



DAC-9013

SDI to Analog Composite/ Component Video Converter

User Manual



Video Production Technology

DAC-9013 User Manual

- Ross Part Number: **9013DR-004-02**
- Release Date: October 19, 2012.

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

Copyright

© 2012 Ross Video Limited. All rights reserved.

This work is proprietary and confidential to Ross Video Limited, its subsidiaries and its other affiliated corporations and may not be copied, distributed, sold or otherwise used or relied upon without the express written permission of Ross Video Limited. Reproduction or reverse engineering of copyrighted software is prohibited.



Patents

This product is protected by the following US Patents: 4,205,346; 5,115,314; 5,280,346; 5,561,404; 7,034,886; 7,508,455; 7,602,446; 7,834,886; 7,914,332. This product is protected by the following Canadian Patents: 2039277; 1237518; 1127289. Other patents pending.

Notice

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

Trademarks

-  is a registered trademark of Ross Video Limited.
-  is a trademark of Ross Video Limited.
- Ross, ROSS, ROSS®, and MLE are registered trademarks of Ross Video Limited.
- VELCRO® is a registered trademark of Velcro Industries B.V.
- Betacam® is a registered trademark of Sony Corporation.
- 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 to avoid personnel injury and to prevent product damage.

Product 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



Protective Earth — This symbol identifies a Protective Earth (PE) terminal, which is provided for connection of the supply system's protective earth (green or green/yellow) conductor.



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.



Warning Hazardous Voltages — This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.



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



1. **Warning** – Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. 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.
6. 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.



7. **Warning – Indoor Use: WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
8. Do not block ventilation openings. Install in accordance with manufacturer's instructions.
9. Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
10. Do not use this apparatus near water.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Clean only with a dry cloth.
14. To avoid electrical shock, disconnect the A/C power cord before any servicing.
15. 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

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 a 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

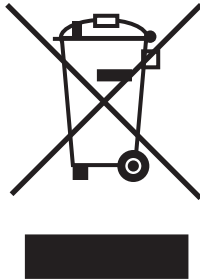
“Contact Us” section on the last page of this manual. All GearLite products are covered by a generous 3-year warranty and will be repaired without charge for materials or labor within this period. See the “Warranty and Repair Policy” section in this manual for details.

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.

Introduction

Overview

The DAC-9013 SDI to Analog Composite/Component Converter 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 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 has a full 10bit data path, and a reference input for color framing (NTSC and PAL B/G only).

The front panel of the DAC-9013 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 provides conversion of 525 and 625 SDI signals (SMPTE 259M). NTSC, PAL, and PAL-N standards are supported. Component levels can be set to Betacam®, MII, or SMPTE standards. Special measures have been taken to ensure excellent return loss at both input and output.

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

Simplified Block Diagram

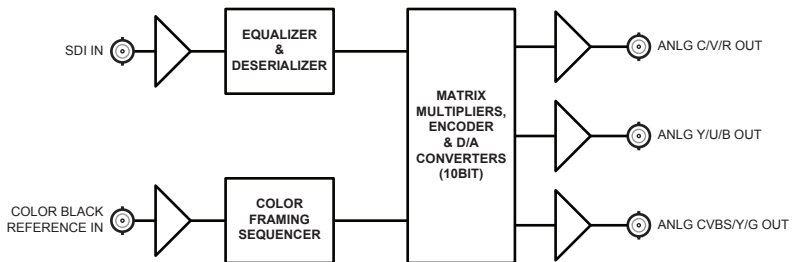


Figure 1 Simplified Block Diagram of DAC-9013 Functions

Features

The DAC-9013 includes the following features:

- NTSC, PAL, PAL-N operation
- 10bit DAC
- 10bit data processing
- 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 VBI on composite output
- 4x over-sampling (54MHz)
- 5V universal adapter with locking DC connector
- Separate status and reference LEDs
- Excellent I/O specifications
- Small brick form factor
- 5V universal adapter with locking DC connector
- 3-year warranty

Installation

Static Discharge

Whenever handling the DAC-9013 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 DAC-9013 module you received from the shipping container and check the contents 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 DAC-9013 can be mounted in any convenient location. However, to ensure long life for this product, observe the following precautions and operating requirements:

- Maintain an ambient temperature of 20°C 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 connectors.

Surface Mount Strips

The included VELCRO® brand surface mount 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.

To install the Surface Mount Strips

1. Remove the **Protective Backing Film** from the adhesive on the bottom of the two **VELCRO® brand Surface Mount Strips**.
2. Adhere the **Surface Mount Strips** to the bottom side of the chassis. (**Figure 2**)

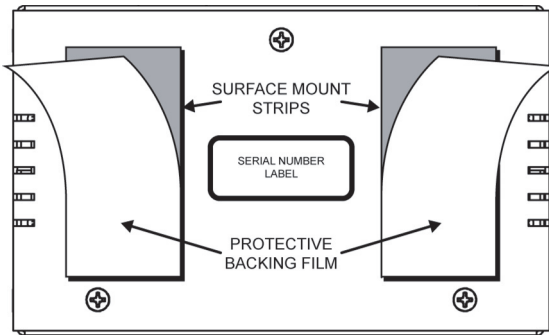


Figure 2 Surface Mount Installation Option

3. Remove the **Protective Backing Film** from the other side of the **VELCRO® brand Surface Mount Strips**.
4. Press the chassis into position on the surface you want to mount it to.



Operating Tip — An additional **VELCRO® brand Surface Mount Strip** is available to mount the power adapter.

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.

Optional Mounting Accessories

Ross Video is committed to providing practical solutions for the needs of your high-quality broadcast facility.

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.

To install the Flat Metal Plate

1. Remove the **2** screws from the bottom of the chassis.
2. Install the **Flat Metal Plate** onto the bottom of the chassis (**Figure 3**) using the screws provided in the Mounting Kit. Do not use the screws removed during **Step 1**.

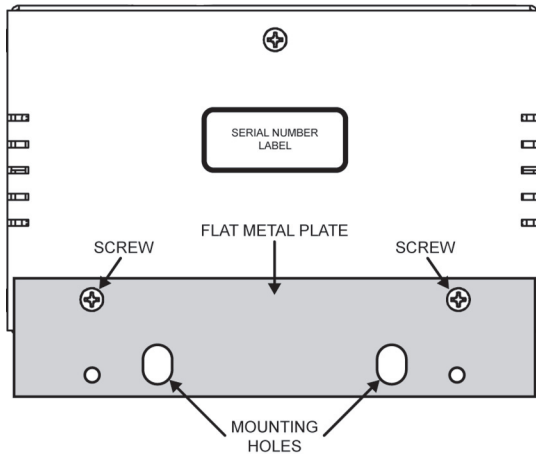


Figure 3 Flat Metal Plate Installation Option

3. Install the chassis in the desired location using the **Mounting Holes** on the **Flat Metal Plate**. Mounting screws are not provided by Ross Video.

Angle Mounting Bracket

The Angle Mounting Bracket (**Figure 4**) allows a single GearLite module to be installed in positions not possible with the flat metal plate. The bracket has a 90° angle. Mounting screws are not provided by Ross Video.

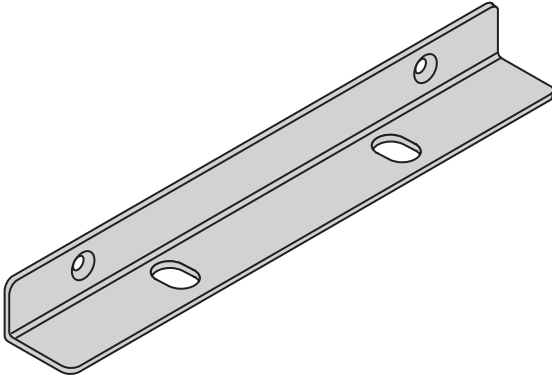


Figure 4 *Angle Mounting Bracket*

Setup

Power Adapter 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 DAC-9013. The DAC-9013 has a standard miniature power jack (center pin positive).

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 is supplied



Caution — Use of improper adaptors may damage the DAC-9013 and will void the warranty.

Installations outside of North America using line voltages of 200-240V require a plug, certified for the country of use, to be installed on the supplied line cord. Refer to the section “**Important Regulatory and Safety Notices to Service Personnel**” at the front of this manual for details.

Cable Connections Overview

Connect the cables to the DAC-9013 according to the designations indicated on the chassis label and **Figure 5**. The input is internally terminated at 75ohm. It is not necessary to terminate unused outputs.

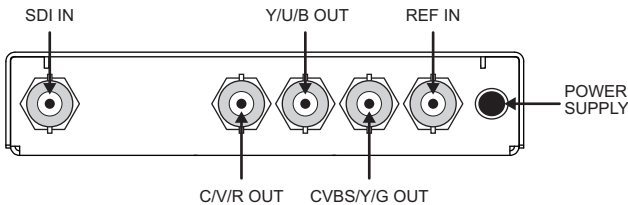


Figure 5 DAC-9013 Connections

Status LEDs

The front edge of the DAC-9013 has four LED indicators that display the status of the input signals, and indicate menu function and configuration selections. (Figure 6)

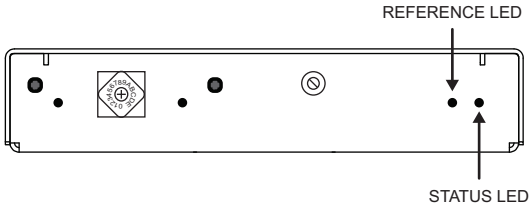


Figure 6 DAC-9013 Front Edge Status Indicator LEDs

Table 1 describes the status LEDs available on the DAC-9013. Note that the DAC-9013 is operating correctly when the REFERENCE and STATUS LEDs are continually lit.

Table 1 Status LED Descriptions

LED	Color	Function
REFERENCE	Green	When lit, this LED indicates that a reference input signal is present and locked.
	Off	When unlit, this LED indicates a reference input signal error such as a: <ul style="list-style-type: none"> • missing input signal • input signal is not locked • input signal conflicts with the setting of Menu item 0 or • loss of power to the DAC-9013.
STATUS	Green	When lit, this LED indicates a valid ^a input signal is present and no errors are detected. The DAC-9013 is functioning correctly.
	Flashing Green	When flashing green, this LED indicates an input signal problem or an inconsistency between the SDI input standard and the selected output format.
	Off	When unlit, this LED indicates a loss of power to the DAC-9013.
UP	Yellow	For menu items that have multiple selections, these LEDs will be in a state as indicated in the Function Setup and Configuration Menu.
DOWN	Yellow	

a.*A valid signal is defined as any analog composite video signal standard input into the DAC-9013, 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 OK LED to be lit. Any other analog composite video signal, of a different standard (PAL-B, PAL-M, PAL N), that is input into the converter will be invalid.

Fine Phase Adjustment

The Fine Phase Adjust potentiometer, located at the front panel of the DAC-9013, allows the analog output to be moved approximately $\pm 18.5\text{ns}$ (approximately $\pm 24^\circ @ 3.58\text{MHz}$). **Figure 7** illustrates the potentiometer location.

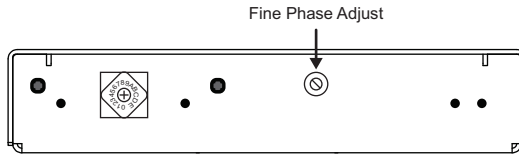


Figure 7 DAC-9013 Fine Phase Potentiometer

Configuration

The DAC-9013 includes a **Function Select** 16-position rotary switch that enables you to select specific functions and their options. This switch works in conjunction with the **Down** and **Up** buttons to configure the DAC-9013 to convert SDI signals to analog video signals. This section provides information on configuring the DAC-9013 using this switch and buttons. Refer to **Figure 8** for switch and button locations.

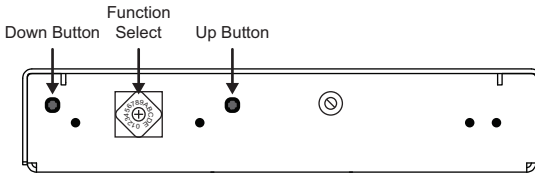


Figure 8 DAC-9013 Switch and Button Locations

General Operating Rules

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

- For each of the supported Video Standards (NTSC / PAL-B / PAL-M / 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 (625/50), PAL-M (525/50), PAL-N (625/60). Note that NTSC (525/60) is the default standard. Refer to the section “**Function Setup and Configuration Menus**” on page 16 for complete settings information.

Example Configuration

1. To configure the Format function:
 - Turn the **Function Select** switch to Position **1**. The default configuration is CVBS + Y/C.
 - The **DOWN** LED will be lit and the **UP** LED will be lit, to indicate CVBS + Y/C configuration selection.

2. To change Format configuration to RGB:
 - Keep the **Function Select** in Position **1**.
 - Press the **Down** button twice.
 - The **DOWN** LED will be unlit and the **UP** LED will be lit, to indicate RGB configuration selection.
3. To change the Format configuration to YUV:
 - Keep the **Function Select** in Position **1**.
 - Press the **Down** button once to return to the default configuration.
 - Press the **Down** button again to scroll down to YUV.
 - The **DOWN** LED will be lit and the **UP** LED will be unlit, to indicate YUV configuration selection.

Function Setup and Configuration Menus

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

Table Legend

- + Press the **Up** button from the default position
- Press the **Down** button from the 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	LED Display	
			DOWN	UP
0	Input Video Standard	NTSC* (525)	○	○
		PAL-B/G (625) +	●	●
		PAL-N +	●	○

Table 2 Function Setup and Configuration Menu

Function Selection Switch Position	Function Menu	Up/Down Buttons Mode Selection Menu	LED Display	
			DOWN	UP
1	Output Video Format	CVBS+Y/C*	○	○
		YUV –	○	●
		RGB –	●	○
2	YUV Format ^a	SMPTE EBU N10 +	○	●
		MII +	●	○
		Betacam®*	○	○
3	Y Gain	x1.5 +(h)	●	☀
		x1 to x1.5 +(h)	●	○
		x1*	○	○
		x0 to x1 –(h)	○	●
		x0 –(h)	☀	●
4	U Gain	x2 +(h)	●	☀
		x1 to x2 +(h)	●	○
		x1*	○	○
		x0 to x1 –(h)	○	●
		x0 –(h)	☀	●
5	V Gain	x2 +(h)	●	☀
		x1 to x2 +(h)	●	○
		x1*	○	○
		x0 to x1 –(h)	○	●
		x0 –(h)	☀	●
6	Chroma	Chromas (and burst) On*	●	○
		Chromas (and burst) Off –	○	●

Table 2 Function Setup and Configuration Menu

Function Selection Switch Position	Function Menu	Up/Down Buttons Mode Selection Menu		LED Display	
				DOWN	UP
7	Hue ^b	+22.5°	+(h)	●	☀
		From 0° to +22.5°	+(h)	●	○
		= 0°		○	○
		From 0° to -22.5°	-(h)	○	●
		-22.5°	-(h)	☀	●
8	Sub-carrier Phase ²	+22.5°	+(h)	●	☀
		From 0° to +22.5°	+(h)	●	○
		= 0°		○	○
		From 0° to -22.5°	-(h)	○	●
		-22.5°	-(h)	☀	●
9	Setup On	On*		●	○
		Off	-	○	●
A	Black Level	22.5° IRE	+(h)	●	☀
		From 11.25° to 22.5°	+(h)	●	○
		11.25°		○	○
		From 0° to 11.25°	-(h)	○	●
		0°*	-(h)	☀	●
B	Superblack Clip Level	-7 IRE below Black*	-	●	○
		-40 IRE below Black		○	●
C	VI Blanking	Blank	+	●	○
		Pass		○	●

Table 2 Function Setup and Configuration Menu

Function Selection Switch Position	Function Menu	Up/Down Buttons Mode Selection Menu		LED Display	
				DOWN	UP
D	Start of Setup	Odd Field	Even Field		
		22	22 +	●	☀
		22	21 +	●	○
		21	21 +		
		21	20 +	○	○
		20*	20*	○	●
		20	19 -		
		19	19 -	☀	●
E	PLL	On*		●	○
		Off		○	●
F	Default	Reset Proc Amp (Up button requires a 1 second button press) +		●	○
		Reset All (Down button requires a 1 second button press) -		○	●

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

b. Hue and Sub-carrier Phase apply to CVBS mode only.

Specifications

Technical Specifications

Specifications are subject to change without notification.

Table 3 DAC-9013 — Technical Specifications

Category	Parameter	Specification
Serial Digital Video Inputs	Number of Input Signals	1
	Signal Standards Accommodated	SMPTE 259M (270Mbps)
	Input Impedance	75ohm terminating
	Return Loss	>19dB to 270MHz
	Equalization	Automatic, up to 26dB (200m of Belden 8281 cable @ 270Mbps)
Analog Reference	Signal Standards	NTSC (SMPTE 170M-1999) PAL-B/G (ITU-R BT.470-6)
	Input Impedance	75ohm
	Return Loss	>37dB to 5MHz
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, PAL-G, PAL-N
	Output Impedance	75ohm
	Output Return Loss	>45dB to 5MHz
	Output Isolation	>44dB to 5MHz
	Signal Level	Refer to Table 4 on page 22
	DC Offset for RGB or Composite Video	<± 50mV
	Frequency Response	±0.25dB to 5.5MHz
	Sub-carrier Jitter	<± 0.5° typical
	Thermal Stability	<0.1° / °C

Table 3 DAC-9013 — Technical Specifications

Category	Parameter	Specification
Analog Composite Output	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 0-5MHz
Power	Require Voltage	+5V DC (5% regulation)
	Current Consumption	<640mA typical
	Total Power	3.2W typical
Other	Thermal Environment	20°C to 40°C (68°F to 104°F), ambient, non-condensing
	Dimensions (approx.)	13cm x 9cm x2.5cm (5" x 3.5" x 1")
	Weight (approx.)	312g (11oz)

Analog Video Levels

Table 4 Analog Video Levels

Video Format		Standard Levels	
Composite Video	NTSC	1Vp-p	± 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	
YUV Betacam®	625	Y Video 700mV	
		Y Sync 300mV	
		U/V Levels 1000mV ^a	
YUV MII	525	Y Video 700mV	
		Y Sync 300mV	
		U/V Levels 648mV	
	625	Y Video 700mV	
		Y Sync 300mV	
		U/V Levels 700mV ^a	
YUV SMPTE/ EBU N10	525 or 625	Y Video 700mV	
		Y Sync 300mV	
		U/V Levels 700mV	

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

Service Information

Warranty and Repair Policy

The GearLite DAC-9013 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 GearLite DAC-9013 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 GearLite DAC-9013 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 GearLite DAC-9013 User Manual provides all pertinent information for the safe installation and operation of your GearLite Product. Ross Video policy dictates that all repairs to the GearLite DAC-9013 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 GearLite DAC-9013, 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 GearLite DAC-9013. 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.

Notes:

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

Technical Support

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

General Information

Telephone: +1 613 • 652 • 4886
Fax: +1 613 • 652 • 4425
Email: solutions@rossvideo.com
Website: <http://www.rossvideo.com>

Visit Us

Visit our website for:

- Company information and news
- Related products and full product lines
- Online catalog
- Testimonials



Video Production Technology