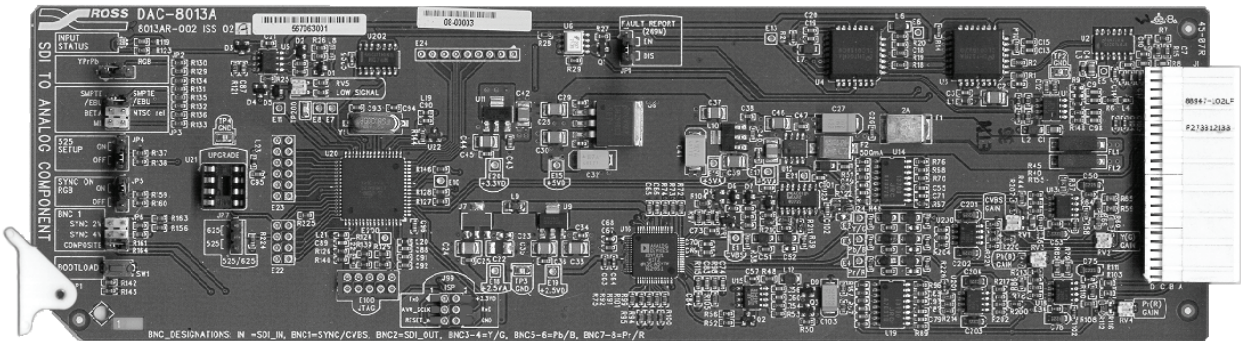


DAC-8013A

SDI to Analog Component Converter User Manual



Ross Part Number: 8013ADR-004

Issue: 01



Live Production Technology™

DAC-8013A SDI to Analog Component Converter User Manual

- Ross Part Number: **8013ADR-004**
- Document Issue: **01**
- Printed in Canada.

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

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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 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



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 RossGear 8000 series frame. Refer to the RossGear 8000 series frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as it’s 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 cords 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 within 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 type and rating.

Only use attachments/accessories specified by the manufacturer.

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

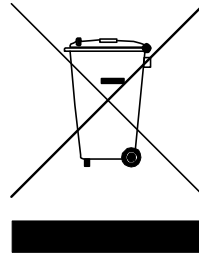
Routine maintenance to this RossGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Contact Us" section on the last page of this manual. All RossGear products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

- A Word of Thanks
- Overview
- Functional Block Diagram
- Features
- Documentation Terms

A Word of Thanks

Congratulations on choosing the Ross Video **DAC-8013A SDI to Analog Component Converter**. The **DAC-8013A** is part of a full line of products within the RossGear Terminal Equipment family, backed by Ross Video's experience in engineering and design expertise since 1974.

You will be pleased at how easily your new **DAC-8013A** 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 **DAC-8013A**, 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 **DAC-8013A** SDI to Analog Component Converter offers an economical means of converting a serial digital component (SDI) signal (SMPTE-259-C) to analog component format in order to feed RGB monitors or other analog component equipment.

The **DAC-8013A** also functions as a serial distribution amplifier and provides one serial re-clocked output. Input cable equalization is exceptionally good, being able to operate fault-free with 650-ft. (200m) of 1694A cable. An LED indicator displays the input status of the card.

The ability to monitor certain signal faults and report in SMPTE 269M format is also available.

The **DAC-8013A** occupies one slot in the Ross DFR-8104 1RU and the DFR-8110 2RU digital rack frames. It is also fully compatible with the Leitch* 6800 series digital rack frame.

Functional Block Diagram

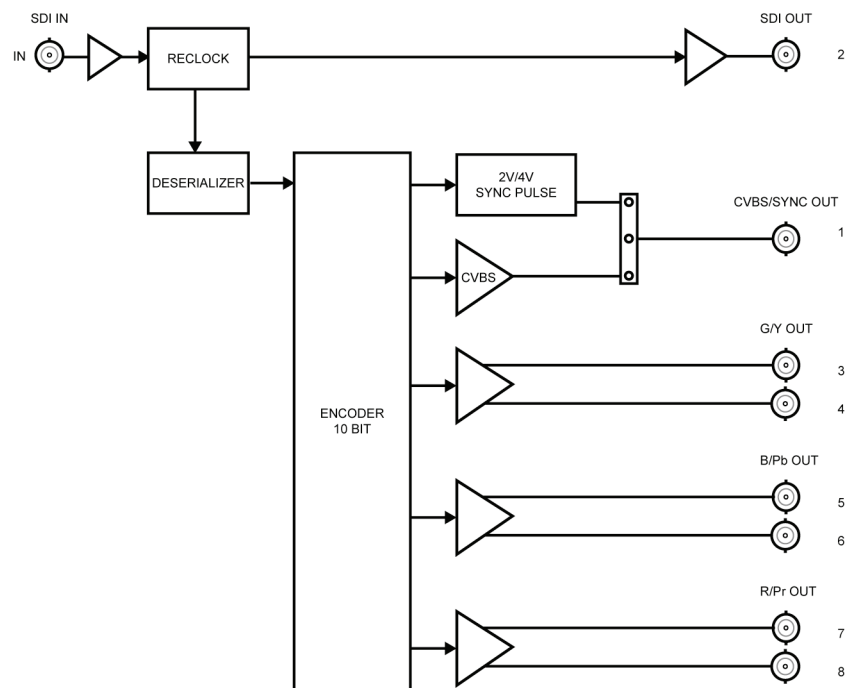


Figure 1. Simplified Block Diagram of DAC-8013A Functions

* Leitch is a trademark of Leitch Technology Corporation.

Features

The following features make the **DAC-8013A** the best solution for converting SDI to analog:

- RGB and YPrPb color spaces are supported
- Betacam, SMPTE/EBU N10 and MII** component modes
- Separate high-level sync or composite output
- 10-bit processing and conversion
- Distribution amplifier with one re-clocked serial output
- Sync may be added to the RGB signals
- 525/625 line operation
- Fault Reporting (SMPTE 269M format)
- Input cable equalization for 200 meters of cable
- 10 modules fit into a 2 RU frame
- Fully compatible with Leitch 6800 series frames
- 5-year transferable warranty

Documentation Terms

The following terms are used throughout this guide:

- “**Frame**” refers to the **DFR-8104A** and **DFR-8110A** frames that house the **DAC-8013A** card.
- All references to the **DFR-8104A** and **DFR-8110A** also include the **DFR-8104A-C** and **DFR-8110A-C** versions with the cooling fan option. See the respective User Manuals for details.
- “**Operator**” and “**User**” both refer to the person who uses the **DAC-8013A**.
- “**Board**” and “**Card**” both refer to the **DAC-8013A** card, including all components and switches.
- “**System**” and “**Video system**” refers to the mix of interconnected digital and analog production and terminal equipment in which the **DAC-8013A** operates.

** YPrPb color space only

Installation and Setup

In This Chapter

This chapter contains the following sections:

- Static Discharge
- Unpacking
- Board Installation
- BNC Labels
- Cable Connections

Static Discharge

Whenever handling the **DAC-8013A** 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-8013A** 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.

Board Installation

Use the following procedure to install the **DAC-8013A** in a RossGear 8000 series digital distribution frame:

1. Refer to the User Manual of the RossGear 8000 series frame, to ensure that the frame is properly installed according to instructions. If this card is to be installed in any compatible frame other than a Ross Video product, refer to the frame manufacturer's manual for specific instructions.



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 convective cooling.

2. After selecting the desired frame installation slot, hold the **DAC-8013A** 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 plug is properly seated.

This completes the procedure to install the **DAC-8013A** in a RossGear 8000 series digital distribution frame.

BNC Labels

Affix the supplied BNC label, as per the included instructions, to the BNC area on the rear of the rack frame.

Cable Connections

This section provides instructions for connecting cables to the **DAC-8013A** when mounted in RossGear 8000 series Digital Products Frames. The **DAC-8013A** includes two sets of analog component outputs, as well as SDI and Sync/CVBS outputs. It is not necessary to terminate unused outputs. The serial input is internally terminated in 75 ohms. Refer to Figure 2 for BNC designations.

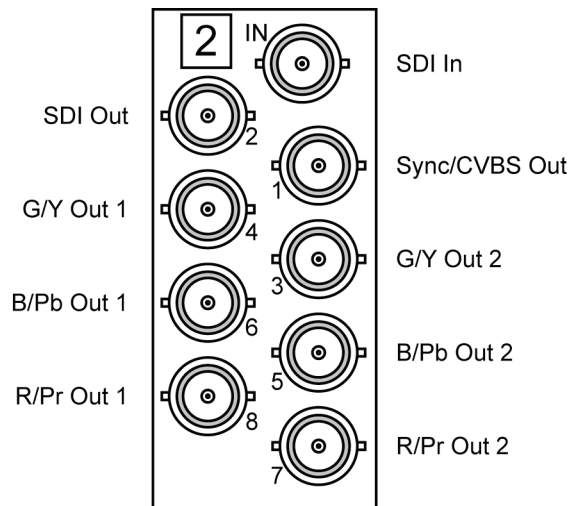


Figure 2. BNC Designations for the RossGear DFR-8110A (2RU Frame)

User Controls

In This Chapter

This chapter contains the following sections:

- Jumper Locations
- Input Status LED

Jumper Locations

Use the following information to set up the **DAC-8013A** jumpers.

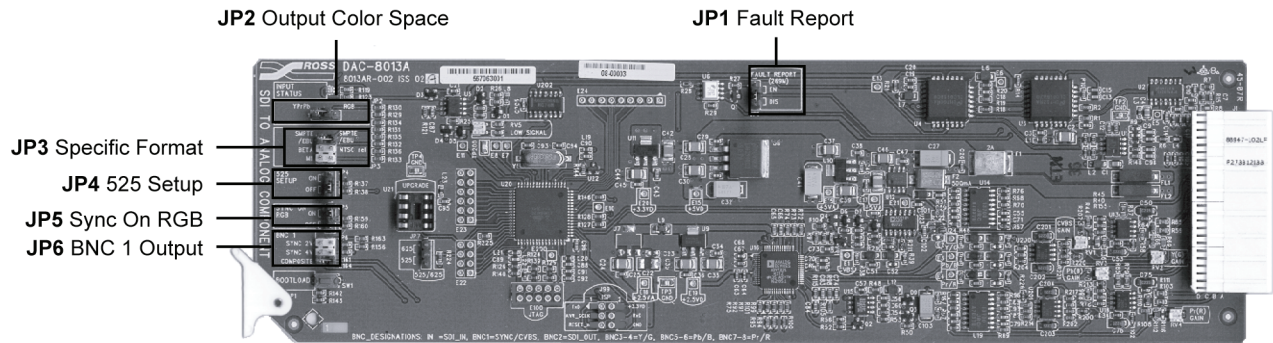


Figure 3. Jumper Locations

JP1 — Fault Report

JP1 – Fault Report enables or disables SMPTE 269M Fault Reporting.

Select one of the following settings:

- **EN** — Enables SMPTE 269M fault reporting.
- **DIS** — Disables SMPTE 269M fault reporting. This is the default setting.

Refer to Chapter 5 “**SMPTE 269M Fault Reporting**” for details on fault reporting.

JP2 — Output Color Space

JP2 – Output Color Space sets the output color space.

Select one of the following:

- **YPrPb** — This is the default setting.
- **RGB**

JP3 — Specific Format

JP3 – Specific Format sets the specific output format based on the color space selected on **JP2**.

YPrPb Formats

Select one of the following settings:

- **SMPTE/EBU** — This is the default setting.
- **BETA**
- **MII**

RGB Formats

Select one of the following settings:

- **SMPTE/EBU** — This is the default setting.
- **NTSC-RELATED** (525 only)

JP4 — 525 Setup

JP4 – 525 Setup enables or disables the YPrPb setup in 525 line formats.

Select one of the following settings:

- **ON**
- **OFF** — This is the default setting.

JP5 — Sync On RGB

JP5 – Sync ON RGB enables or disables sync on the RGB outputs.

Select one of the following settings:

- **ON** — Adds Sync to the RGB signals.
- **OFF** — Sync will not be present on the RGB signals. This is the default setting.

JP6 — BNC 1 Output

JP6 – BNC 1 Output selects the output for BNC 1.

Select one of the following settings:

- **SYNC 2V** — Provides 2 V p-p sync for equipment that require it.
- **SYNC 4V** — Provides 4V p-p sync for equipment that require it.
- **Composite** — Provides a composite signal for monitoring. The **DAC-8013A** uses the required NTSC or PAL signal to match the input signal. This is the default setting.

Input Status LED

The front edge of the card includes an LED indicator which shows the input status of the card. This section provides information on the LED indicator of the **DAC-8013A** card.

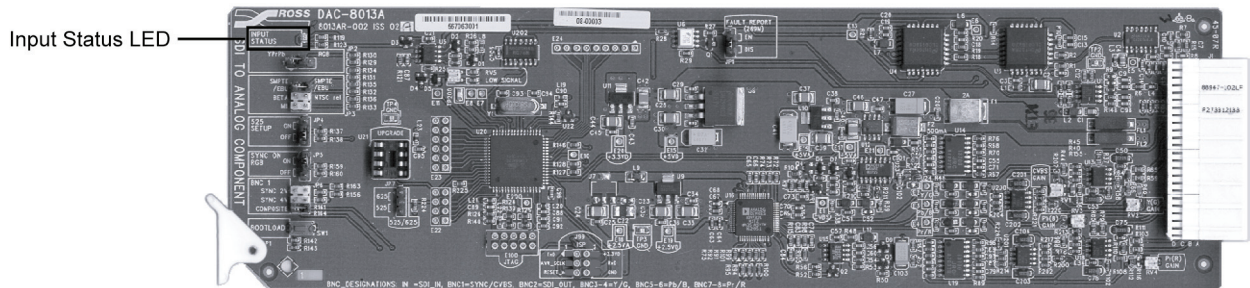


Figure 4. Input Status LED Location

Table 1. Input Status LED Descriptions

LED	Color	Status Description
Input Status	Green	The input signal is within the capability of the cable equalizer and re-clocking circuit to restore.
	Red	One of the following has occurred: <ul style="list-style-type: none"><li data-bbox="711 422 1365 541">• The input signal level is too low or is absent. If the signal level is too low, the signal may still be restored correctly, but the circuits will be working close to the limit of their capability and reliability cannot be assured.<li data-bbox="711 548 1224 575">• The card does not recognize the line format.<li data-bbox="711 581 1360 638">• The selected output format is not supported for the input format present.

Upgrades

In This Chapter

This chapter provides instructions to properly upgrade your **DAC-8013A**. To order a **DAC-8013A Upgrade Kit**, contact Ross Video Technical Support using the information located in the “**Contact Us**” section of this manual.

This chapter contains the following sections:

- Equipment Supplied
- Socket and Button Locations
- Software Upgrade
- Confirming the Upgrade

Equipment Supplied

- The **DAC-8013A** User Manual
- Required upgrade chip(s)

Socket and Button Locations

Refer to the following diagram when upgrading the **DAC-8013A** card.

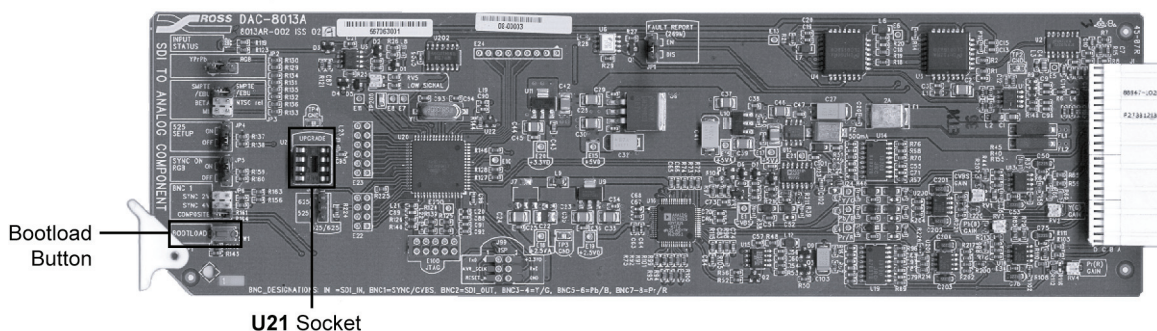


Figure 5. DAC-8013A Upgrade Socket and Bootload Button Locations

Software Upgrade

This procedure applies to any software upgrade you may perform on the **DAC-8013A**. If you are upgrading multiple cards, repeat this procedure for each card to be upgraded.

Use the following procedure to upgrade a card:

1. With the card out of the frame, refer to Figure 5, to locate the **U21** socket.
2. If the socket is occupied, remove the chip from the socket as follows:
 - Use a tong-type IC chip removal tool (not supplied) to grab the chip by the leadless ends and gently pry the chip out of the socket.
 - Store the chip in a labeled static-free container.
3. Carefully remove the new chip from the packaging.
4. Align the new chip over the socket with the keyed sides together and the legs over the socket holes.
5. Gently and firmly press the chip into the socket.
6. Press the **BOOTLOAD** button while inserting the card into the powered frame and wait for the upgrade to complete.

Operating Tip

Alternately, if the frame is powered off, you can insert the card, press the **BOOTLOAD** button and power on the frame.

- When the green **OK LED** starts flashing, the upgrade is in progress and you can release the **BOOTLOAD** button.
 - The **OK LED** will flash at various rates throughout the upgrade.
 - The upgrade is done when the LED stops flashing. Upgrades can take approximately 90 seconds to complete.
7. Confirm the upgrade following the steps in the section, “**Confirming the Upgrade**”.
 8. Remove the card from the frame.
 9. Repeat step 2 to remove the chip from socket **U21**.

This completes the procedure for upgrading a card.

Confirming the Upgrade

When confirming a card upgrade, the version number of the software is reported by the LED flashing the same number of times as the version.

When contacting Ross Video Technical Support, ensure you have the software numbers ready.

Reading Software Version Numbers

Use the following procedure to read software version numbers:

1. Ensure the card is properly installed in the frame.
2. Power up the card and wait until the **Input Status** LED is lit. Refer to Figure 6 for the LED location.

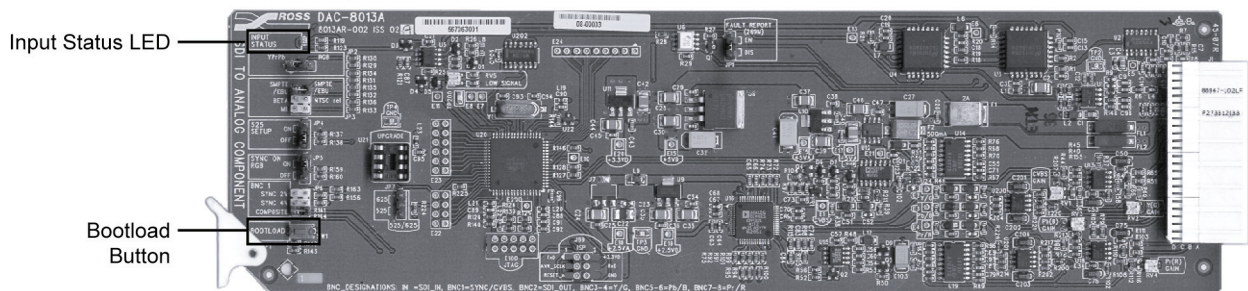


Figure 6. DAC-8013A Input Status LED

3. Hold the **BOOTLOAD** button down for three seconds. The card begins to flash the Input Status LED red in the following cycle:
 - The first set of flashes are longer and are equal to the major version number, or **M**.
 - The second set of flashes are shorter and are equal to the minor revision number, or **R**.

Note

The LED repeats the cycle until the **BOOTLOAD** button is released.

4. Confirm that the displayed numbers match the upgrade version you have performed. If the numbers do not match, contact Ross Video Technical Support.

This completes the procedure to read software version numbers.

SMPTE 269M Fault Reporting

In This Chapter

This chapter contains the following sections:

- Overview
- Jumper Setup
- Frame Connections
- Details

Overview

The SMPTE 269M Fault Reporting system, also known as a SMPTE “alarm”, indicates if one or more frame modules encounter a fault or an abnormal condition. The **DAC-8013A** provides a jumper to enable SMPTE-269M fault reporting. The card connects by means of an internal interface circuit to an auxiliary telco connector on RossGear 8000 series frames. When the frame connection is interfaced with a customer-designed system of LEDs or audible alarms, faults can be traced to a specific frame when a card fault occurs within that frame.

The following diagram illustrates a general arrangement for SMPTE 269M alarm reporting:

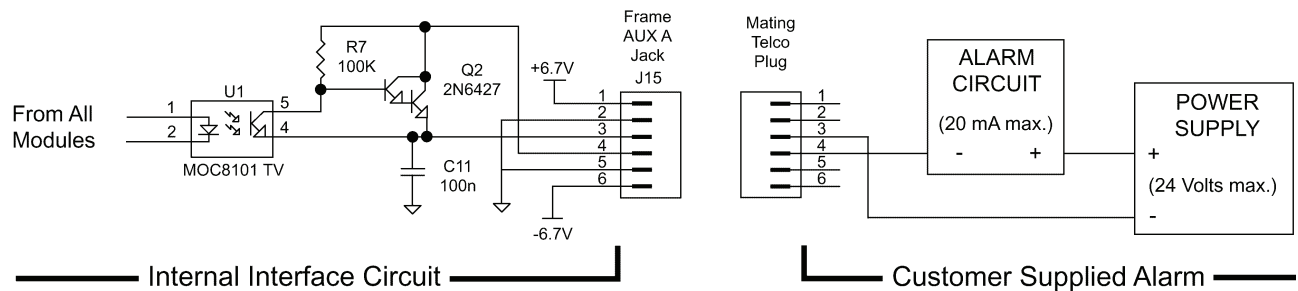


Figure 7. SMPTE 269M Alarm Reporting: Internal Interface and Typical Connections

Jumper Setup



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.

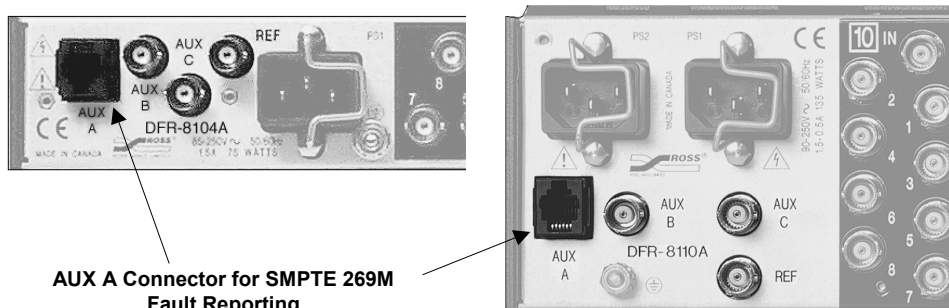
Use the following procedure to set up SMPTE Fault Reporting for the **DAC-8013A**:

1. To access the **JP1**, remove the card from the frame by pressing down the white card ejector tab and pulling the card from the frame slot.
2. Observing all static discharge and handling precautions, place the card with the component side facing up on a clean and flat surface.
3. Set **JP1** as follows:
 - To enable SMPTE Fault Reporting, set jumper **JP1** to **Enable**.
 - To disable SMPTE Fault Reporting, set jumper **JP1** to **Disable**.

This completes the procedure for setting up SMPTE Fault Reporting for the **DAC-8013A**.

Frame Connections

The SMPTE 269M Fault Reporting connection on RossGear 8000 series frames is provided by the auxiliary telco connector, **AUX A**, for interfacing with a customer-designed alarm system.



AUX A Connector for SMPTE 269M Fault Reporting

Figure 8. SMPTE 269M Alarm Reporting Frame Connections

Details

The fault report contacts are closed when the card detects an internal failure or a power loss condition. The fault report will pulse closed for 1 to 2 ms every 16ms when the input signal is low, missing, or invalid.

Some internal failures are:

- Failure of the card to initialize
- Failure in the fault reporting circuitry
- Failure to detect a valid input signal to the card

For additional information on alarm system design, refer to the SMPTE document *ANSI/SMPTE 269M - 1999*.

Specifications

In This Chapter

This chapter includes the technical specifications for the **DAC-8013A** card.

Table 2. DAC-8013A Technical Specifications

Category	Parameter	Specification
SDI Input	Number of Inputs	1
	Standards	SMPTE 259M-C 270Mb/s 525/625 Lines
	Return Loss	>22dB to 300MHz
	Equalization	Automatic, up to 200 meters
	Input Impedance	75Ω
SDI Output	Number of Outputs	1
	Standards	SMPTE 259M-C 270Mb/s 525/625 Lines
	Output Impedance	75Ω
	Return Loss	>20dB to 300MHz
	Signal Level	800mV +/- 10%
	DC Offset	+/- 10mV
	Rise and Fall Time	800pS (20-80%)
	Overshoot	<5%
Component Video Outputs	Number of Outputs	2 sets
	Component Video Format (525/625 Lines)	RGB: Betacam, SMPTE/EBU N10 YPrPb: Betacam, SMPTE/EBU N10, MII
	Output Level (typical)	1V p-p
	Output Impedance	75Ω
	Output Return Loss	>45dB to 6MHz
	DC Offset	+/- 10mV
	Luminance Frequency Response	+/- 0.25dB to 5.5MHz
	Output Quantizing	10 bits
CVBS Video Output	Number of Outputs	1 (shared with Sync output)
	Standard	NTSC, PAL
	Output Level	1V p-p
	Output Impedance	75Ω
	Output Return Loss	>45dB to 6MHz
	DC Offset	+/- 20mV
Sync Output	Number of Outputs	1 (shared with CVBS output)
	Output Level	2V p-p or 4V p-p
	Output Impedance	75Ω
	Output Return Loss	>45dB to 6MHz
	Rise and Fall Time	134 ns
Power	Total Power Consumption	4.5W

Specifications are subject to change without notice.

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this RossGear product is not required. In the event of problems with your DAC-8013A, the following basic troubleshooting checklist may help identify the source of the problem. If the module still does not appear to be working properly after checking all possible causes, please contact your Ross Video products distributor, or the Ross Video Technical Support department at the numbers listed under the “**Contact Us**” section at the end of this manual.

1. **Visual Review** – Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, 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. **Reseat 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. **Card Exchange** – Exchanging a suspect card with a card that is known to be working correctly is an efficient method for localizing problems to individual cards.

Warranty and Repair Policy

The RossGear DAC-8013A 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 DAC-8013A 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 DAC-8013A 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 DAC-8013A User Manual provides all pertinent information for the safe installation and operation of your Product. Ross Video policy dictates that all repairs to the DAC-8013A 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 DAC-8013A, 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 DAC-8013A. 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

DAC-8013A and Related Products

Your **DAC-8013A SDI to Analog Component Converter** is a part of the RossGear family of products. Ross Video offers a full line of RossGear terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, keyers, switchers, as well as analog audio and video products.

Standard Equipment

- **DAC-8013A** SDI to Analog Component Converter
- **8013ADR-004** SDI to Analog Component Converter User Manual

Optional Equipment

- **8013ADR-004** additional SDI to Analog Component Converter User Manual
- **DFR-8104A** Digital Products Frame and Power Supply (PS-8102)
(1RU, holds 4 modules, includes 1 power supply)
- **DFR-8104A-C** Digital Products Frame with Cooling Fan Module and Power Supply (PS-8102)
(1RU, holds 4 modules, includes 1 power supply)
- **DFR-8110A** Digital Products Frame and Power Supply (PS-8102)
(2RU, holds 10 modules, includes 1 power supply)
- **DFR-8110A-C** Digital Products Frame with Cooling Fan Module and Power Supply (PS-8102)
(2RU, holds 10 modules, includes 1 power supply)

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

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