dual 12G/6G/3G/HD/SD Reclocking Distribution Amplifier User Manual



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Our mission is to:

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

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

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

David Ross
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Ross Video Code of Ethics

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

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

DRA-8902 Series · User Manual

- Ross Part Number: 8902DR-004-02
- Release Date: January 26, 2018.

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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

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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 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
- Functional Block Diagrams
- User Interfaces
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on choosing an openGear DRA-8902 Dual 12G/6G/3G/HD/SD Reclocking 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 DRA-8902, 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

Your DRA-8902 is a Dual 12G/6G/3G/HD/SD Reclocking Amplifier, capable of equalizing and reclocking all common serial digital signals. An LED indicator for each channel, at the front of the card, identify the presence of incoming video, simplifying system troubleshooting.

The DRA-8902 series includes two products: the DRA-8902-10 and the DRA-8902-16. Refer to **Table 1.1** for details.

Table 1.1 DRA-8902 Series Products

Product	Number of Inputs	Number of Outputs
DRA-8902-10	2	10
DRA-8902-16	2	16

Features

The DRA-8902 includes the following features:

- Equalizes and reclocks SDI signals of 270Mbps, 1.485Gbps, 2.97Gbps, 5.94Gbps, and 11.88Gbps
- Supports DVB-ASI (EN 50083-9), MADI (AES10), and SMPTE 310 signals
- Configure and monitor via DashBoard
- Automatic detection of incoming data rate
- Automatically mutes the channel output when a loss of input occurs
- Automatically performs a fail-over switch between the two SDI inputs (configurable via DashBoard)
- LED indicators for input signal presence
- Excellent input and output return loss
- Fits OG3-FR series frames
- Fully compliant with openGear specifications
- 5 year transferable warranty

Functional Block Diagrams

Figure 1.1 describes the signal flow of the DRA-8902-10.

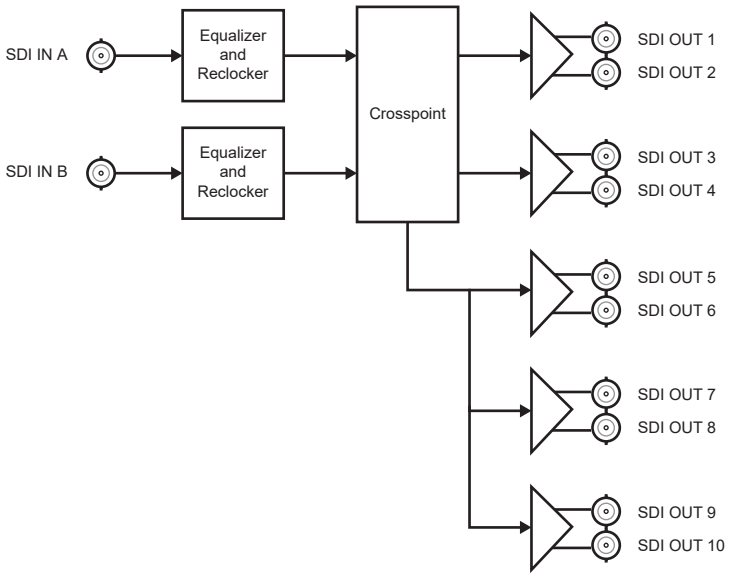


***Figure 1.1** Simplified Diagram — DRA-8902-10*

Figure 1.2 describes the signal flow of the DRA-8902-16.

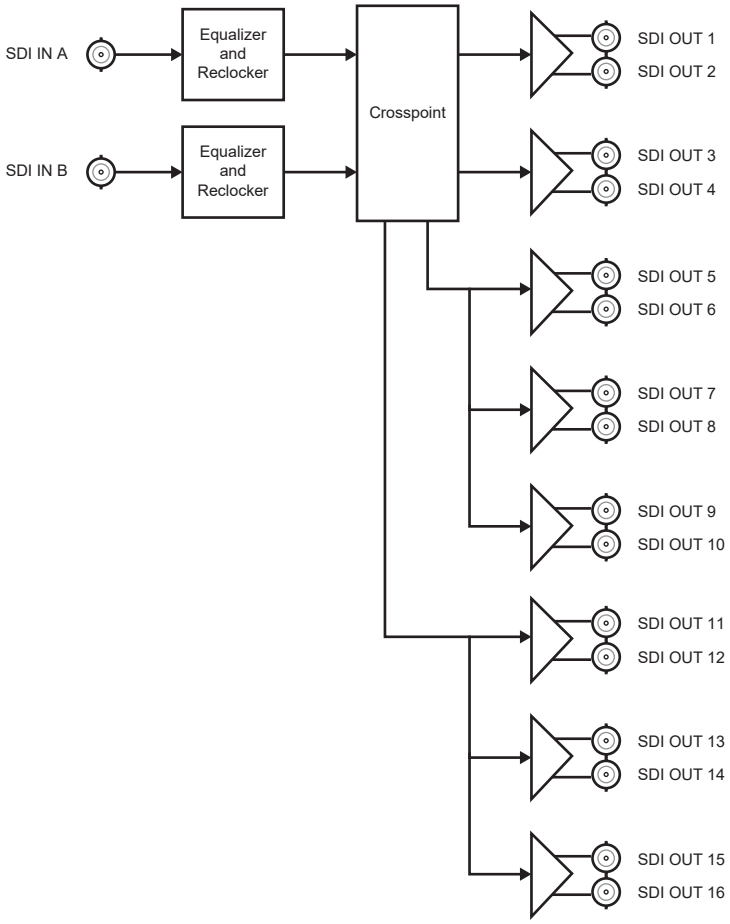


***Figure 1.2** Simplified Diagram — DRA-8902-16*

User Interfaces

The following interfaces are available for control and monitoring of your DRA-8902.

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...

- 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...

- card-edge LEDs, refer to the section "**Monitoring Features**" on page 3-3.

SNMP Monitoring and Control

The Network Controller card in the openGear frame provides optional support for remote monitoring and control of your frame and openGear cards using Simple Network Management Protocol (SNMP), which is compatible with many third-party monitoring and control tools.

For More Information on...

- SNMP controls on your card, refer to your DRA-8902 Management Information Base (MIB) file.
- SNMP Monitoring and Control, refer to your ***MFC-OG3 Series User Manual***.

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.
- "**DRA-8902**" refers to both the DRA-8902-10 and DRA-8902-16 unless otherwise noted.
- "**DRA-8902-10**" refers to the DRA-8902 with two inputs and ten outputs.
- "**DRA-8902-16**" refers to the DRA-8902 with two inputs and sixteen outputs.
- "**Network Controller Card**" refers to the 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 all versions of the OG3-FR series frames unless otherwise indicated.
- "**Operator**" and "**User**" both refer to the person who uses the DRA-8902.
- "**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 DRA-8902, installing the card in the openGear frame, cabling details, and how to upgrade the software on your card(s).

The following topics are discussed:

- Before You Begin
- Installing the DRA-8902
- 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 the manual that accompanied it.

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 DRA-8902

The DRA-8902 can be installed in 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 card model.

Supported Rear Modules

Notice — *Ensure that you install the DRA-8902 using one of the supported rear modules listed below. Installing the DRA-8902 with an unsupported rear module can damage the card, the rear module, or both.*

The rear module depends on the configuration you wish to use.

- **DRA-8902-10** — The **8322AR-313** Rear Module is required.
- **DRA-8902-16** — The **8322AR-314** Rear Module is required.

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 openGear 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.

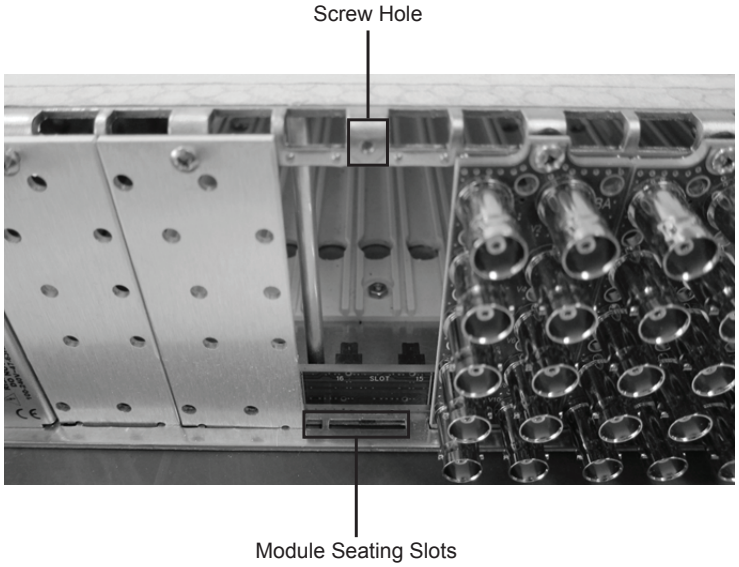


Figure 2.1 *Rear Module Installation in an OG3-FR Series Frame (Cards not shown)*

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. 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

Notice — *Ensure all the bullet connectors on the card-edge are aligned correctly to the edge of the main card before inserting the card into a frame slot. Inserting misaligned bullet connectors into the rear module backplane can damage the connectors, the rear module, or both.*

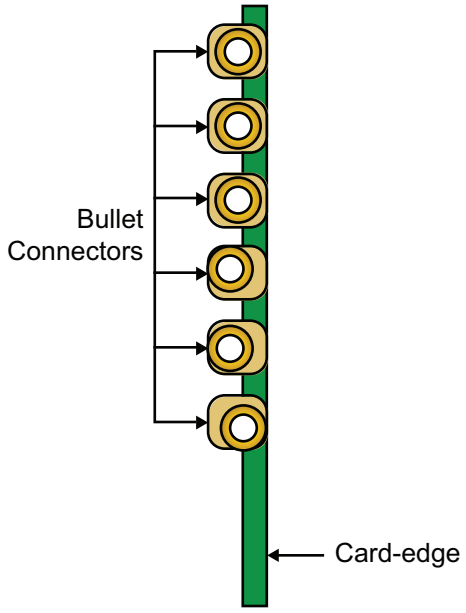


Figure 2.2 *Example — Mis-alignment of Bottom Three Connectors*

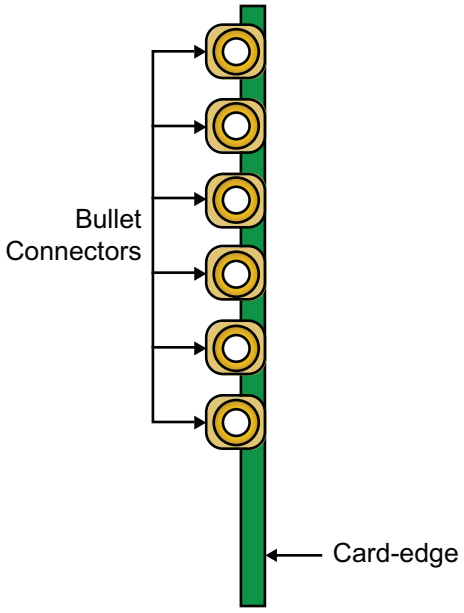


Figure 2.3 *Bullet Connectors — Example of Correct Alignment*

2. Hold the card by the edges and carefully align the main card edges with the slots in the frame.
3. Fully insert the card into the frame until you feel the bullet connectors on the card edge come into contact with the rear module.
4. Continue to slide the card until the bullet connectors are fully seated into the BNCs of the rear module. You will feel a click when the bullet connectors fully mates into the rear module.

Cabling

This section provides Belden 1694A cabling details based on the card model.

Note — *It is recommended to terminate unused outputs. You can also mute an unused output via the Mute Outputs options available in the Setup tab of DashBoard.*

DRA-8902-10 Cabling

The 8322AR-313 Full Rear Module is required for the DRA-8902-10. Each rear module occupies two slots and accommodates one card. This rear module provides two SDI inputs, and ten SDI outputs.(**Figure 2.4**)

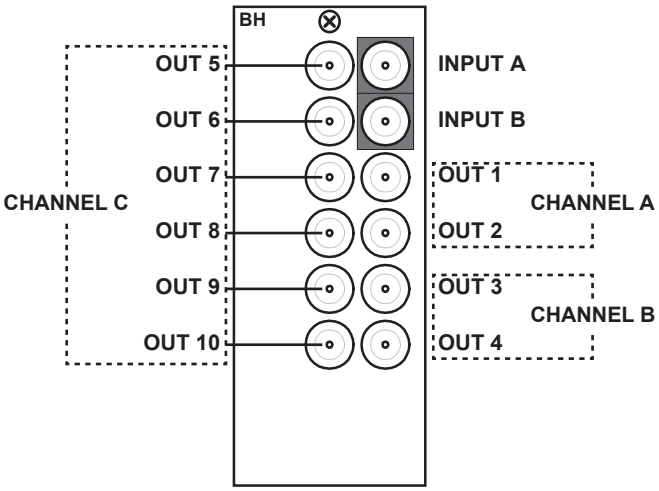


Figure 2.4 *Cable Connections for the DRA-8902-10*

DRA-8902-16 Cabling

The 8322AR-314 Full Rear Module is required for the DRA-8902-16. Each rear module occupies two slots, and accommodates one card. This rear module provides two SDI inputs, and sixteen SDI outputs. (**Figure 2.5**)

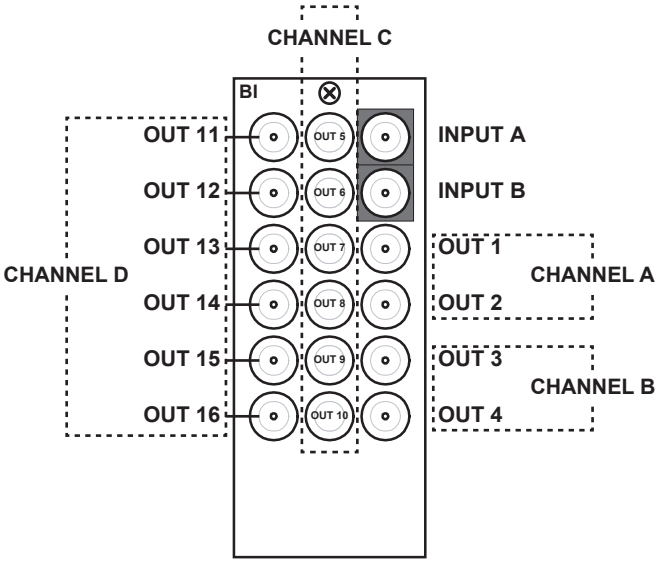


Figure 2.5 *Cable Connections for the DRA-8902-16*

Software Upgrades

The DRA-8902 can be upgraded in the field via DashBoard. 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.

Configuration

In This Chapter

This chapter provides a general overview of the user controls available on your DRA-8902.

The following topics are discussed:

- Card Overview
- Monitoring Features
- Using DashBoard
- Configuring the DRA-8902

Card Overview

This section describes major components of the card hardware. There are no card-edge controls as all configuration and setup is done using the menus in DashBoard. Refer to the section "**Monitoring Features**" on page 3-3 for details on the card-edge LEDs.

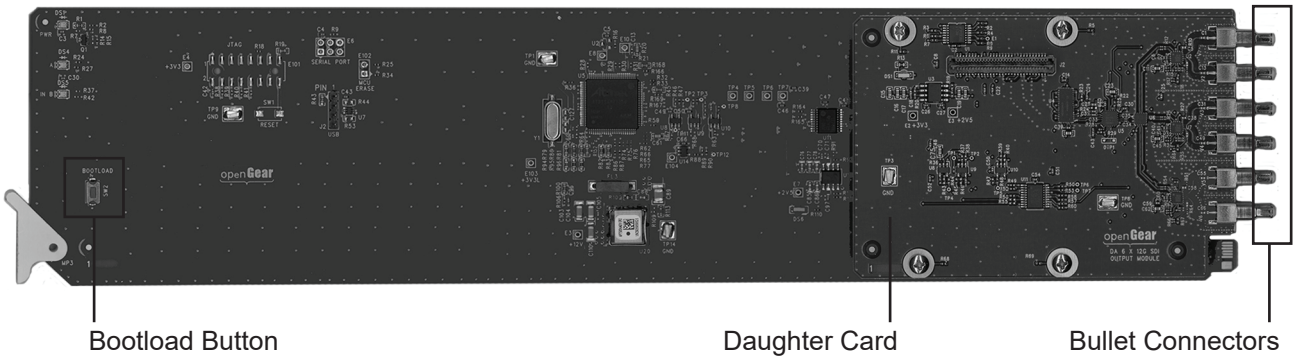


***Figure 3.1** Card Components — Example of a DRA-8902-10*

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.

Bullet Connectors

The bullet connectors on the card-edge insert into the backplane of the rear module, to connect the card to the rear module. It is strongly recommended to verify that the bullet connectors are aligned correctly before inserting into the rear module.

Daughter Card

One or two daughter cards may be installed on the DRA-8902 main PCB. These daughter cards provide additional output connections for the rear module.

For More Information on...

- the cabling designations for your card, refer to the section "**Cabling**" on page 2-5.
- configuring the output channels for your card, refer to the section "**Assigning an Input to an Output Channel**" on page 3-5.
- the Bootload process, refer to the section "**Bootload Button**" on page 6-2.

Monitoring Features

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

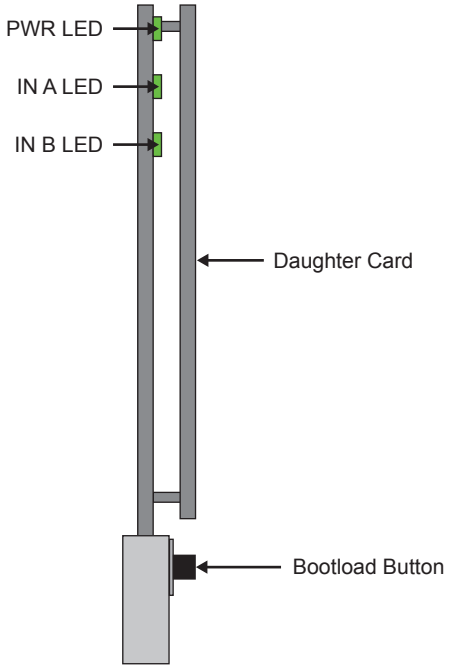


***Figure 3.2** LED Locations*

Status LEDs

Table 3.1 provides basic LED displays and descriptions.

Table 3.1 Status LEDs

LED	Color	Display and Description
PWR	Green	When lit green, this LED indicates that the card is functioning normally and that no anomalies have been detected.
	Flashing Green	When flashing green, this LED indicates that the Bootload button was pressed, and the card is receiving a new software load from the frame.
	Flashing Green and Orange	When lit green with flashing orange, this LED indicates a signal or configuration problem. Verify the signal status and settings.
	Amber	When lit amber, this LED indicates the card is running internal diagnostics while powering up.
	Red	When lit red or flashing red, this LED indicates the card is not operational. Re-seat card in frame, check the rear module cable connections, or call Ross Video Technical Support.
	Off	When off, this LED indicates there is no power to the card.
IN #	Green	When lit green, this LED indicates that a valid SDI signal is present for the specified SDI input.
	Red	When lit red, this LED indicates that the SDI signal is missing or invalid for the specified SDI input.

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 are available from the Ross Video website.

For More Information on...

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

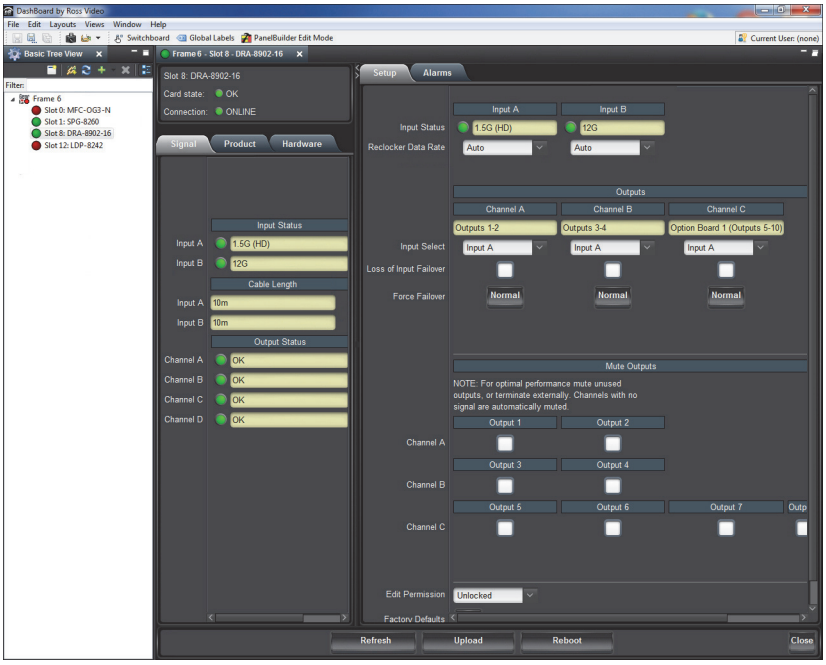
To launch DashBoard

1. Ensure that you are running DashBoard software version 8.0 or higher.
2. Launch DashBoard by double-clicking its icon on your desktop.
3. Ensure that the openGear frame with your DRA-8902 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-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 6 is expanded to show a list of installed cards including the DRA-8902-16.
2. Double-click the node for a card to display its menus in the **Device View** of DashBoard (right-side of the DashBoard window).



Example of a DRA-8902-16 in DashBoard

Configuring the DRA-8902

This section briefly outlines how to configure the DRA-8902 using the options available in DashBoard.

Configuring the Reclocker

This section summarizes how to select a data rate for the reclocker. This enables the card to reclock to a specific data rate or automatically detect and reclock the data rate. It also sets the input signal rate type that the DRA-8902 will process.

To set the reclocker data rate

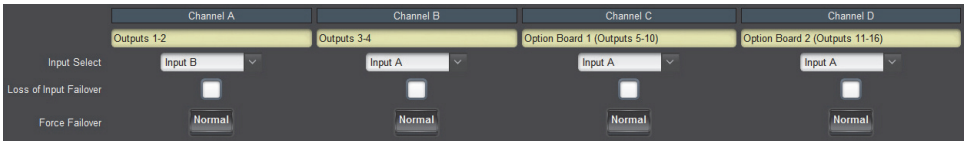
1. From the **Device View**, select the **Setup** tab.
2. Use the **Reclocker Data Rate** menu to select a data rate for the input signal. Choose from the following:
   - **Auto** — The DRA-8902 automatically reclocks at the detected rate for the input.
   - **125M (MADI)** — The DRA-8902 is set to reclock at MADI rate of 125Mbps only. This is the required setting when using MADI signals.
   - **270M (SD)** — The DRA-8902 is set to reclock at 270Mbps only.
   - **1.5G (HD)** — The DRA-8902 is set to reclock at 1.485Gbps only.
   - **3G** — The DRA-8902 is set to reclock at 2.97Gbps only.
   - **6G** — The DRA-8902 is set to reclock at 5.94Gbps only.
   - **12G** — The DRA-8902 is set to reclock at 11.88Gbps only.

Assigning an Input to an Output Channel

An output channel groups multiple output signals, enabling you to configure groups of outputs quickly using the same settings. When you assign an input signal to a channel, all the outputs in that channel will use the specified input signal. For example, if you assign Input A to Channel C on the DRA-8902-16, Outputs 5 to 10 will use Input A.

To assign an input to an output channel

1. From the **Device View**, select the **Setup** tab.
2. Locate the options for the output channel you want to configure.



Setup Tab — Output Channel Options

3. Use the **Input Select** menu to assign an input signal to a specific output channel group. Choose from the following:
   - **Input A** — Assigns the source available on the **INPUT A** BNC of the rear module.
   - **Input B** — Assigns the source available on the **INPUT B** BNC of the rear module.

Enabling the Failover Feature

The failover feature enables the DRA-8902 to use a backup input source when the primary input source is lost and a valid backup input is detected. Once the DRA-8902 determines that the primary input source is stable (valid and locked), it automatically switches back to the primary source. The **Input** field on the **Signal** tab reports when the backup source is in use for either channel.

The primary source assignments are determined using the procedure "**To assign an input to an output channel**".

To enable the failover feature to automatically switch inputs

1. From the **Device View**, select the **Setup** tab.
2. Select the **Loss of Input Failover** box for the channel.

   The box displays a check-mark.

To immediately force a failover switch

1. From the **Device View**, select the **Setup** tab.
2. Toggle the **Force Failover** button for the channel.

   The button label changes to **Forced** and the button is lit red.

To enable an alarm during a force failover switch

1. From the **Device View**, select the **Alarms** tab.
2. Select the **Failover** box for the channel.

   The box displays a check-mark. The **Signal** tab will report when the channel is in failover mode.

Muting an Output

If you have an unused output, it is recommended to either terminate the output or mute the output via the Mute Outputs options available in DashBoard.

To mute an unused output

1. From the **Device View**, select the **Setup** tab.
2. Locate the **Mute Outputs** area located near the bottom of the **Setup** tab. You may need to scroll down the tab.
3. Select the **Output** box for the output you wish to mute.

   The box displays a check-mark.

Configuring the Invalid Signal Alarms

When enabled, this feature will indicate an alarm condition (red) in the corresponding **Status** field(s) of the **Signal** tab. This occurs if the DRA-8902 does not detect a valid input signal for that channel. To verify which BNC to troubleshoot, refer to the rear module labeling.

For More Information on...

- the rear module cabling designations, refer to the section "**Cabling**" on page 2-5.

To enable the alarm for an invalid input signal

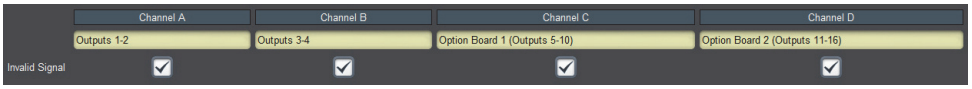
1. From the **Device View**, select the **Alarms** tab.
2. To raise an alarm when an invalid input signal is detected, select the **Invalid Signal** check box in the **Input** area of the tab for the input you wish to monitor.

Alarms Tab

The **Input Status** fields in the **Signal** tab and the **Status** tab report when an invalid input signal is detected on the corresponding Input BNC.

To enable the alarm for an invalid output signal

1. From the **Device View**, select the **Alarms** tab.
2. To raise an alarm when an invalid output signal is detected, select the **Invalid Signal** check box in the **Channel** area of the tab for the output you wish to monitor.



Alarms Tab — Invalid Output Signal Alarm Boxes

The corresponding **Output Status** field in the **Signal** tab reports when an invalid input signal is detected.

Enabling the Failover Alarm

Enabling the Failover alarm allows the card to report when a loss of input has occurred and the output channel automatically switched to the backup source specified in the section "**Enabling the Failover Feature**" on page 3-6. When the source is switched over, a failover message displays in the **Output Status** fields of the **Signal** tab and the **Setup** tab. If the alarm is disabled, the status fields do not report when the loss of input failover has occurred.

To enable the failover alarm

1. From the **Device View**, select the **Alarms** tab.
2. To raise an alarm when the output signal is switched to the backup source, select the **Failover** check box in the **Channel** area of the tab for the output you wish to monitor.

Alarms Tab — Failover Alarm Boxes

The corresponding **Output Status** field in the **Signal** tab reports when an invalid input signal is detected.

DashBoard Menus

In This Chapter

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

The following topics are discussed:

- Status Tabs
- Setup Tab
- Alarms Tab

Operating Tip — *Wait 30 seconds after the last setting change to ensure all changes are saved to the non-volatile memory of the card.*

Status Tabs

This section summarizes the read-only information displayed in the **Status** tabs. The fields in the **Signal** tab 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.

Signal Tab

Table 4.1 outlines the read-only information displayed in the **Signal** tab.

Table 4.1 Signal Tab Items

Tab Title	Item	Parameters	Description
Input Status	Input #	125M (MADI) (Green)	A MADI signal detected at 125Mbps is present
		270M (SD) (Green)	A valid 270Mbps input signal is present
		1.5G (HD) (Green)	A valid 1.485Gbps input signal is present
		3G (Green)	A valid 2.97Gbps input signal is present
		6G (Green)	A valid 5.94Gbps input signal is present
		12G (Green)	A valid 11.88G input signal is present
		Signal Not Locked (Green)	An input signal is present, but not locked but the Invalid Signal alarm on the Alarms tab is disabled.
		Signal Not Locked (Red)	A valid input signal is detected and is not locked
		No signal (Green)	A valid input signal is not detected but the Invalid Signal alarm on the Alarms tab is disabled.
		No signal (Red)	A valid input signal is not detected. The Invalid Signal alarm on the Alarms tab is enabled.
Cable Length	Input #	#	Indicates the approximate Belden 1694A cable length used for the input signal
		N/A	A valid input source was not detected on the input BNC
Output Status	Channel #	OK (Green)	A valid output signal is detected
		Auto Failover (Green)	The Channel is in Failover mode (the Loss of Input Failover box is selected in the Setup tab) but the Failover alarm is not enabled on the Alarms tab for the channel.
		Auto Failover (Red)	The Channel is in Failover mode (the Loss of Input Failover box is selected in the Setup tab) for the channel

Table 4.1 Signal Tab Items

Tab Title	Item	Parameters	Description
Output Status	Channel #	Force Failover (Green)	The Channel is in a forced Failover mode (the **Force Failover** button was clicked in the Setup tab) but the Failover alarm is not enabled on the Alarms tab for the channel
		Force Failover (Red)	The Channel is in a forced Failover mode (the **Force Failover** button was clicked in the Setup tab) for the channel
		No Signal (Green)	The output signal is not present. The Invalid Signal alarm for this channel (in the Alarms tab) is disabled.
		No Signal (Red)	The output signal is not present. The Invalid Signal alarm (in the Alarms tab) for this channel is enabled.
		Signal Not Locked (Green)	An output signal is present, but not locked. The Invalid Signal alarm (in the Alarms tab) is disabled for this output channel.
		Signal Not Locked (Red)	An output signal is present, but not locked. The Invalid Signal alarm (in the Alarms tab) is enabled for this output channel.

Product Tab

Table 4.2 outlines the read-only information displayed in the **Product** tab.

Table 4.2 Product Tab Items

Tab Title	Item	Parameters	Description
	Product	DRA-8902-#	Displays the card model
	Supplier	Ross Video Ltd.	Indicates the manufacturer of your card
	Board Rev	##	Indicates the version of the PCB
	Board S/N	######	Indicates the card serial number
	Software Rev	##.##	Indicates the software version
Daughter Boards	1	6 Output	Indicates if a Daughter Card is installed in the indicated position on the PCB and provides the specified connections
		None	
	2	6 Output	
		None	

Hardware Tab

Table 4.3 outlines the read-only information displayed in the **Hardware** tab.

Table 4.3 Hardware Tab Items

Tab Title	Item	Parameters	Description
Hardware	Voltage (mV)	#	Supply voltage
	Current (mA)	#	Current consumption of card in milliamperes
	CPU Headroom	#	Processing power available
	RAM Available	#	On-board processing memory available
	Configuration Bank	#	Storage count
	Uptime (h)	#	Displays the number of hours since the last reboot of the card

Setup Tab

Table 4.4 summarizes the **Setup** options available in DashBoard.

Table 4.4 Setup Menu Items

Menu Title	Item	Parameters	Description
Input #	Input Status (read-only)	125M (MADI) (Green)	A MADI signal detected at 125Mbps is present
		270M (SD) (Green)	A valid 270Mbps input signal is present
		1.5G (HD) (Green)	A valid 1.485Gbps input signal is present
		3G (Green)	A valid 2.97Gbps input signal is present
		6G (Green)	A valid 5.94Gbps input signal is present
		12G (Green)	A valid 11.88G input signal is present
		Signal Not Locked (Green)	An input signal is present, but not locked. The Invalid Signal alarm is disabled in the Alarms tab.
		Signal Not Locked (Red)	An input signal is present, but not locked.
		No signal (Green)	A valid input signal is not present, but the Invalid Signal alarm is disabled in the Alarms tab.
		No signal (Red)	A valid signal is not present
	Reclocker Data Rate[a]	Auto*	Card automatically detects the incoming data rate
		125M (MADI)	Reclocker is set to 125Mbps
		270M	Reclocker is set to 270Mbps
		1.5G	Reclocker is set to 1.485Gbps
		3G	Reclocker is set to 2.97Gbps
		6G	Reclocker is set to 5.94Gbps
		12G	Reclocker is set to 11.88Gbps
Outputs - Channel #	Channel # (read-only)	Outputs 1-2	Indicates the OUT BNCs included in the channel
		Outputs 3-4	
		Outputs 5-10	
		Outputs 10-16	
	Input Select	Input A	Specifies that the signal on the SDI INPUT A BNC is the primary source for this output channel
		Input B	Specifies that the signal on the SDI INPUT B BNC is the primary source for this output channel

Table 4.4 Setup Menu Items

Menu Title	Item	Parameters	Description
Outputs - Channel #	Loss of Input Failover	Selected	The input signal is automatically switched to the backup when the card detects the primary is unavailable
		Cleared	Disables the failover feature
	Force Failover	Normal*	Click this button to force the specified channel to use the backup input when the primary input of the channel is lost. Note that the card returns to the primary input once the primary input signal is stable. If the card is in Forced Failover mode, the button label will display “Forced”.
		Forced	
Mute Outputs - Channel #	Output #	Selected	Mutes the specified output for the channel. It is recommended to terminate or mute unused outputs.
		Cleared*	The output is not muted.
	Edit Permission	Unlocked*	All configurable menu options are editable
		Locked	All configurable menu options, except this one, are locked and are read-only
	Factory Defaults	Reset	Resets all editable parameters to the factory default values

a. When using MADI signals, you must set the Reclocker Data Rate to 125M (MADI) and not Auto.

Alarms Tab

Table 4.5 summarizes the **Alarms** options available in DashBoard.

Table 4.5 Alarms Menu Items

Menu Title	Item	Parameters	Description
Input #	Invalid Signal	Selected*	The Status field in the Signal tab reports the loss of the input as an error/alarm
		Cleared	The Status field in the Signal tab reports the loss of the input as information only (status indicator does not report an alarm condition)
Outputs - Channel #	Channel # (read-only)	Outputs 1-2	Indicates the OUT BNCs included in the channel
		Outputs 3-4	
		Outputs 5-10	
		Outputs 10-16	
	Invalid Signal	Selected*	The specified Channel field in the Output Status area of the Signal tab reports the detected invalid input as an error/alarm
		Cleared	The specified Channel field in the Output Status area of the Signal tab reports that an invalid input is detected, but as information only (status indicator does not report an alarm condition)
	Failover	Selected*	The specified Channel field in the Output Status area of the Signal tab reports when the channel has switched to failover mode
		Cleared	The specified Channel field in the Output Status area of the Signal tab reports the switch to failover mode as information only (status indicator does not report an alarm condition)

Specifications

In This Chapter

This chapter includes the technical specifications for the DRA-8902. 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 DRA-8902.

Table 5.1 Technical Specifications

Category	Parameter		Specification
SDI Inputs	Number of Inputs		2
	Data Rates and SMPTE Standards Accommodated		19.39Mbps, 38.78Mbps, SMPTE 310 MADI, AES10-2008 270Mbps, 525/625 Component, SMPTE 259M 270Mbps, DVB-ASI 1.485Gbps Component, SMPTE 292M 2.97Gbps Component, SMPTE 424M 5.94Gbps Component, SMPTE 2081 11.88Gbps Component, SMPTE 2082
	Impedance		75ohm
	Equalization (Belden 1694A cable)		>380m (1640ft) @ 270Mbps >210m (650ft) @ 1.485Gbps >180m (490ft) @ 2.97Gbps >80m (260ft) @ 5.94Gbps >50m (190ft) @ 11.88Gbps
	Return Loss		>15dB to 1.485Gbps >10dB to 2.97Gbps >7dB to 5.94Gbps >4dB to 11.88Gbps
	Connector Type		HD-BNC
SDI Outputs[a] [b]	Number of Outputs	DRA-8902-10	10
		DRA-8902-16	16
	Impedance		75ohm
	Return Loss		>15dB to 1.485Gbps >10dB to 2.97Gbps >7dB to 5.94Gbps >4dB to 11.88Gbps
	Rise & Fall Times		MADI: 1.0-3.0nS, <0.5nS difference 270Mbps: 0.4-1.5nS, <0.5nS difference 1.485Gbps: <270ps, <100ps difference 2.97Gbps: <135ps, <50ps difference 5.94Gbps: <80ps, <30ps difference 11.88Gbps: <45ps, <18ps difference

Table 5.1 Technical Specifications

Category	Parameter		Specification
SDI Outputs	Jitter		MADI: <2.0UI (<4.0nS) 270Mbps: <0.2UI, jitter measured 10Hz-1kHz 1.485Gbps: <1.0UI jitter measured 10Hz-100kHz, <0.2UI above 100kHz 2.97Gbps: <1.0UI jitter measured 10Hz-100kHz, <0.3UI above 100kHz 5.94Gbps: <2.0UI jitter measured 10Hz-100kHz, <0.3UI above 100kHz, band limit @594MHz 11.88Gbps: <2.0UI jitter measured 10Hz-100kHz, <0.3UI above 100kHz, band limit @1188MHz
	Signal Level		800mV ±10%
	DC Offset		0V ±50mV (MADI is 400mV +/- 10%)
	Overshoot		<10%
	Connector Type		HD-BNC
Environment	Max. Ambient Temperature		40°C (104°F)
Power	Total Power Consumption	DRA-8902-10	5.6W
		DRA-8902-16	7.6W

a. All outputs are non-inverting. It is recommended to terminate unused outputs. You can also mute an output via the Mute Outputs options available in the Setup tab of DashBoard.

b. All outputs are non-inverting when using DVB-ASI and 270Mbps signals.

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.

Bootload Button

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

To reload the software on the card

1. Eject the card from the openGear frame.
2. Press and hold the **Bootload** button, while re-inserting the card into the frame.
3. Release the button.
   - The **PWR** LED will flash 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 restart with its last operational software load.
   - Contact Ross Technical Support for the latest software load for your card.

Warranty and Repair Policy

The DRA-8902 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 DRA-8902 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 DRA-8902 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 DRA-8902 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 DRA-8902, 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 DRA-8902. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

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

Contact Us

Contact our friendly and professional support representatives for the following:

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

Technical Support	Telephone:	+1 613 • 652 • 4886
	After Hours Emergency:	+1 613 • 349 • 0006
	Email:	techsupport@rossvideo.com
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