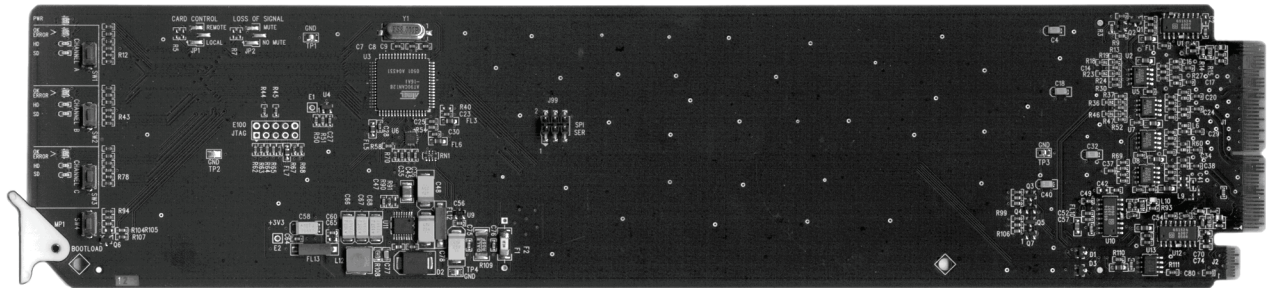


TEA-8207
Triple MD-SDI Equalizing Amplifier
User Manual



TEA-8207 • Triple MD-SDI Equalizing Amplifier User Manual

- Ross Part Number: **8207DR-004-06**
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Important Regulatory and Safety Notices

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

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

Symbol Meanings



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



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



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



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



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

Important Safety Instructions



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



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



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

EMC Notices

United States of America FCC Part 15

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



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

CANADA

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

Cet appareil numérique de la 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

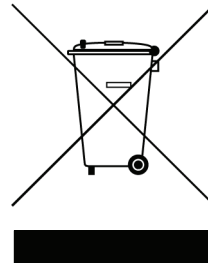
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All openGear products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

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Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagram
- Documentation Terms

A Word of Thanks

Congratulations on choosing an openGear **TEA-8207 Triple MD-SDI Equalizing Amplifier**. Your TEA-8207 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 TEA-8207 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 TEA-8207, 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 TEA-8207 is a three channel Multi-Definition SDI distribution amplifier, capable of equalizing all common serial digital signals. Support for both standard-definition and high-definition signals makes the TEA-8207 an extremely versatile SDI distribution amplifier.

Each channel of the TEA-8207 equalizes the incoming SDI signal, compensating for up to 300m of cable at 270Mbps and over 120m of cable at 1.485Gbps. One SDI channel provides 3 outputs, and the two other SDI channels provide 2 outputs each. Special attention has been taken to ensure the SDI outputs faithfully reproduce the incoming signals, with excellent jitter and return loss specifications.

LED indicators at the front of the card identify the presence of incoming video, simplifying system troubleshooting.

Features

The following features make the TEA-8207 the best solution for general SDI equalizing, reclocking, and distribution:

- Three independent channels, with 2, 2, and 3 outputs each, total of 7 outputs
- Equalizes all SDI signals from 143Mbps to 1.485Gbps
- Equalizes up to 300m of Belden 1694A cable at 270Mbps, or over 120m of cable at 1.485 Gbps
- LED indicators for signal presence on each channel
- Excellent input and output return loss exceeds SMPTE specifications
- Fits openGear DFR-8300 series frames
- 5 year transferable warranty

Functional Block Diagram

This section provides a functional block diagram that outlines the workflow of the TEA-8207.

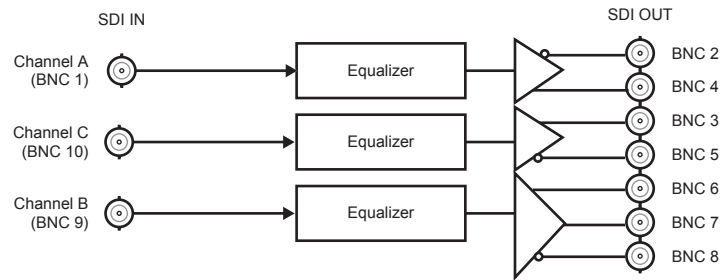


Figure 1.1 Simplified Block Diagram of TEA-8207 Functions

Documentation Terms

The following terms are used throughout this manual:

- “**Frame**” refers to the DFR-8300 series frame that houses the TEA-8207.
- All references to the **DFR-8300 series frame** also include the 10-slot frame versions (DFR-8310) and the 20-slot frame versions (DFR-8321 series).
- “**Operator**” and “**User**” both refer to the person who uses the TEA-8207.
- “**Board**” and “**Card**” all refer to the TEA-8207 itself, including all components and switches.
- “**System**” and “**Video system**” refers to the mix of interconnected production and terminal equipment in which the TEA-8207 operates.
- “**DashBoard**” refers to the DashBoard Control System™.
- “**Operating Tip**” and “**Note**” boxes are used throughout this manual to provide additional user information.

Installation

In This Chapter

This chapter provides instructions for installing the rear modules for the TEA-8207, installing the card into the frame, and cabling details.

The following topics are discussed:

- Before You Begin
- Installing the TEA-8207
- Cabling for the TEA-8207

Before You Begin

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

Static Discharge

Whenever handling the TEA-8207 and other related equipment, please observe all static discharge precautions as described in the following note:



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

Unpacking

Unpack each TEA-8207 you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Installing the TEA-8207

The TEA-8207 are compatible with the DFR-8300 series frames. The procedure for installing the rear module in your openGear frame is the same regardless of the frame, module, or card used.

Rear Modules for the TEA-8207

The rear module for the TEA-8207 depends on the openGear frame you are installing the card into.

- **DFR-8310 series frames** — When installing the TEA-8207 in a DFR-8310 series frame, the **8310AR-030** Rear Module (R1-8207) is required. The TEA-8207 is also compatible with the DFR-8310-BNC frames.
- **DFR-8321 series frames** — When installing the TEA-8207 in a DFR-8321 series frame, the **8320AR-030** Full Rear Module (R2-8207) is required.

Installing a Rear Module

If you are installing the TEA-8207 in a DFR-8310-C-BNC or DFR-8310-BNC frame, or if the rear module is already installed, skip this section.

Use the following procedure to install the rear module in a DFR-8300 series frame:

1. Refer to the ***DFR-8300 Series User Manual*** to ensure that the frame is properly installed according to instructions.
2. Locate the card frame slot on the rear of the frame.
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.

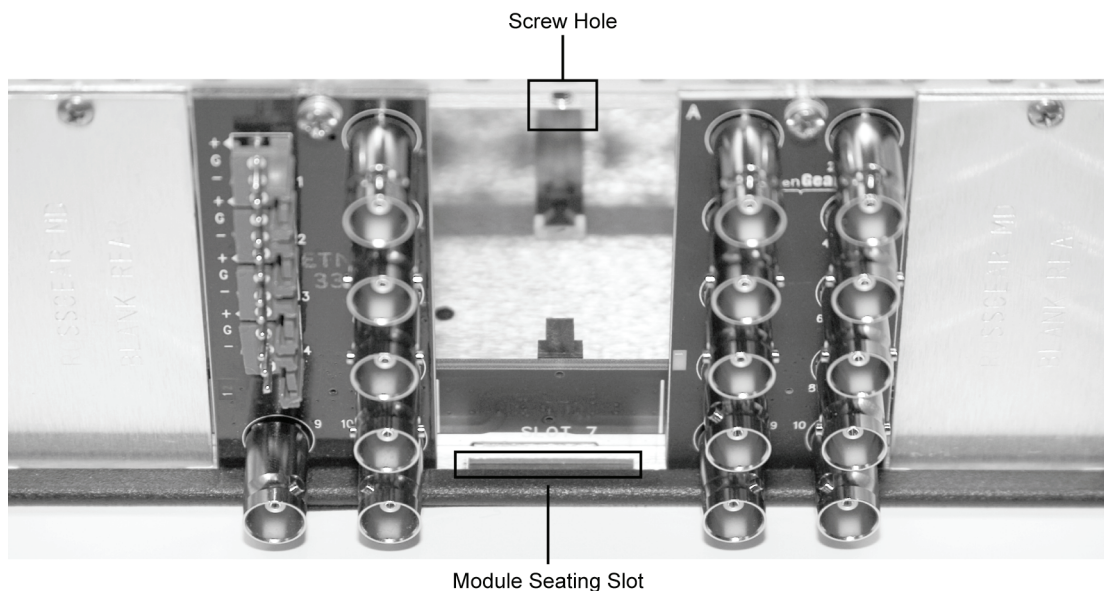


Figure 2.1 Rear Module Installation in a DFR-8310 Series Frame (TEA-8207 not shown)

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 frame 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.

This completes the procedure for installing the rear module in a DFR-8300 series frame.

Installing the TEA-8207

Use the following procedure to install the TEA-8207 in a DFR-8300 series frame:

1. Refer to the ***DFR-8300 Series User Manual*** to ensure that the frame is properly installed according to instructions.



Note — *Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using convectional cooling.*

2. After selecting the desired frame installation slot, hold the TEA-8207 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.
4. Affix the supplied rear module label to the BNC area on the rear module.

This completes the procedure for installing the TEA-8207 in a DFR-8300 series frame.

Cabling for the TEA-8207

This section provides instructions for connecting cables to the installed BNC rear modules on the DFR-8300 series frame backplane. The inputs are internally terminated in 75 ohms. It is not necessary to terminate unused outputs.

Connections for the DFR-8310 Series Frames

In the DFR-8310 series frame, the TEA-8207 each occupy one slot and provide seven outputs and three SDI inputs. Connect the input and output cables according to **Figure 2.2**.

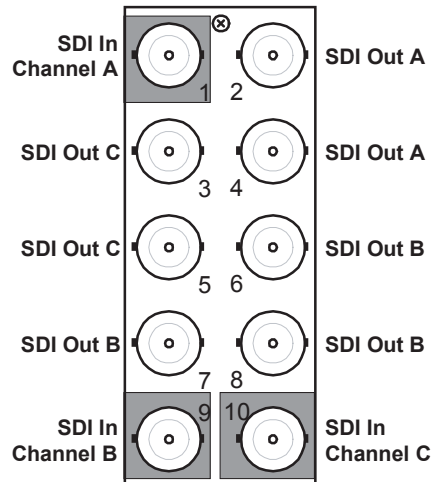


Figure 2.2 Cable Connections for the TEA-8207

Connectors for the DFR-8321 Series Frames

In the DFR-8321 series frame, the TEA-8207 each occupy two slots and provide seven outputs and three SDI inputs. Connect the input and output cables according to **Figure 2.2**.

User Controls

In This Chapter

This chapter provides a general overview of the user controls available on the TEA-8207.

The following topics are discussed:

- Card Overview
- Control and Monitoring

Card Overview

This section describes the card-edge controls on the TEA-8207. Refer to **Figure 3.1** for locations.

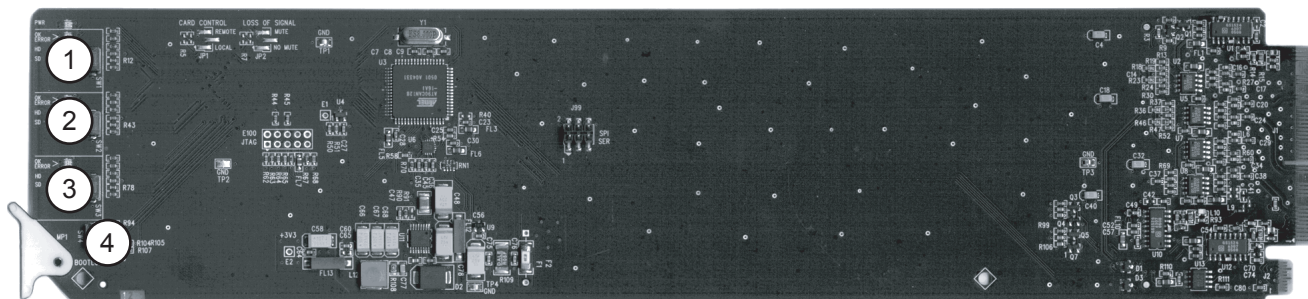


Figure 3.1 TEA-8207 Card-edge Controls

- | | |
|------------------------------------|------------------------------------|
| 1) Channel A Rate Selection Button | 3) Channel C Rate Selection Button |
| 2) Channel B Rate Selection Button | 4) Bootload Button |

1. Channel A Rate Selection Button

Channel A has a rate selection button and corresponding SD and HD LEDs. Use the rate selection button and LEDs to set the input signal rate type that Channel A will process. Pressing the button cycles between the HD and SD options. You can choose between the following signal rate types:

- **HD** — Select this option when using 1.485Gbps rate.
- **SD** — Select this option when using 143Mbps, 177Mbps, 270Mbps, 360Mbps, and 540Mbps rates.

2. Channel B Rate Selection Button

Channel B has a rate selection button and corresponding SD and HD LEDs. Use the rate selection button and LEDs to set the input signal rate type that Channel B will process. Pressing the button cycles between the HD and SD options. You can choose between the following signal rate types:

- **HD** — Select this option when using 1.485Gbps rate.
- **SD** — Select this option when using 143Mbps, 177Mbps, 270Mbps, 360Mbps, and 540Mbps rates.

3. Channel C Rate Selection Button

Channel C has a rate selection button and corresponding SD and HD LEDs. Use the rate selection button and LEDs to set the input signal rate type that Channel C will process. Pressing the button cycles between the HD and SD options. You can choose between the following signal rate types:

- **HD** — Select this option when using 1.485Gbps rate.
- **SD** — Select this option when using 143Mbps, 177Mbps, 270Mbps, 360Mbps, and 540Mbps rates.

4. Bootload Button

In the unlikely event of a complete card failure, you may be instructed by a Ross Technical Support specialist to perform a software reload on the card. Refer to the section “**Bootload Button**” on page 6-2 for details.

Control and Monitoring

The TEA-8207 is a three channel distribution amplifier and has components installed into **CHANNEL A**, **B**, and **C** sections of the card. This section describes the TEA-8207 LEDs and Channel Rate Selection buttons.

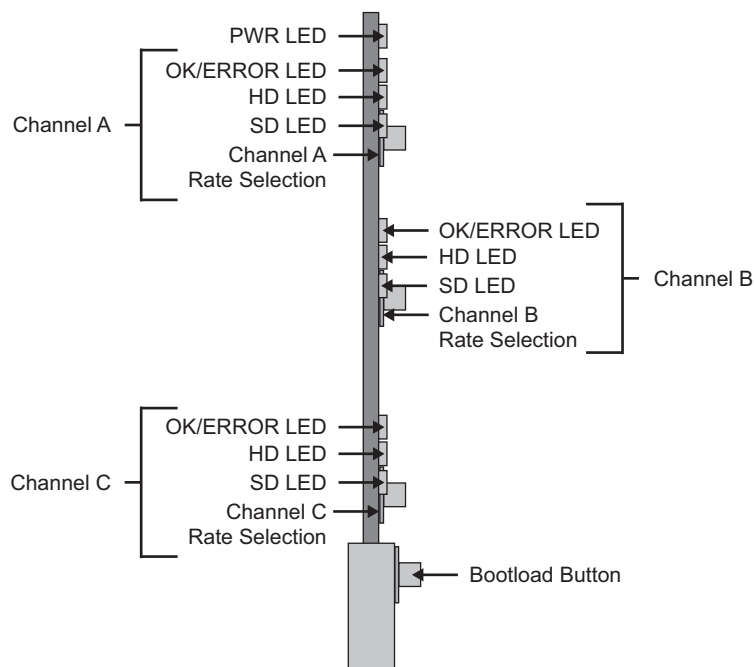


Figure 3.2 LED and Rate Selection Switch Locations

Status LEDs on the TEA-8207

The front edge of the TEA-8207 has LED indicators for the power, video input status, and communication activity. Basic LED displays and descriptions are provided in **Table 3.1**.

Table 3.1 LEDs on the TEA-8207

LED	Color	Display and Description
PWR	Green	When lit green, this LED indicates that the card is functioning normal and that no anomalies have been detected. The following conditions must be satisfied: • a valid input signal is present • a valid reference signal is present when a reference is required, and that the reference standard matches the input standard.
	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.

Table 3.1 LEDs on the TEA-8207

LED	Color	Display and Description
PWR	Red	When lit red or flashing red, this LED indicates the card is not operational. Re-seat card in frame, check the rear module type and connections, or call Ross Video Technical Support.
	Off	When off, this LED indicates there is no power to the card.
OK/ERROR	Green	When lit, this LED indicates that a valid SDI input signal is present.
	Red	When red, this LED indicates that the SDI input signal is missing or invalid.
HD		When lit, this LED indicates that the reclocker is set to a fixed rate of 1.5Gbps, or is configured in Auto mode and is locked to a 1.5Gbps signal.
SD		When lit, this LED indicates that the reclocker is set to a fixed rate of 270Mbps, or is configured in Auto mode and is locked to a 270Mbps signal.

Factory Default Values

Any channel can be set back to factory settings, where the data rate is set to **HD** and the alarm is enabled on loss of input.

Use the following procedure to reset a channel to factory default values:

1. Press and hold the **Bootload** button on the card.
2. Press the Rate Selection button for the selected channel. The **Signal Status LED** flashes green and red for approximately 2 seconds to confirm the reset values.

This completes the procedure for resetting a channel to factory default values.

Menus

In This Chapter

This section provides a detailed explanation on using remote control functions with your TEA-8207.

The following topics are discussed:

- SNMP Monitoring and Control
- DashBoard Control System Software

SNMP Monitoring and Control

The Network Controller card in the DFR-8300 series frame provides optional support for remote monitoring and control of your frame and TEA-8207 using SNMP (Simple Network Management Protocol), which is compatible with many third-party monitoring and control tools.

Refer to your TEA-8207 MIB (Management Information Base) file for a breakdown of SNMP controls on this card.

Refer to your ***DFR-8310 User Manual*** and ***MFC-8300 Series User Manual*** for additional information on SNMP Monitoring and Control.

DashBoard Control System Software

The DashBoard Control System™ enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the DFR-8300 series frame through the Network Controller Card. This section briefly summarizes the menus, items, and parameters available from DashBoard for the TEA-8207. Default parameters are noted with an asterisk (*).

Status Menus

Table 4.1 summarizes the **Status** tab fields displayed in DashBoard for the TEA-8207.

Table 4.1 Status Menu Items

Menu Title	Item	Parameters	Description
Product (Read-only)	Product	TEA-8207	
	Supplier	Ross Video Ltd.	
	Board Rev	##	
	Serial Number	#####	Indicates the card serial number
	Software Rev	##.##	Indicates the software version
Hardware (Read-only)	Voltage (mV)	#	Supply Voltage
	Current (mA)	#	Current consumption of card
	Rear Module		Indicates the installed rear module
	CPU Headroom	#	Processing power available
	RAM Available	#/###	On-board processing memory available
	EE Bank	#	Storage count
Signal (Read-only)	Signal Status	OK	All channels are passing a valid signal
		No Input #	Indicates the channel that has no input signal
	Channel A Status	No Signal	No signal present
		Signal Present	An input signal is present
	Channel B Status	Same as above	
	Channel C Status	Same as above	

Setup Menus

Table 4.2 summarizes the **Setup** menu items available in DashBoard for the TEA-8207.

Table 4.2 Setup Menu Items

Menu Title	Item	Parameters	Description
Setup	Channel A Rate ^a	High Def*	Sets the rate of Channel A to HD (1.485Gbps). Select this option if a mix of SD and HD signals are passed through the channel.
		Std Def	Sets the rate of Channel A to SD. Select this option when using 143Mbps, 177Mbps, 270Mbps, 360Mbps, or 540Mbps signals.
	Channel B Rate ^a	Same as above	
	Channel C Rate ^a	Same as above	
	Edit Permission	Unlocked*	All configurable options are editable
		Locked	All configurable menu options, except this one, are locked and are read-only
	Factory Defaults	Reset	Resets all menu options to the factory default values

- a. The **Channel A, B, or C Rates** in the **Setup** menu affect the **Slew Rate** of the output driver. Ensure that the correct standard for your input is selected.

Alarms Menu

Table 4.3 summarizes the **Alarms** tab fields displayed in DashBoard for the TEA-8207.

Table 4.3 Alarms Tab Items

Menu Title	Item	Parameters	Description
Alarms	Loss of Input A	Ignore	The Signal Status field ignores the status for the specified input
		Alarm*	The Signal Status field displays the status for the specified input
	Loss of Input B	Same as above	
	Loss of Input C	Same as above	

Specifications

In This Chapter

This chapter provides technical specification details on the TEA-8207. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section includes the technical specifications for the TEA-8207.

Table 5.1 TEA-8207 Technical Specifications

Category	Parameter	Specification
SDI Input	Number of Inputs	3
	Data Rates Supported	
	Impedance	75Ω terminating
	Equalization	<300m of Belden 1694A cable @ 270Mbps <120m of Belden 1694A cable @ 1.485Gbps
	Return Loss	>15dB to 1.485GHz
SDI Outputs	Number of Outputs	7
	Impedance	75Ω
	Return Loss	>17dB to 1.485GHz
	Signal Level	800mV ±10%
	DC Offset	0V ±50mV
	Rise and Fall Time (20-80%)	700ps typical (270Mbps) 120ps typical (1.485Gbps)
	Overshoot	<1%
Power	Total Power Consumption	2W

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 TEA-8207, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the “**Contact Us**” section.

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

Bootload Button

In the unlikely event of a complete card failure, you may be instructed by a Ross Technical Support specialist to perform a complete software reload on the TEA-8207. To perform this task, perform the following steps:

1. Eject the card.
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 it's last operational software load.

Software loads can be sent to the TEA-8207 using the MFC-8310-N Frame Controller with Networking, or via connection to the openBUS on the rear of the frame.

Warranty and Repair Policy

The TEA-8207 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 TEA-8207 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 TEA-8207 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 TEA-8207 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 TEA-8207 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 TEA-8207, 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 TEA-8207. 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

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

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