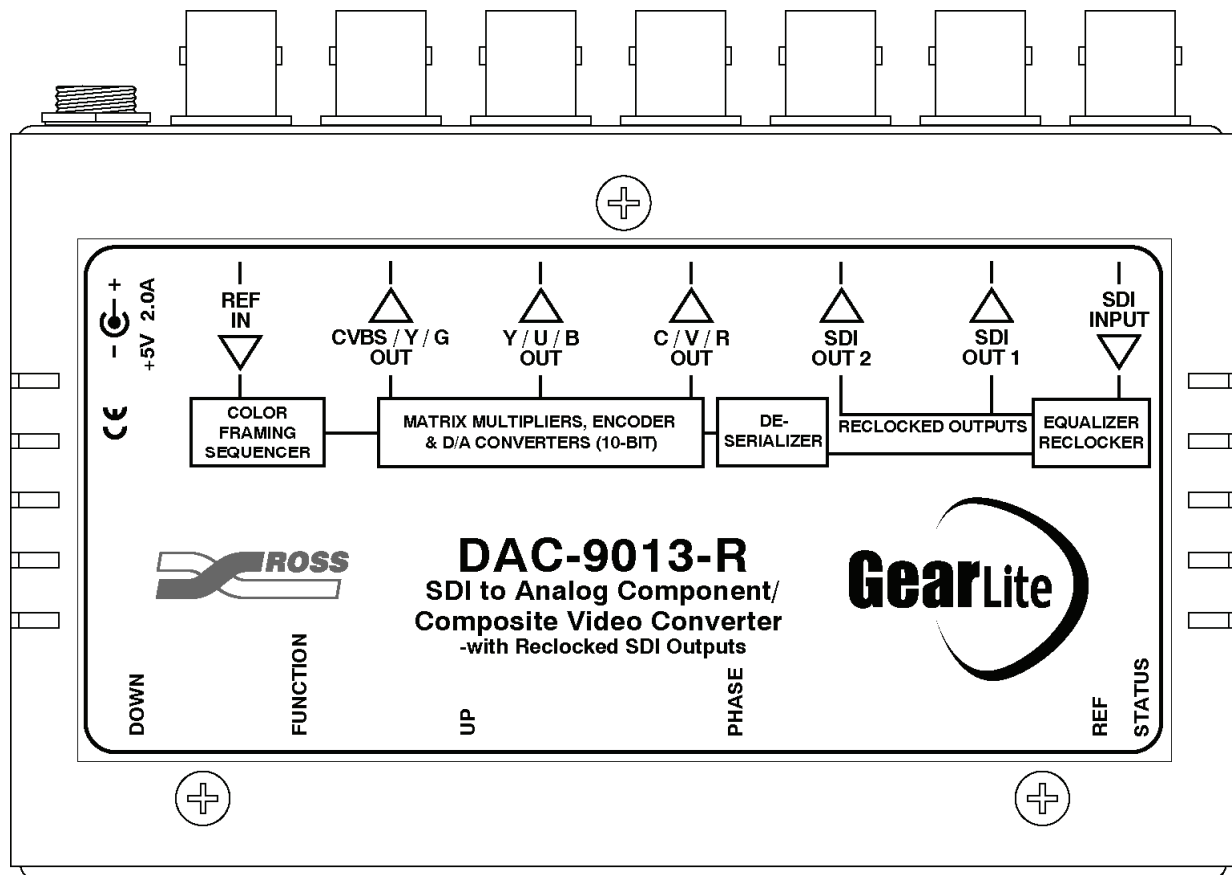




DAC-9013-R

SDI to Analog Composite/Component Video Converter with Reclocked Outputs User Manual



DAC-9013-R • SDI to Analog Composite/Component Video Converter with Reclocked Outputs User Manual

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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 warnings.

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.



Notice

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

CANADA

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

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

EUROPE

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

INTERNATIONAL

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



Notice

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

Maintenance/User Serviceable Parts

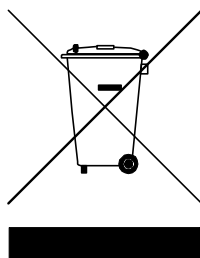
Routine maintenance to this GearLite product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All RossGear GearLite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



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Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagrams
- Features

Overview

The DAC-9013-R SDI to Analog Composite/Component Video Converter with Reclocked SDI Outputs is a high quality signal conversion solution for SDI signals and part of a growing family of GearLite self-contained, small brick-format modules.

The DAC-9013-R addresses program stream imaging requirements by converting 10-bit SDI video to analog composite video (CVBS) or analog component video (RGB or YUV). Y/C outputs are also supported. The DAC-9013-R has a full 10-bit data path, and a reference input for color framing (NTSC and PAL B/G only).

The front panel of the DAC-9013-R chassis provides an Input Status LED and a Reference LED for visual reference. In addition, user-selectable settings are available for proc amp controls.

The GearLite DAC-9013-R provides conversion of 525 and 625 SDI signals (SMPTE 259M-C). NTSC, PAL, and PAL-N standards are supported. Component levels can be set to Betacam™, MII, or SMPTE standards. The DAC-9013-R also has two reclocked SDI outputs. Special measures have been taken to ensure excellent return loss at both input and output.

The DAC-9013-R includes 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 DAC-9013-R provides a flexible high quality SDI conversion solution in a small, stand-alone package.

Functional Block Diagram

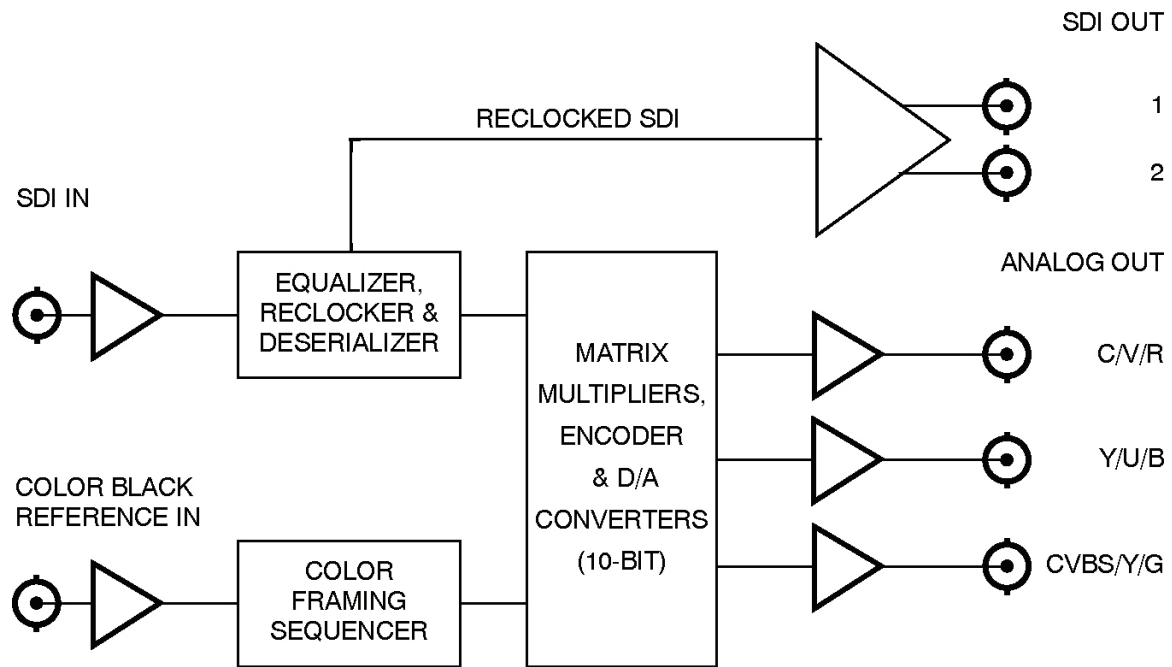


Figure 1. Simplified Block Diagram of DAC-9013-R Functions

Features

The DAC-9013-R SDI to Analog Composite/Component Video Converter with Reclocked Outputs has the following features:

- NTSC, PAL, PAL-N operation
- 10-bit DAC
- 10-bit data processing
- 2 reclocked SDI outputs
- YUV or RGB or (CVBS + YC)
- User adjustable Proc Amp
- Color framing of analog composite output signal
- Color bar test signal with valid SDI input
- Normal or narrow Vertical Interval Blanking on composite output
- 4x oversampling (54 MHz)
- 5V universal adapter with locking DC connector
- Separate status and ref LEDs
- Excellent I/O specifications
- 3-year warranty

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 DAC-9013-R SDI to Analog Composite/Component Video Converter with Reclocked Outputs 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 DAC-9013-R 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 module 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.

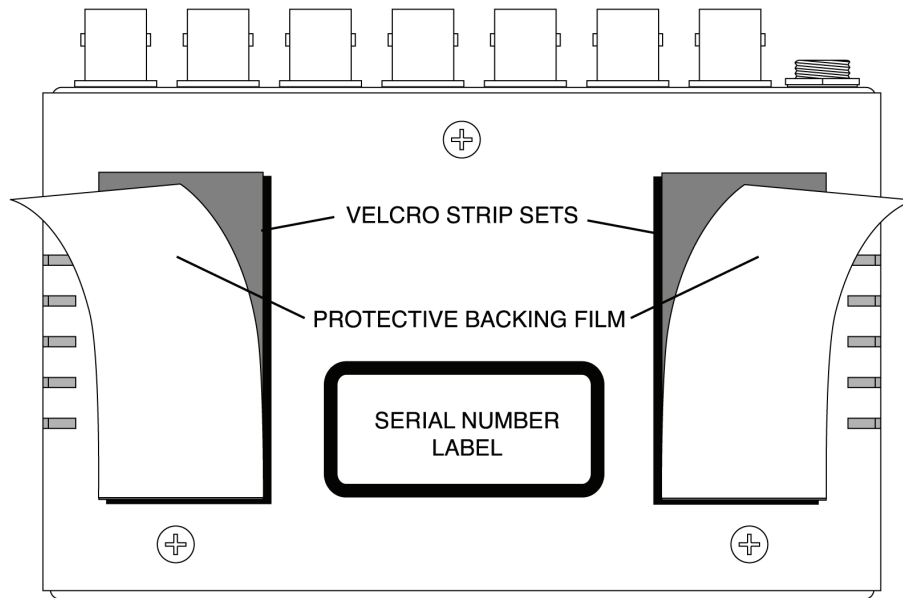


Figure 2. Velcro Installation Option

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:

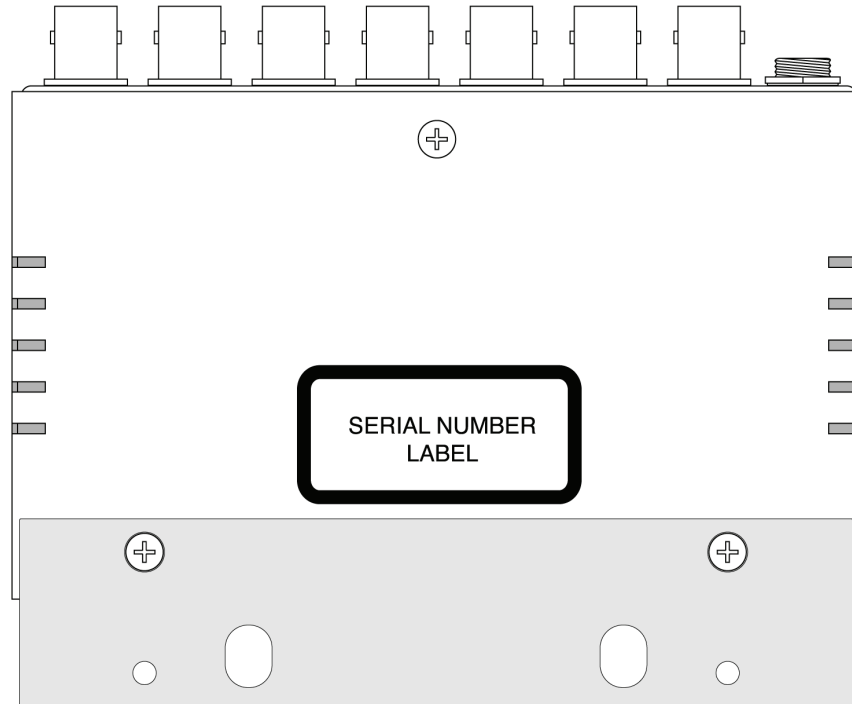


Figure 3. Flat Metal Plate Installation Option

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.

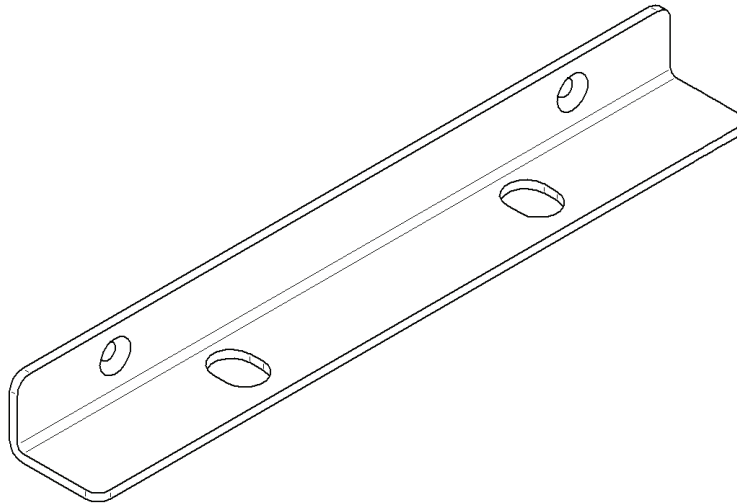


Figure 4. BMP-9000 90° Mounting Bracket

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.

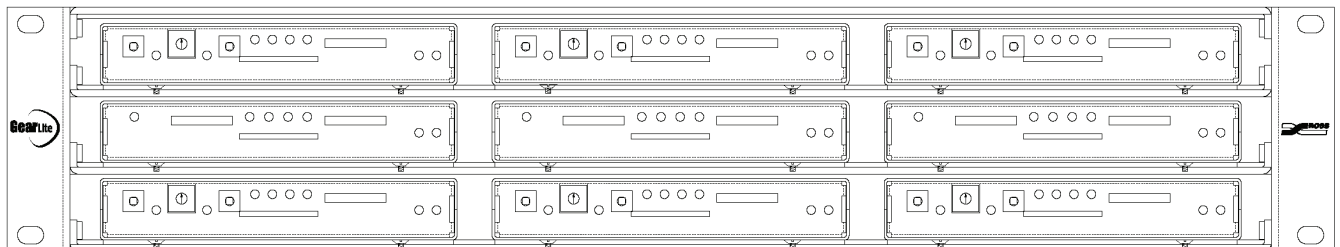


Figure 5. GRF-9000 with Nine GearLite Modules Installed

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.

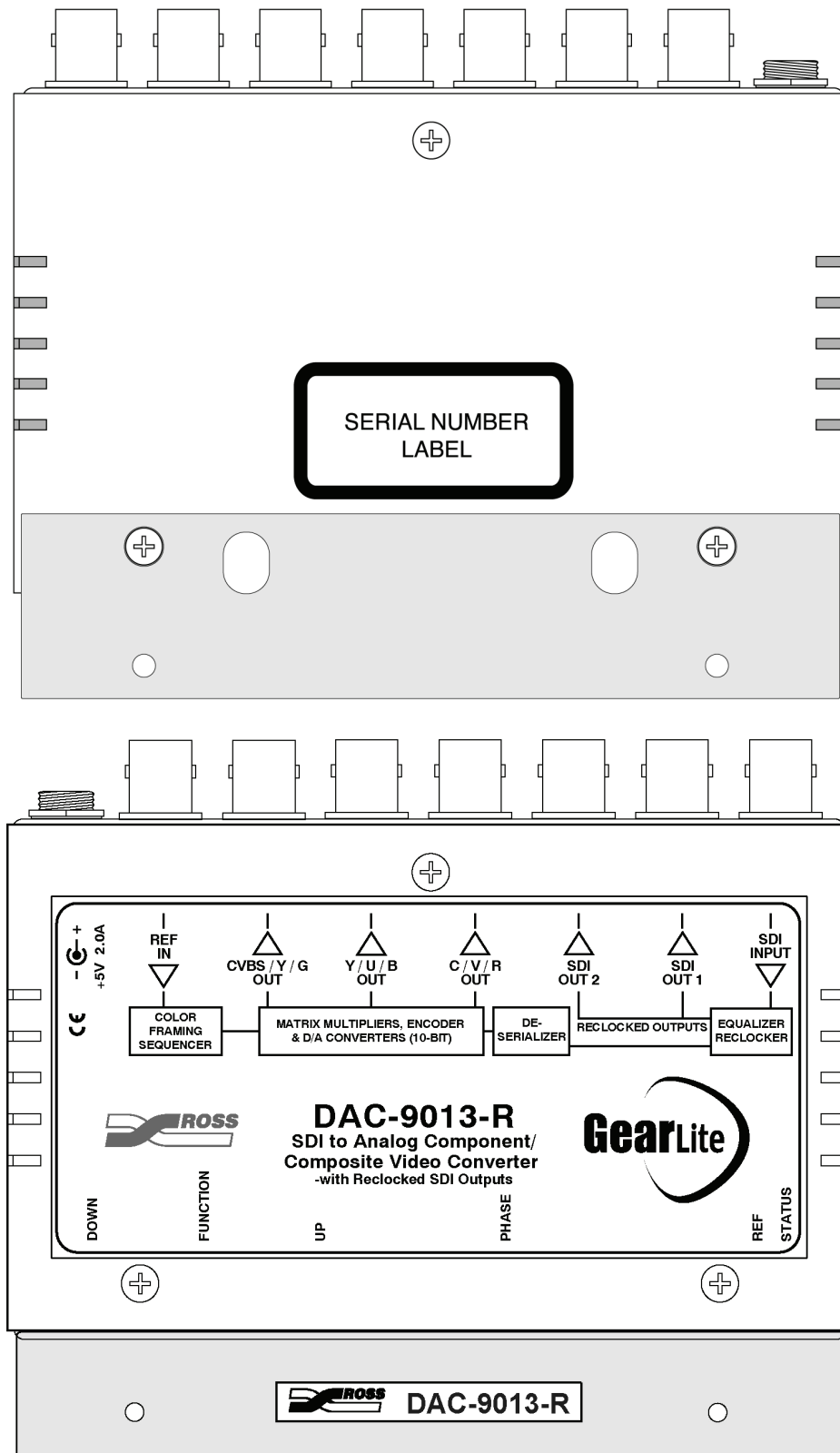


Figure 6. Flat Metal Plate and Label Positions for GRF-9000 Mounting

Setup and Operation

In This Chapter

This section provides details of all operating modes and features.

The following topics are discussed:

- Input and Output Signal Details
- Phase Locked Loop Circuit
- Cable Connections
- User Controls
- Setup and Configuration
- Function Setup and Configuration Menu Table

Input and Output Signal Details

The DAC-9013-R accommodates a SMPTE 259M-C SDI input signal. The input is equalized, reclocked, and then de-serialized to 10-bit parallel data. This data stream is encoded to composite video, or scaled and converted to the selected component format (YUV or RGB). The digital data is then converted to analog using 10-bit DACs. The DAC-9013-R enables the user to adjust a number of parameters, such as video level, hue, etc. The DAC-9013-R also has an input for an analog composite reference signal. This reference signal must comply with either SMPTE 170M-1999 or ITU-R BT.470-6. The reference signal is used to determine in which color field the output should be (for composite output only). This color framing circuit works in NTSC and PAL B/G modes. Please note that the reference signal and the SDI input to the DAC-9013-R must be co-timed. The color framing circuit identifies Color Field 1 on the reference input. The next SDI odd field will be set to Color Field 1 on the analog encoded output.

Phase Locked Loop Circuit

The DAC-9013-R incorporates a high quality PLL circuit to help reduce the effects of jitter on the SDI input signal being passed on to the analog composite outputs. In situations where the SDI input signal may have high amounts of jitter, it is recommended that the PLL be enabled. The PLL may be disabled if the user would prefer to have the analog composite output reflect the SDI input jitter.

The PLL is locked to the SDI input signal. Disruptions of the SDI input (i.e. untimed switches) may cause the output to be disrupted. In cases where the output of a router (or other serial digital switch) is required to be converted, it is recommended that an SDI synchronizer (such as the RossGear DVB-8020A-S) be used upstream, immediately before the DAC-9013-R.

Cable Connections

Connect the cables to the DAC-9013-R according to the designations indicated on the chassis label. The input is internally terminated at 75 Ohms. It is not necessary to terminate unused outputs.

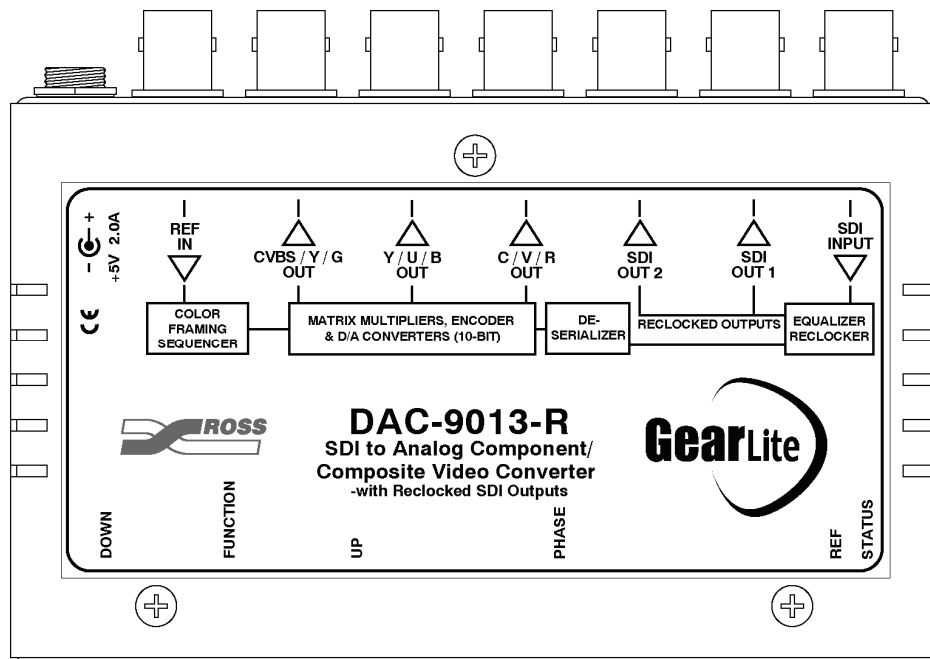


Figure 7. DAC-9013-R Cable Connections Indicator Label

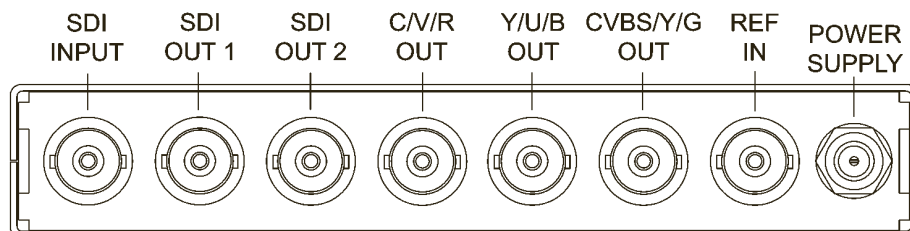


Figure 8. DAC-9013-R Rear Connections Configuration

Power Adaptor and Supply

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 DAC-9013-R is supplied



Caution

Use of improper adaptors may damage the DAC-9013-R 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 DAC-9213 has the following front edge user controls:

- Function Select
- Up and Down Selector buttons and LEDs
- Phase Adjust Button
- Status LED
- Reference LED

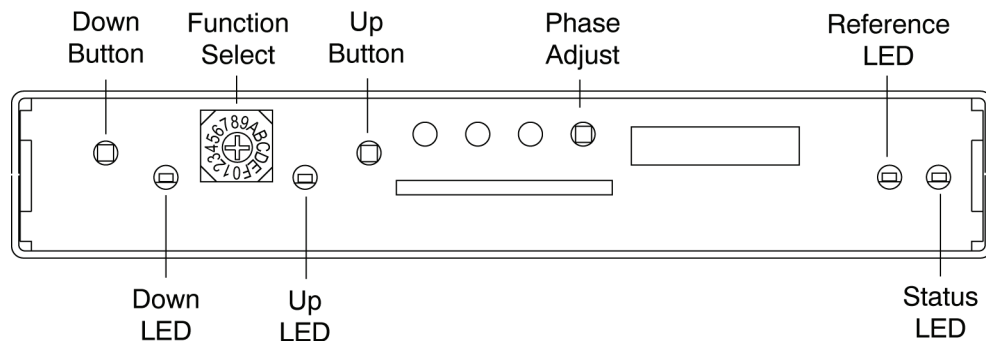


Figure 9. User Controls

Status and Selection LEDs

The front panel of the module has four LEDs (Down, Up, Status, Reference) that display the status of the input signals, and indicate menu function and configuration selections. The LED displays are described in Table 1.

Table 1. Selection and Status LED Descriptions

LED	Reference	Function
Reference (Green)	On	Reference input is present and locked.
	Off	Reference signal problem (missing, not locked, or conflict with Menu item 0), or loss of power.
Status (Green)	On	Valid* input signal is present and no anomalies have been detected. The unit is functioning normally.
	Flashing	Input signal problem or an inconsistency between the SDI input standard and the selected output format.
	Off	Loss of power.
Up (Yellow)	Function Menu	For menu items that have multiple selections, the LED will be in a state as indicated in the Function Setup and Configuration Menu.
Down (Yellow)	Function Menu	For menu items that have multiple selections, the LED will be in a state as indicated in the Function Setup and Configuration Menu.

* A "valid" signal is defined as any analog composite video signal standard input into the DAC-9013-R, which matches the setting of the **Video Standard** that has been selected in the Function Setup and Configuration Menu. In other words, if the converter is in its default state for NTSC (525/60) video, then only an NTSC (525/60) composite video signal input will cause the Status LED to be lit continuously. Any other analog composite video signal, of a different standard (PAL-B, PAL-N), that is input into the converter will be "invalid" and the Status LED will be flashing.

* The module is operating correctly when the Status and Reference LEDs are continually lit.

Fine Phase Adjustment

The Fine Phase Adjust potentiometer, located at the front panel of the DAC-9013-R module, allows the analog output to be moved approximately $\pm 18.5\text{ns}$ (approx. $\pm 24^\circ$ @ 3.58MHz).

Function Selection Switch and Down/Up Buttons

The Function Select switch is a 16-position rotary switch used to select specific functions and their options. The Function Select switch works in conjunction with the Down and Up Buttons.

First, the function category is selected with the rotary switch, and then the Down and Up Buttons are used to select modes or level settings within that function category. The following **Setup and Configuration** section provides complete details on the available functions and their options.

Setup and Configuration

Use the Function Select switch and the Down and Up buttons to configure the DAC-9013-R to convert SDI signals to analog video signals. Settings are described in Table 2.

General Operating Rules

Please note the following important operating rules for the DAC-9013-R:

- For each of the supported **Video Standards** (NTSC / PAL-B / PAL-N) the card stores the default video settings independently in non-volatile memory.
- The module always powers-up in the last configuration used.
- Always check to see that the inputs are valid and the correct **Video Standard** has been selected from the function menu.

Function Selection

Start by setting the Function Select switch to Position 0 and adjust your video input to the correct SDI Video Standard: NTSC (525/60), PAL-B/G (625/50), or PAL-N (625/60). NTSC (525/60) is the default standard. See Table 2 Function Setup and Configuration Menu for complete settings information.

Example Configuration:

- To configure the **Format** function, turn Function Select to Position 1. The default configuration will be **CVBS + Y/C**. The Down LED will be lit and the Up LED will be lit, to indicate **CVBS + Y/C Format** configuration selection.
- To change **Format** configuration to **RGB**, keep Function Select in Position 1 and then press Up button once. The Down LED will be unlit and the Up LED will be lit, to indicate **RGB Format** configuration selection.
- To then change configuration of **Format** function to **YUV**, keep Function Select in Position 1 and then press Down button once to return to default configuration, and once more to scroll down to **YUV** configuration. The Down LED will be lit and the Up LED will be unlit, to indicate **YUV Format** configuration selection.

Function Setup and Configuration Menu Table

A single press of the Down and Up buttons is a “momentary” click of the button unless indicated by “(h)”.

Table Legend

- + Press Up button from default position
- Press Down button from default position
- (h) Hold Up or Down button for 2 - 3 seconds for faster adjustment or special function
- * Factory Default state
- Lit LED display
- Unlit LED display
- ☼ Flashing LED display

Table 2. Function Setup and Configuration Menu

Function Selection Switch Position	Function Menu	Up/Down Buttons Mode Selection Menu See Table Legend for symbol meanings	LED Display See Table Legend for symbol meanings	
			Down (yellow)	Up (yellow)
0	Input Video Standard	525 (NTSC) *	○	○
		625 (PAL B/G) +	●	●
		625 (PAL N) +	●	○
1	Output Video Format	CVBS + Y/C *	○	○
		YUV -	○	●
		RGB -	●	○

Function Selection Switch Position	Function Menu	Up/Down Buttons Mode Selection Menu See Table Legend for symbol meanings	LED Display See Table Legend for symbol meanings	
			Down (yellow)	Up (yellow)
2	YUV Format ¹	SMPTE EBU N10 +	○	●
		MII +	●	○
		Betacam™ *	○	○
3	Y Gain	x1.5 + (h)	●	☀
		x1 to x1.5 + (h)	●	○
		x1 * ± (h)	○	○
		x0 to x1 - (h)	○	●
		x0 - (h)	☀	●
4	U Gain	x2 + (h)	●	☀
		x1 to x2 + (h)	●	○
		x1 * ± (h)	○	○
		x0 to x1 - (h)	○	●
		x0 - (h)	☀	●
5	V Gain	x2 + (h)	●	☀
		x1 to x2 + (h)	●	○
		x1 * ± (h)	○	○
		x0 to x1 - (h)	○	●
		x0 - (h)	☀	●
6	Chroma	Chroma (and burst) On *	●	○
		Chroma (and burst) Off -	○	●
7	Hue ²	+22.5° + (h)	●	☀
		From 0° to +22.5° + (h)	●	○
		= 0° * ± (h)	○	○
		From 0° to -22.5° - (h)	○	●
		-22.5° - (h)	☀	●
8	Subcarrier Phase ²	+22.5° + (h)	●	☀
		From 0° to +22.5° + (h)	●	○
		= 0° * ± (h)	○	○
		From 0° to -22.5° - (h)	○	●
		-22.5° - (h)	☀	●

Function Selection Switch Position	Function Menu	Up/Down Buttons Mode Selection Menu See Table Legend for symbol meanings		LED Display See Table Legend for symbol meanings	
				Down (yellow)	Up (yellow)
9	Setup	On *		●	○
		Off -		○	●
A	Black Level	15 IRE	+ (h)	●	☀
		From 0 to 15 IRE	+ (h)	●	○
		0 IRE	± (h)	○	○
		From 0 to -7.5 IRE	- (h)	○	●
		-7.5 * IRE	- (h)	☀	●
B	Superblack Clip Level	Clip below -1.5 IRE	+ (h)	●	☀
		Clip below -6 IRE	+ (h)	●	○
		Clip below -11 IRE	+ (h)	○	●
		Pass all *	- (h)	☀	●
C	VI Blank	Narrow/Blank	+	●	○
		Normal/Pass *		○	●
D	Start of Setup	Odd field	Even Field		
		22 +	22 +	●	☀
		22 +	21 +	●	○
		21 +	21 +		
		21 +	20 +	○	○
		20 * ±	20 * ±	○	●
		20 -	19 -		
E	PLL	On *		●	○
		Off -		○	●
F	Default	Reset Proc Amp (Up button requires a one-second button press)	+	●	○
		Reset All (Down button requires a one-second button press)	-	○	●

* Default

¹ In CVBS or RGB modes, Position 2 has no effect and both LEDs will be off.

² Hue and Subcarrier Phase apply to CVBS mode only.

Specifications

In This Chapter

This chapter contains the following tables:

- Technical Specifications
- Analog Video Levels

Technical Specifications

Table 3. Technical Specifications

Category	Parameter	Specification
Power	Required Voltage	+5V DC (5% regulation)
	Current Consumption	<640mA typical
	Total Power	<3.2W typical
Other	Warranty	3-year transferable
	Thermal Environment	20 – 40°C (68 – 104°F) non-condensing
Serial Digital Video Input	Number of Inputs	1
	Signal Standards Accommodated	SMPTE 259M-C (270Mb/s)
	Input Impedance	75Ω terminating
	Return Loss	>19dB to 270MHz
	Equalization	Automatic, up to 26dB (200m of Belden 8281 cable @ 270Mb/s)
Analog Reference	Signal Standards	NTSC (SMPTE 170M-1999), PAL B/G (ITU-R BT.470-6)
	Input Impedance	75Ω
	Return Loss	>37dB to 5MHz

Category	Parameter	Specification
Analog Composite Output	Number of Outputs	3
	Video	Composite Analog Video + Y/C or RGB or YUV
	Supported Composite Formats	NTSC, NTSC (EIAJ), PAL B/G, PAL N
	Output Impedance	75Ω
	Output Return Loss	>45dB to 5MHz
	Output Isolation	>44dB to 5MHz
	Signal Level	See DAC-9013-R Analog Video Levels table (Table 4. in DAC-9013-R User Manual)
	DC Offset for RGB or Composite Video	<± 50mV
	Frequency Response	± 0.25dB to 5.5MHz
	Subcarrier Jitter	<± 0.5° typical
	Thermal Stability	<0.1° / °C
	Timing Adjustment	± 18.5ns
	Group Delay	< 20ns to 4.2MHz
	Differential Phase	<0.7°
	Differential Gain	<0.5%
	Outputs Short Circuit Protected	Yes
	Path Length (SDI Input to Composite output)	2.3μs typical
	RMS Noise (unweighted)	<-57dB 0 - 5.0MHz

Specifications are subject to change without notification

Table 4. Analog Video Levels

Analog Video Levels			
Composite Video	NTSC	1Vpp	$\pm 5\%$
	PAL B/G		
	PAL N		
RGB	525	Video Level 714mV	
		Sync level 286mV	
	625	Video Level 700mV	
		Sync Level 300mV	
YUV Betacam™	525	Y VIDEO 714mV	
		Y SYNC 286mV	
		U/V LEVELS 934mV	
	625	Y VIDEO 700mV	
		Y SYNC 300mV	
		U/V LEVELS 1000mV*	
YUV MII	525	Y VIDEO 700mV	
		Y SYNC 300mV	
		U/V LEVELS 648mV	
	625	Y VIDEO 700mV	
		Y SYNC 300mV	
		U/V LEVELS 700mV*	
YUV SMPTE / EBU N10	525 or 625	Y VIDEO 700mV	
		Y SYNC 300mV	
		U/V LEVELS 700mV	

Specifications are subject to change without notification.

* Other U/V levels may be obtained by adjusting Menu items 4 and 5

Service Information

In This Chapter

This chapter contains Warranty and Repair Policy information.

Warranty and Repair Policy

The RossGear DAC-9013-R 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 DAC-9013-R 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 DAC-9013-R 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 DAC-9013-R SDI to Analog Composite/Component Video Converter with Reclocked Outputs 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 DAC-9013-R 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 DAC-9013-R, 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 DAC-9013-R. 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 DAC-9013-R and related products.

Standard Equipment

- **DAC-9013-R**, SDI to Analog Composite/Component Video Converter with Reclocked Outputs, 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

- **9013RDR-004**, additional 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 **DAC-9013-R** SDI to Analog Composite/Component Video Converter with Reclocked Outputs 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.

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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