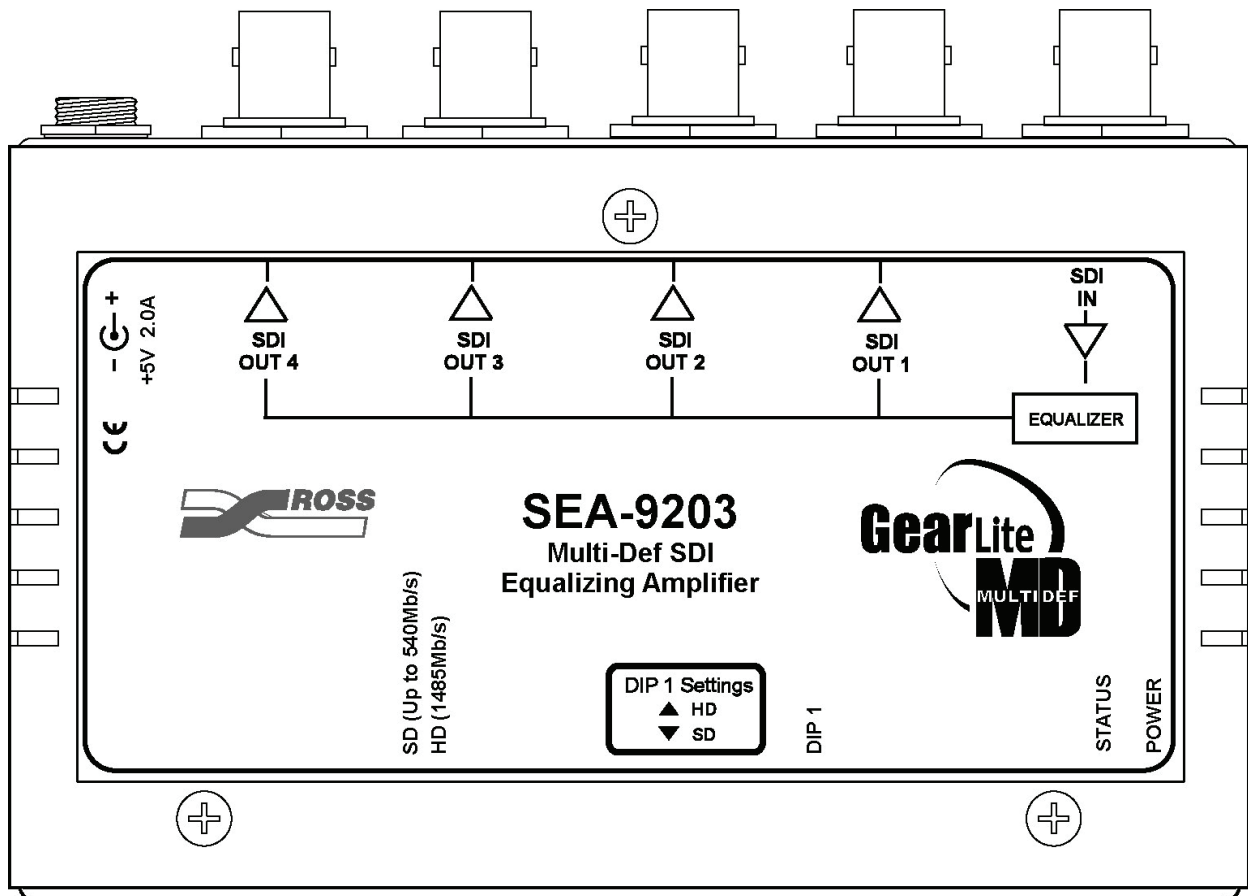




SEA-9203

Multi-Definition SDI Equalizing Amplifier

User Manual



SEA-9203 • Multi-Definition SDI Equalizing Amplifier User Manual

- Ross Part Number: **9203DR-004**
- Document Issue: **02D**
- Printing Date: January 28, 2009. Printed in Canada.

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

Copyright

© 2009 Ross Video Limited. All rights reserved.

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

Notice

The material in this manual is furnished for informational purposes only. It is subject to change without notice and should not be construed as a commitment by Ross Video Limited. Ross Video Limited assumes no responsibility or liability for errors or inaccuracies that may appear in this manual.

Trademarks

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

Important Regulatory and Safety Notices to Service Personnel

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

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

Symbol Meanings



Warning

This 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.



Notice

This 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
Suscep-
tibility**

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



Warning

Read these instructions.

Keep these instructions.

Heed all warning.

Follow all instructions.

The safe operation of this product requires that a protective earth connection be provided. A grounding conductor in the equipment's supply cord provides this protective earth. To reduce the risk of electrical shock to the operator and service personnel, this ground conductor must be connected to an earthed ground.

Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit in to your outlet, consult an electrician for replacement of the obsolete outlet. Protect the power cord from being walked on or pinching particularly at plugs, convenience receptacles, and point where they exit from the apparatus.

Use only power cords specified for this product and certified for the country of use. Refer to the Product Power Cord Requirement Section that follows.

Indoor Use: “WARNING – TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE”

Do not block ventilation openings. Install in accordance with manufacturer’s instructions.

Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

Do not use this apparatus near water.

Only use attachments/accessories specified by the manufacturer.

Unplug this apparatus during lightning storms or when unused for long periods of time.

Clean only with a dry cloth.

To avoid electrical shock, disconnect the A/C power cord before any servicing.

Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug damage, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

EMC Notices

US FCC Part 15

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



Changes or modifications to this equipment not expressly approved by Ross Video Ltd. could void the user’s authority to operate this equipment.

CANADA

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

Cet appareil numérique de classe “A” est conforme à la norme NMB-003 du Canada.

EUROPE

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

INTERNATIONAL

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



Notice

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

Maintenance/User Serviceable Parts

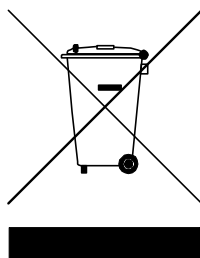
Routine maintenance to this GearLite product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All RossGear GearLite products are covered by a generous 3-year warranty and will be repaired without charge for materials or labor within this period. See the “Warranty and Repair Policy” section in this manual for details.

Environmental Information

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

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

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performances of our products.



Contents

Introduction	1-1
In This Chapter.....	1-1
Overview.....	1-1
Functional Block Diagram.....	1-2
Features.....	1-2
Installation	2-1
In This Chapter.....	2-1
Static Discharge.....	2-1
Unpacking.....	2-1
Mounting and Installation.....	2-2
Velcro Strips.....	2-2
Flat Metal Plate.....	2-4
Non-Slip Pads.....	2-4
Optional Mounting Accessories.....	2-5
Setup and Operation	3-1
In This Chapter.....	3-1
Cable Connections.....	3-1
User Controls.....	3-3
Rate Selection DIP Switch.....	3-3
LEDs.....	3-4
Specifications	4-1
In This Chapter.....	4-1
Technical Specifications.....	4-2
Service Information	5-1
In This Chapter.....	5-1
Warranty and Repair Policy.....	5-1
Ordering Information	6-1
In This Chapter.....	6-1
SEA-9203 and Related Products.....	6-1

Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagrams
- Features

Overview

The SEA-9203 Multi-Definition SDI Equalizing Amplifier is part of the GearLite 9000 series of self-contained, small brick-format modules. The SEA-9203 is designed for use in both SD and HD systems where signals of more than one digital standard are distributed. The amplifier automatically equalizes up to 305m (1000 ft.) of Belden 8281 input cable at 270Mb/s or up to 100m (325 ft.) of Belden 1694A input cable at 1485Mb/s. The SEA-9203 operates on all serial digital standards, from 143Mb/s up to and including 1485Mb/s. Special measures have been taken to ensure excellent return loss at both input and output. This ensures error-free performance with short cables.

The front panel of the SEA-9203 chassis provides visual performance indicators and a user accessible DIP switch to select either SD or HD signals.

The SEA-9203 is delivered with a universal power adaptor and line cord suitable for the country of use. Various mounting options are included that allow a wide range of installation choices. The SEA-9203 provides a broadcast-quality SDI distribution solution in a small, stand-alone package.

Functional Block Diagram

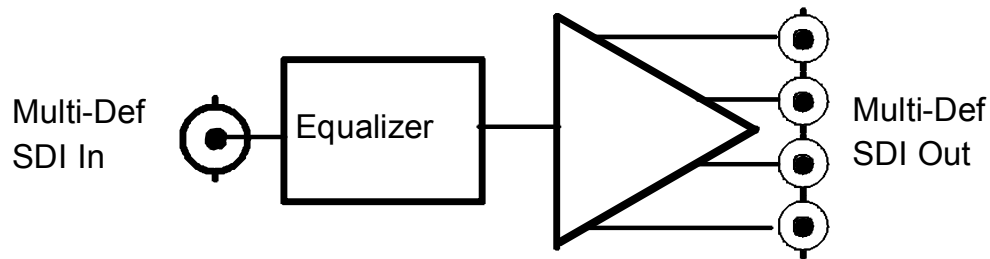


Figure 1. Simplified Block Diagram of SEA-9203 Functions

Features

The SEA-9203 Multi-Definition SDI Equalizing Amplifier has the following features:

- Automatically supports all common data rates from 143Mb/s to 1485Mb/s
- Automatic input cable equalization up to 305m (1000 ft.) of Belden 8281 cable at 270Mb/s or up to 100m (325 ft.) of Belden 1694A cable at 1485Mb/s
- Excellent I/O specifications
- Terminating input 75 Ohms
- Visual indicator LEDs for power, status, and signal setting
- Small brick form factor
- 5V universal adapter with locking DC connector
- 3-year warranty

Note

In this manual, the term SDI (Serial Digital Interface) is used throughout. SDI refers to both Standard Definition (up to 540Mb/s) and High Definition (1485Mb/s) signals.

Installation

In This Chapter

This chapter contains the following sections:

- Static Discharge
- Unpacking
- Mounting and Installation
- Velcro Strips
- Flat Metal Plate
- Non-Slip Pads
- Optional Mounting Accessories

Static Discharge

Whenever handling the SEA-9203 Multi-Definition SDI Equalizing Amplifier and other related equipment, please observe all static discharge precautions as described in the following note:



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

Unpacking

Unpack each SEA-9203 module 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.

Mounting and Installation

The GearLite 9000 series self-contained modules can be mounted in any convenient location. However, to ensure long life for these products, observe the following precautions and operating requirements:

- Maintain an ambient temperature of 20° to 40°C.
- Allow for air circulation around the chassis for convectional cooling.

Many different mounting positions are possible with the included mounting hardware. Some installation options are permanent and require careful consideration of the final positioning before installation. Please note that in some mounting locations, the power adaptor must be affixed in a similar manner as the chassis.

Other possible options include the use of adhesive magnetic sheets (not included) affixed to the chassis and the power adaptor, for removable mounting on metal cabinets etc.

Cable ties may be necessary in some applications to relieve strain on the mounting hardware and the BNC connectors.

Velcro Strips

The included Velcro strips allow the GearLite chassis and power supply to be affixed to a permanent location during use and easily removed for adjustments. Carefully consider the installation location before proceeding; the adhesive is very aggressive and is not easily removed. The adhesive will cure fully in 24 hours.

Installing Velcro Strips

1. Remove the protective backing film from the adhesive on the bottom of the two mating Velcro strip sets.
2. Adhere the strip sets to the bottom side of the module as shown in Figure 2.

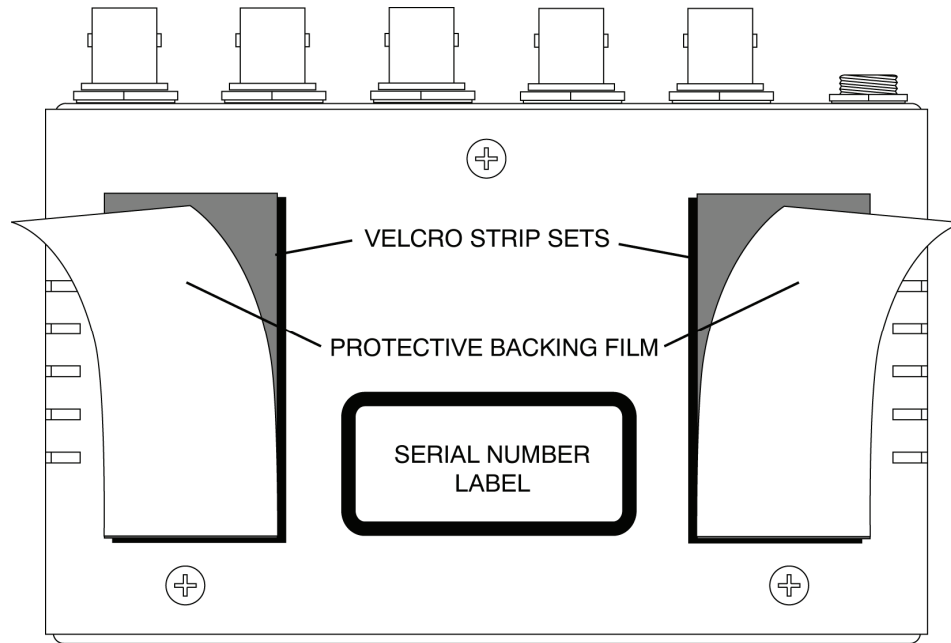


Figure 2. Velcro Installation Option

3. To apply the adhesive Velcro to the mounting location:
 - remove the protective backing film from the top of the adhesive strips
 - press the module into position on the mounting surface
4. To mount the power adaptor, apply the remaining mating Velcro strip set, repeating the previous steps.

Flat Metal Plate

Use the flat metal plate for permanent mounting to a rack, a desk, or any other location where bolts or screws can be applied. Be sure to position the module to allow for operator adjustments, if required.

Installing the Flat Metal Plate

1. Affix the flat metal plate to the bottom of the chassis using the chassis screws as shown in the figure below:

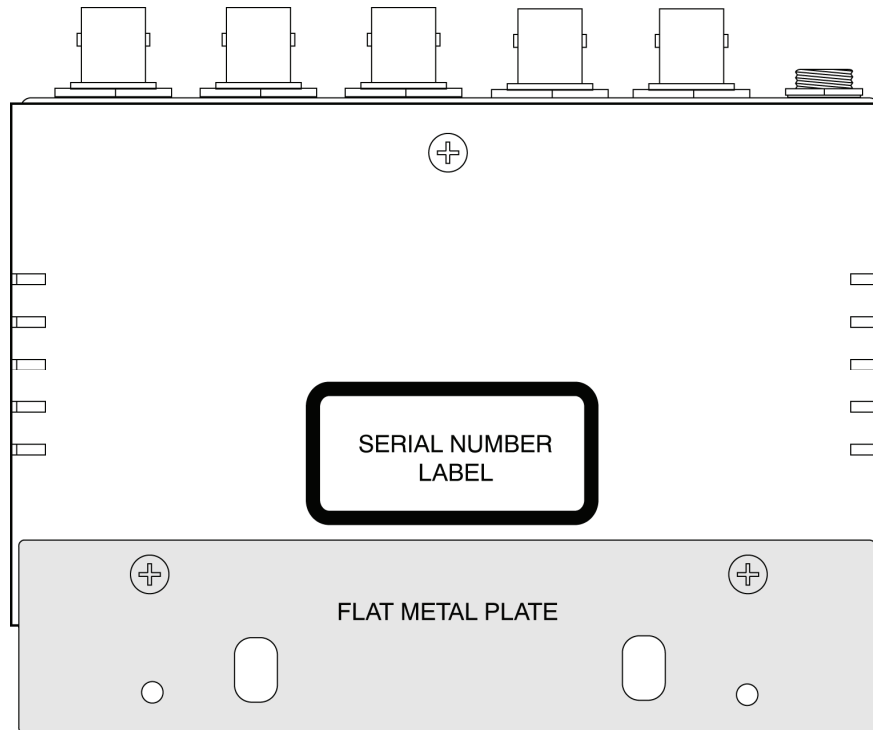


Figure 3. Flat Metal Plate Installation Option

2. Affix the metal plate by the two extended holes to the desired location with customer supplied bolts or screws according to the installation requirements.

Non-Slip Pads

Four non-slip adhesive pads have been supplied for desktop placements. Simply remove the protective backing film from the adhesive and affix one non-slip pad to each of the four corners on the bottom of the chassis. Two pads can be used at the rear of the module to help support it when mounted in the GRF-9000 GearLite Rack Frame (see Optional Mounting Accessories).

Optional Mounting Accessories

Ross Video is committed to providing practical solutions for the needs of your high-quality broadcast facility. The following products may be ordered separately to expand your installation options. Refer to Chapter 6, “**Ordering Information**” for details.

BPM-9000

The BPM-9000 Angle Mounting Bracket enables a single GearLite module to be installed in positions not possible with the flat metal plate. The installer must provide screws or bolts for installing in the desired location. The bracket has a 90° angle.

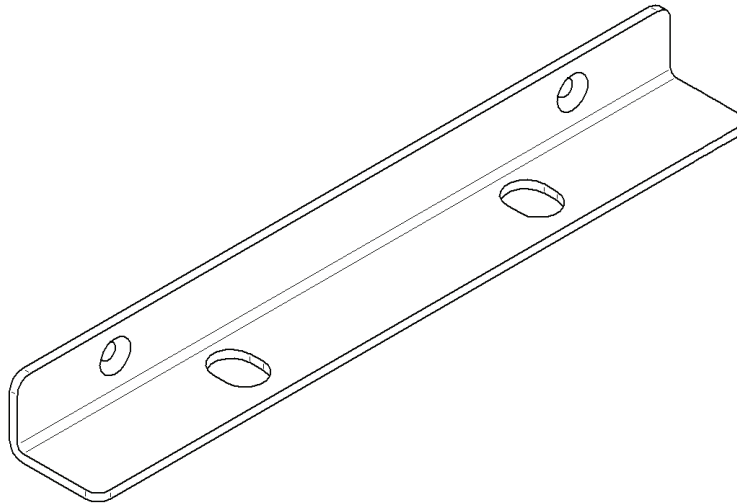


Figure 4. BMP-9000 90° Mounting Bracket

GRF-9000

The GRF-9000 GearLite Rack Frame is a rack mounting frame system for GearLite modules. The mounting system provides convenient organization for up to nine GearLite modules in only a 2RU space.

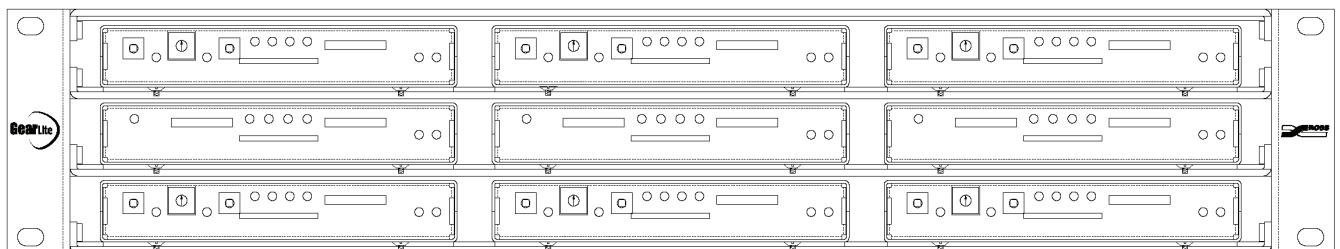


Figure 5. GRF-9000 with Nine GearLite Modules Installed

The flat metal plate and small plastic label (see Figure 6) included with every GearLite module are used to mount a module into the GRF-9000. Complete instructions are included in the GRF-9000 User Manual.

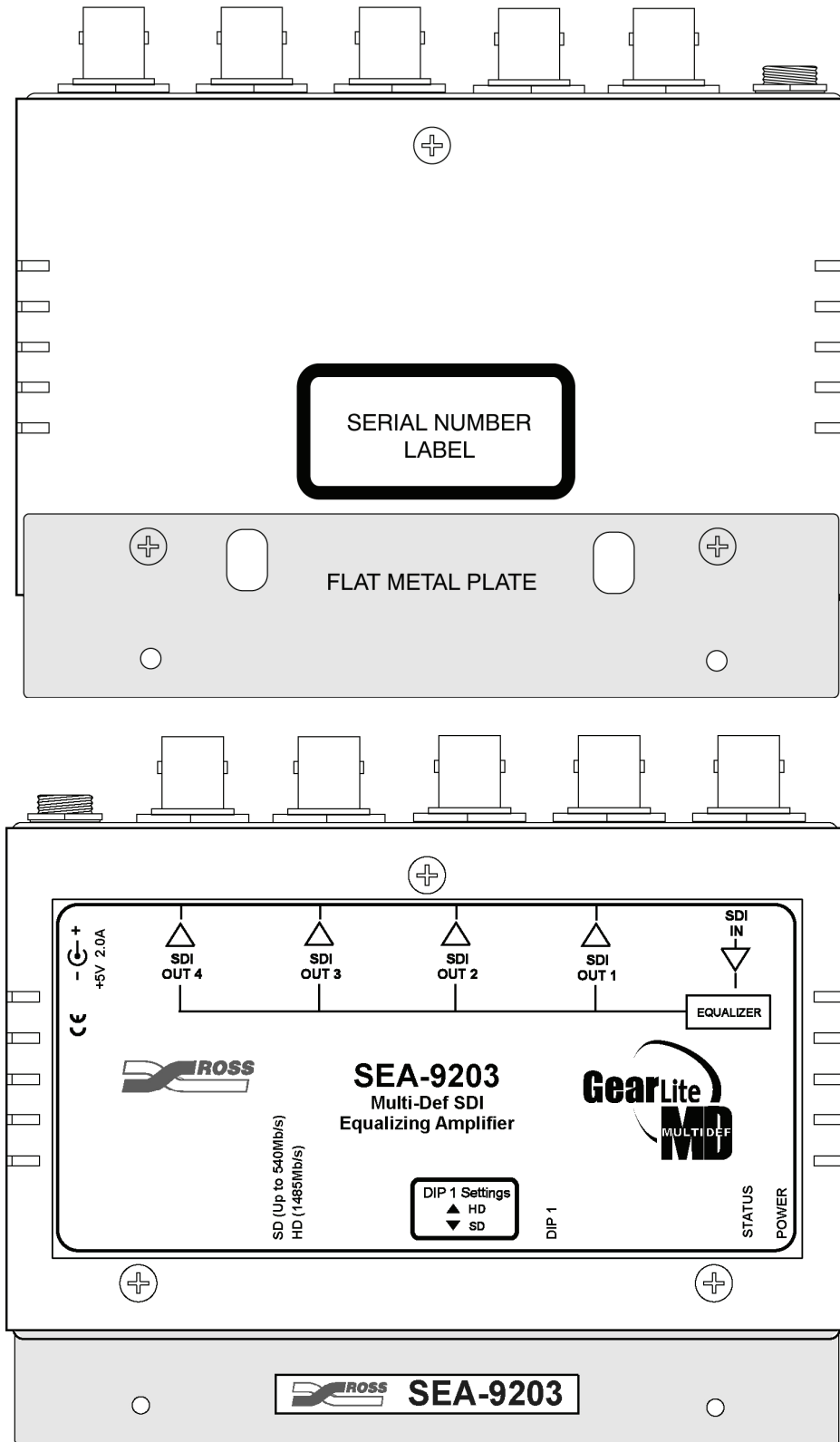


Figure 6. Flat Metal Plate and Label Positions for GRF-9000 Mounting

Setup and Operation

In This Chapter

This section provides details of all operating modes and features.

The following topics are discussed:

- Cable Connections
- User Controls
- Rate Selection DIP Switches
- LED

Cable Connections

Connect the SDI input and output cables to the SEA-9203 according to the designations indicated on the chassis label. See Figures 7 and 8. The input is internally terminated into 75 Ohms. It is not necessary to terminate unused outputs.

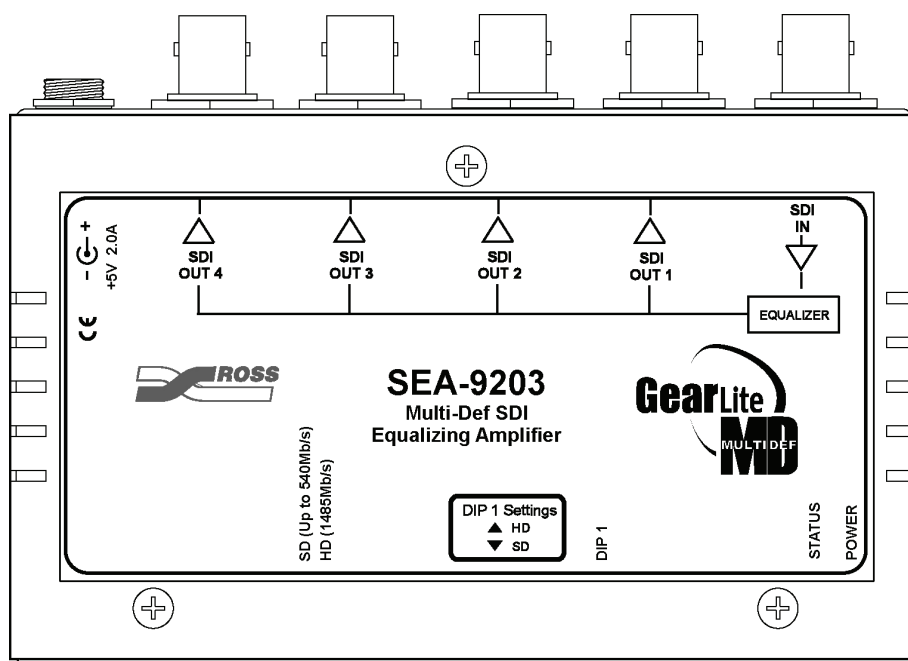


Figure 7. SEA-9203 Cable Connections Indicator Label

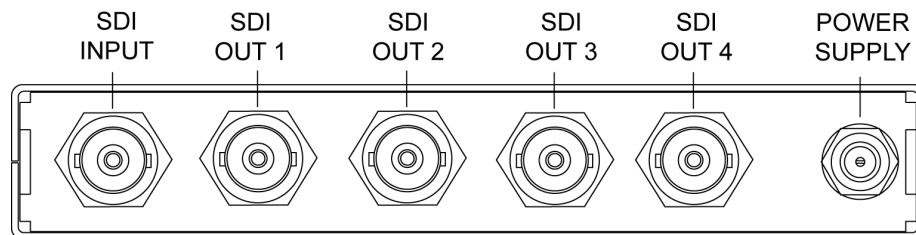


Figure 8. SEA-9203 Cable Connections

Output Polarity

SDI Out 1 and 3 are inverting.

SDI Out 2 and 4 are non-inverting.

Power Adaptor

Connect the PS-9000 power adaptor to the power supply connector. The PS-9000 provides up to 2A of regulated +5V DC (5%). The DC power cord has a locking connector that securely fastens into the power supply DC jack on the converter. The converter has a standard miniature power jack (center pin positive). See Figure 8.

If using an adaptor other than the PS-9000, ensure that:

- the polarity is correct
- the voltage is +5V DC regulated to 5%
- sufficient current for the SEA-9203 is supplied



Caution

Use of improper adaptors may damage the SEA-9203 and will void the warranty.

Installations outside of North America using line voltages of 200 – 240 Volts require a plug, certified for the country of use, to be installed on the supplied line cord.

See the Important Regulatory and Safety Notices section at the beginning of this manual for details.

User Controls

The SEA-9203 has the following front edge user controls:

- DIP Switches
- LEDs

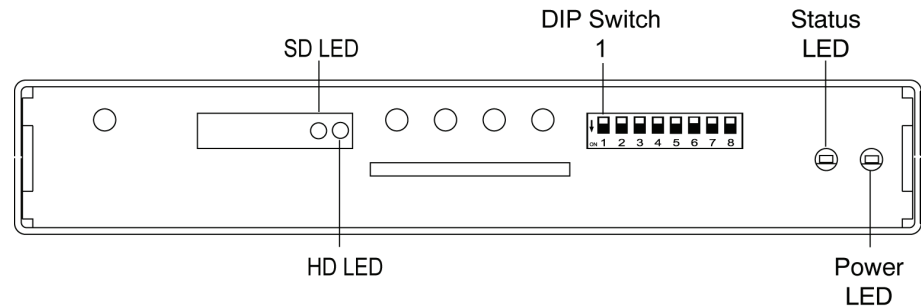


Figure 9. User Controls

Rate Selection DIP Switch

The front edge of the amplifier has a DIP switch which sets the SEA-9203 to pass a SMPTE-compliant HD or SD signal.

- Up = HD
- Down = SD

Multi-Rate Operation

If the SEA-9203 is used in an environment where both SD and HD signals are in use, set the DIP switch to Up. SD signals will be equalized and distributed cleanly, although all SMPTE specifications may not be met.

Note

DIP Switches 2-8 have no function.

LEDs

The front edge of the amplifier has LEDs that indicate the SEA-9203's operating status and the type of signal selected. The LED functions are described in the following table:

Table 1. LED Descriptions

LED	Display	Description
HD	Yellow	High Definition signal selected.
SD	Yellow	Standard Definition signal selected.
Status	Green	Input signal Ok.
	Red	Input signal carrier could not be detected
Power	Green	The SEA-9203 has power.

Specifications

In This Chapter

This chapter contains the Technical Specifications table.

Technical Specifications

Table 2. SEA-9203 - Technical Specifications

Category	Parameter	Specification
Serial Digital Video Input	Number of Inputs	1
	Data Rates SMPTE 259M	143Mb/s 177Mb/s 270Mb/s 360Mb/s
	Data Rates SMPTE 344M	540Mb/s
	Data Rates SMPTE 292M	1483.5Mb/s 1485Mb/s
	Input Impedance	75Ω terminating
	Return Loss	>20dB to 360MHz (SD) >15dB to 1485MHz (HD)
	Equalization	305m (1000ft) Belden 1694A (SD) 100m (325ft) Belden 1694A (HD)
Serial Digital Video Output	Number of Outputs	4
	Output Impedance	75Ω
	Output Return Loss	>22dB to 360MHz (SD) >16dB to 1485MHz (HD)
	Signal Level	800mV ± 10%
	DC Offset	0V ± 50mV
	Rise & Fall Time	700ps typical (SD) 120ps typical (HD)
	Overshoot	<8% typical
Power	Power Consumption	<1.0W @ 270Mb/s (191mA)
	Power Requirements	5V DC (5% regulation)
Other	Warranty	3-year transferable

Specifications are subject to change without notification.

Service Information

In This Chapter

This chapter contains Warranty and Repair Policy information.

Warranty and Repair Policy

The RossGear SEA-9203 is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of **THREE (3)** years from the date of delivery to the customer. In the event that your RossGear SEA-9203 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 RossGear SEA-9203 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 **THREE (3)** 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 RossGear SEA-9203 Multi-Definition SDI Equalizing Amplifier User Manual of our Digital Products line provides all pertinent information for the safe installation and operation of your RossGear Product. Ross Video policy dictates that all repairs to the RossGear SEA-9203 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 RossGear SEA-9203, 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 RossGear SEA-9203. If required, a temporary replacement module will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

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

Ordering Information

In This Chapter

This chapter contains ordering information for the SEA-9203 and related products.

SEA-9203 and Related Products

Standard Equipment

- **SEA-9203**, Multi-Definition SDI Equalizing Amplifier, including:
 - one User Manual
 - an installation kit with various mounting hardware
 - one **PS-9000** 5V Universal Power Adaptor and line cord (pre-packaged for the country of use)

Optional Equipment

- **9203DR-004**, additional SEA-9203 User Manual
- **PS-9000** additional 5V Universal Power Adaptor and line cord (pre-packaged for the country of use)
- **BPM-9000**, 90° Angle Mounting Bracket
(90° angle metal mounting bracket for rack and desk installation)
- **GRF-9000**, GearLite Rack Frame (Front)
(Front of rack frame for mounting up to nine GearLite modules in 2RU space)

Your **SEA-9203 Multi-Definition SDI Equalizing Amplifier** is part of the GearLite line of the RossGEAR family of products. Ross Video Limited offers a full line of RossGEAR digital terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, amplifiers, keyers, switchers, as well as analog audio and video products.

Notes

Notes

Contact Us

Contact our friendly and professional support representatives for the following:

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

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

Visit Us

Please visit us at our website for:

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

www.rossvideo.com
