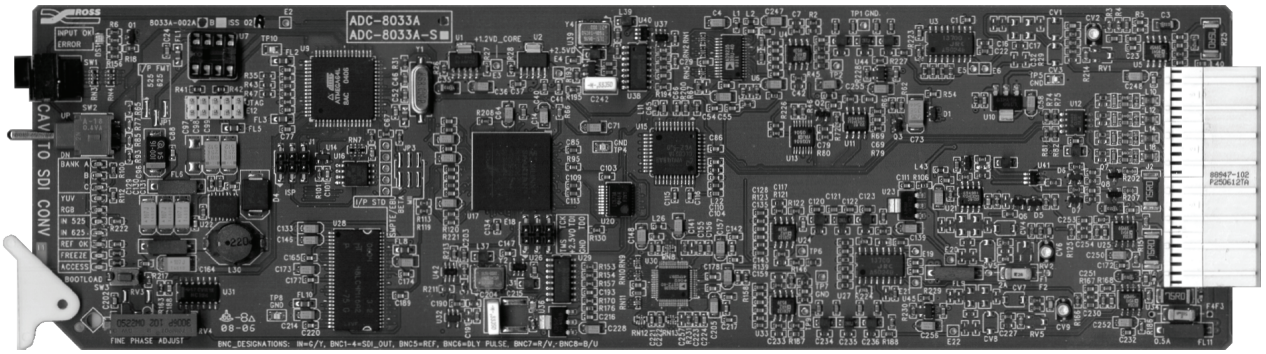
Ross Video Limited

ADC-8033A(-S)

Analog Component to SDI Video Converter

User Manual



Ross Part Number: 8033ADR-004
Issue: 03

Live Production Technology™

ADC-8033A(-S) • Analog Component to SDI Video Converter User Manual

- Ross Part Number: 8033ADR-004
- Document Issue: **03**
- Printed in Canada.

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Trademarks

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 numerique 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

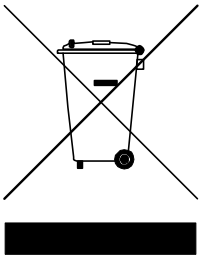
Routine maintenance to this RossGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the "Error! Reference source not found." section on the last page of this 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.

Contents

Introduction

In This Chapter

This chapter contains the following sections:

A Word of Thanks

Congratulations on choosing the Ross Video **ADC-8033A(-S)** Analog Component to SDI Video Converter. You have purchased a powerful, versatile, and advanced converter. The ADC-8033A is part of a full line of Digital Conversion Products within the RossGear Terminal Equipment family of products, backed by our experience in engineering and design expertise since 1974.

You will be pleased at how easily your new ADC-8033A(-S) 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 and operation of your ADC-8033A, please contact us at the numbers listed in this publication. Our technical support staff is always available for consultation, training, or service.

Overview

The ADC-8033A(-S) is the perfect solution for converting analog component (YUV/RGB) sources such as VTRs, cameras and character generators for use in the digital realm.

The component YUV/RGB video signal, with or without setup, is converted to four SDI 4:2:2 (SMPTE-259M) outputs with the highest level of precision. This is achieved because all signal processing and color space conversion is performed in the digital domain. A two times over-sampled 12-bit A-D conversion and high quality digital filtering ensure superb frequency response.

The ADC-8033A(-S) is available in two different models:

- **ADC-8033A —** The base model converter includes **Proc Amp**, **Line Delay,** and **Line Synchronizer** modes.
- **ADC-8033A-S —** The "**S**" model includes **Frame Delay** and **Frame Synchronizer** modes, along with all the features available on the ADC-8033A(-S).

The ADC-8033A-S version comes with a full featured frame synchronizer, capable of synchronizing incoming video to house reference. Various timing modes are available to accommodate most situations. New techniques in frame synchronization contribute to the low power requirements and compact design. The complete circuit for the ADC-8033A-S, including color space converter, frame (or line) synchronizer, serializer, tracking delay pulse, three 12-bit A-D converters and a microprocessor are all contained on a single DA-sized card. Additional daughter cards are not required.

Operating status and function controls are all accessible on the front edge on the card. To simplify configuration, a Heads-Up Display is provided. When enabled it is super-imposed over all card outputs.

The ADC-8033A(-S) fits into the Ross 8000 series digital frames, with four cards in the DFR-8104A (1RU), and up to ten cards in the DFR-8110A (2RU). Please refer to the frame User Manual for specific ventilation and cooling instructions to maintain optimum operating conditions. This card also fits into Leitch* FR-6800 series frames to provide you with greater installation versatility.

The ADC-8033A(-S) converters are part of a full line of RossGear digital distribution products engineered to satisfy the highest quality broadcast standards and the most demanding requirements of your facility.

Functional Block Diagram

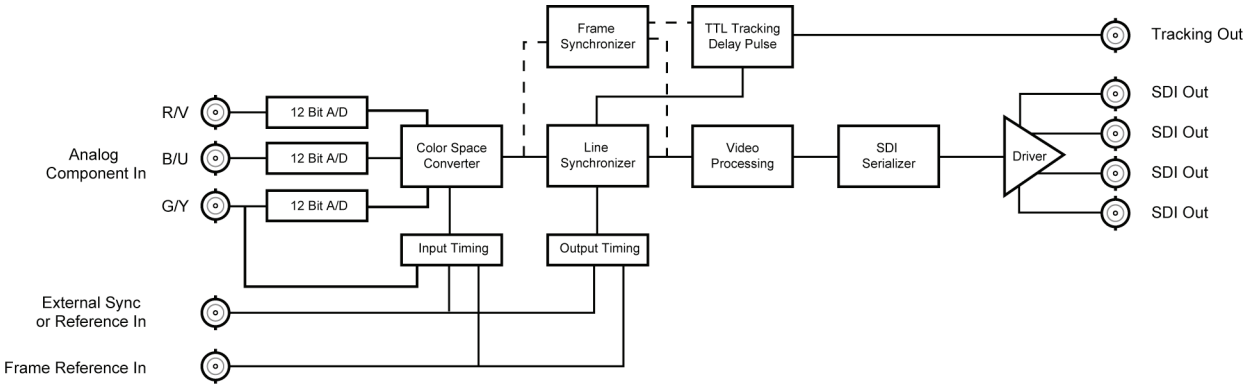


Figure 1. Simplified Block Diagram of ADC-8033A(-S) Functions

* Leitch is a trademark of Leitch Technology Corporation

Features

The following features make the ADC-8033A(-S) the most flexible, high-quality conversion card for your analog to digital conversion requirements:

- YUV input from Betacam, MII and SMPTE/EBU formats
- All RGB input formats supported
- Four serial digital outputs
- 12-bit analog to digital conversion
- 2x over-sampling for excellent frequency response
- Automatic 525/625 line selection
- Can pass vertical interval signals
- Programmable vertical interval blanking
- Compact design on a single DA-sized card
- Heads-Up Display
- Optional Frame Synchronization (no daughter card required)
- Field-upgradeable Frame Synchronization option available
- Extensive Proc Amp controls
- Freeze modes
- Horizontal and vertical timing adjustments
- Setup adjustment
- Black level offset
- Pass or clip Super Black
- Status indicator LEDs on card edge
- Choice of input timing source
- Choice of reference inputs
- Tracking Delay Output for companion audio synchronizer
- Built-in test signals (FF color bars, SDI Checkfield)
- 10 modules fit in a 2RU frame
- Fits Ross Video 8000 series digital products frames and Leitch FR-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 **ADC-8033A(-S)** 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. Refer to the respective User Manuals for details.
- "**Operator**" and "**User**" both refer to the person who uses the **ADC-8033A(-S)**.
- "**Board**", "**Card**", and "**Module**" all refer to the **ADC-8033A(-S)** module itself.
- "**System**" and "**Video system**" refers to the mix of interconnected production and terminal equipment in which the **ADC-8033A(-S)** operates.

Abbreviations

The following abbreviations may be used throughout the text:

Abbreviation	Definition
ADC	Analog to Digital Converter
A-D	Analog-to-Digital
D-A	Digital-to-Analog
DA	Distribution Amplifier
DAC	Digital to Analog Converter
DDR	Digital Disk Recorder
DIS	Disable
DVR	Digital Video Recorder
EN	Enable
LOW SIG	Low Signal
RU	Rack Unit
SDI	Serial Digital Interface
VCR	Video Cassette Recorder
VTR	Video Tape Recorder

Installation and Setup

In This Chapter

This chapter contains the following information sections:

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

Static Discharge

Whenever handling the ADC-8033A(-S) 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 ADC-8033A(-S) 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 ADC-8033A(-S) in a RossGear 8000 series digital distribution frame:

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

Note

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

- After selecting the desired frame installation slot, hold the ADC-8033A(-S) card by the edges and carefully align the card edges with the slots in the frame. Then fully insert the card into the frame until the rear connection plug is properly seated.

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 ADC-8033A(-S) when mounted in RossGear 8000 series Digital Products Frames. See the following frame rear panel diagram for BNC input and output designations:

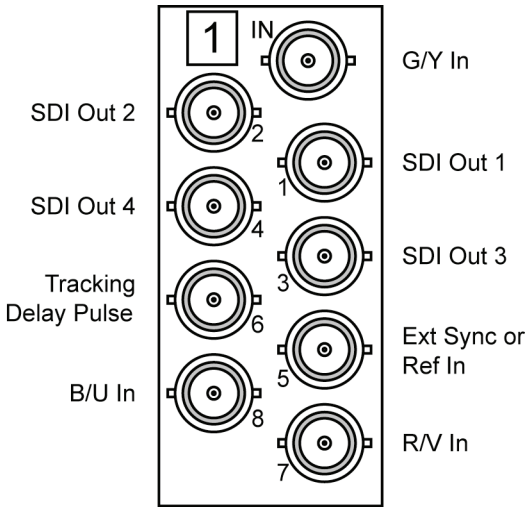


Figure 2. ADC-8033A(-S) BNC Designations for RossGear Frames

User Controls

In This Chapter

This section contains a description of the ADC-8033A(-S) user controls.

Note

> The ADC-8033A(-S) uses card edge controls for changing operational parameters. The card defaults with switch access set to the locked position. Refer to the "**Bank A-F: Switch Access**" section in Chapter 4, "**Using Banks**", before attempting to make any adjustments.

User Controls

The following are general descriptions of the user controls identified in the figure below.

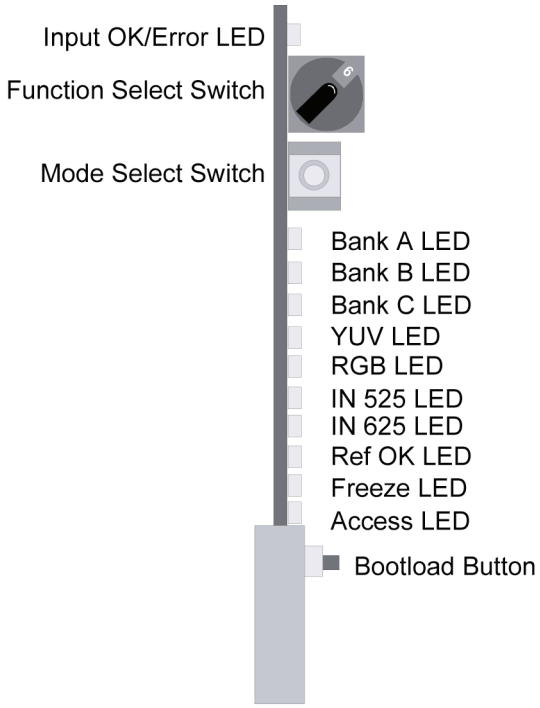


Figure 3. Card-edge User Controls

Function Select Switch

The **Function Select** switch is a 16-position rotary switch used to select functions such as proc amp controls and timing adjustment menu items. The switch works in conjunction with the Mode Select toggle switch; first, the function category is selected, and then the toggle switch is used to select modes or configuration settings within that function selection. See Chapter 4, "**Using Banks**" for complete details.

Mode Select Switch

The **Mode Select** switch is used to enable, disable, and select specific ADC-8033A(-S) *functional modes*, or *configurations*, within the operational function menu (selected first with the **Function Select** switch). The **Mode Select** switch is a 3-position momentary toggle switch with an automatic spring-return to the center position.

There are two methods of toggling to select basic and advanced level menu items:

- Single toggle to select single options.
- Hold toggle to scroll through multiple values or options.

Toggling the switch for menu selection is made according to two basic menu design categories:

- Menu selections utilizing a scrolling *wrap-around* style of selection (from last menu item directly back to first menu item).
- Menu selections utilizing a *bi-directional* style of selection, with upper and lower range limits.

Bootload Button

This button is used to upgrade the ADC-8033A(-S) software or firmware. Refer to Chapter 5, "**Upgrades**" for complete details on the Bootload process.

Status and Selection LEDs

The front edge of the card features LEDs that display the status of the card, and indicate menu function and configuration selections.

As selections are made from the menu tables, (Refer to Chapter 4, "**Using Banks**" for complete bank menu table descriptions), the LEDs display the status of the input signals, as well as menu bank selections. Basic LED displays and descriptions are provided in the following table:

Table 1. Selection and Status LED Descriptions

LED	Color	Display and Description
INPUT OK	Green	When lit, the card is functioning normally and no anomalies have been detected. The following conditions must be satisfied: • A valid input signal is present. • A valid input timing signal is present (see Bank **A-4**). • A valid reference signal is present when a reference is required, and that the reference standard matches the input standard. Selecting Line Sync or Frame Sync modes require that a reference signal is present.
ERROR	Red	When lit, conditions for INPUT OK are not met. Mutually exclusive with INPUT OK.
BANK A	Green	When lit, Bank A is selected.
BANK B	Green	When lit, Bank B is selected.
BANK C	Green	When lit, Bank C is selected.
YUV	Green	When lit, the input signal is selected to be YUV in Bank **A-2**.
RGB	Green	When lit, the input signal is selected to be RGB in Bank **A-2**.
IN 525	Green	When lit, the input timing signal is 525.
IN 625	Green	When lit, the input timing signal is 625.
REF OK	Green	When lit, this LED indicates a reference signal is present and that the reference signal is locked. • *On* = External reference standard matches the input standard • *Flashing* = External reference standard does not match the input standard • *Off* = No external reference is present
FREEZE	Yellow	When lit, this LED indicates that the output is frozen (ADC-8033A-S only).
ACCESS	Yellow	When lit, this LED indicates that Switch Access is unlocked. Bank A, B, and C menu functions are accessible.

Using Banks

In This Chapter

This section provides a detailed explanation on using Bank functions. The following topics are discussed:

- General Operating Rules
- Selecting Banks
- Function Tables
- Using Bank A Functions
- Using Bank B Functions
- Using Bank C Functions
- Timing Modes
- Input/Output Timing
- Tracking Delay Pulse

General Operating Rules

Please note the following important operating rules for the ADC-8033A(-S):

- Whenever the card is powered up, it defaults to Bank A, and the Bank A LED is lit.

Note

> The card defaults with switch access set to the locked position. To unlock the access refer to the "**Bank A-F: Switch Access**" section on page 4-10 before attempting to make any adjustments.

- For each of the supported video formats (SMPTE/EBU, MII, Betacam and NTSC related in RGB/YUV) the card stores the default or user-adjusted video settings independently in non-volatile memory. The selection of settings is determined by the Video Standard Bank A-2.
- Always check to see that the **Input OK** LED is lit. If not, check that the input is valid, and that a valid input timing signal is present as per Bank A-4. If a reference is used, check that the reference is valid and that the reference standard matches the input standard.

Before making adjustments, choose the method that you wish to use. Two methods are available:

1. **No Display —** Adjustments are made using the **Function Select** and **Mode Select** switches, without the assistance of the Heads-Up Display. Results should be confirmed with test equipment suitable for measuring the parameter being adjusted (such as a waveform monitor or vector scope).
2. **Heads-Up Display —** Adjustments are made using **Function Select** and **Mode Select** switches in conjunction with the Heads-Up Display. Ensure that the Heads-Up Display is enabled (Bank A-1). Note that the display is superimposed over *all* ADC-8033A(-S) video outputs.

Operating Conventions For Function Tables

The following rules apply to the function tables that are used throughout this section:

- The label " **+** " instructs you to toggle the **Mode Select** switch **(SW2)** *up* momentarily.
- The label " **-** " instructs you to toggle the **Mode Select** switch **(SW2)** *down* momentarily.
- The label " **+** (h) " instructs you to *hold* the **Mode Select** switch **(SW2)** *up* for one second or more.
- The label " **-** (h) " instructs you to *hold* the **Mode Select** switch **(SW2)** *down* for one second or more.

Selecting Banks

Function Select switch functionality is divided into three banks of functions. Use the following procedure to select Bank **A**, **B** or **C** as required:

1. Rotate **Function Select (SW1)** to position 0. Note that position 0 is always used to select the bank, regardless of the bank that you are currently using.
2. Toggle **Mode Select (SW2)** up or down to choose the desired bank. Three positions are available: Bank A, B, or C.
3. The table below illustrates each switch function, along with the Heads-Up Display label, the Status LED indication, and the default value. If you are not using a display, be sure to verify your selection on the Status LEDs.

Table 2. Switch and Bank Selection

Mode Select		Heads-Up Display Label	Status LED	Default Bank
+	A	BANK A	BANK A	A
	B	BANK B	BANK B	
-	C	BANK C	BANK C	

Function Tables

This section presents a detailed charting of all board-level ADC-8033A(-S) functions in the following three tables. The operational usage is explained in the next section.

Note

Functions, as listed in the Function column as being stored in memory, always power up in the last known state. All other items, however, power up in the default state, regardless of their previous state.

Bank A Function Table

Table 3. Function Select: Bank A Function Table

Function Select	Function	Mode Select Options	Heads-Up Display On-Screen Label and Value	Default Value
0	Bank Select	+ A B - C	BANK A B C	A
1	Heads-Up Display	+ (h) On - Off	HEADS UP ON OFF	OFF
2	Input Video Standard [m]	+ YUV BETA YUV MII YUV SMPTE RGB NTSC RGB MII - RGB SMPTE	IN STD YUV BETA YUV MII YUV SMPTE RGB NTSC RGB MII RGB SMPTE	YUV BETA
3	N/A			
4	Input Timing [m]	+ Frame BNC 5 - Y/G	IN TIMING FRM BNC 5 Y/G	Y/G
5	Test Pattern	+ SDI Check Field Full Field Color Bars - Off	TEST PTN PATH FF BARS OFF	OFF
6	N/A			
7	N/A			
8	Video Gain [m]	+ Increase - Decrease	VID GAIN (###.#)%	100.0% *
9	Black Level Offset [m]	+ Increase - Decrease	BLK OFF (##.#) IRE	0.0 IRE *
A	Chroma Gain [m]	+ Increase - Decrease	CHROMA (###.#)%	100.0% *
B	N/A			
C	C_B Gain [m]	+ Increase - Decrease	CB GAIN (###.#)%	100.0% *
D	N/A			
E	Factory Defaults	+ (h) Reset All - (h) Reset Proc Amp	DEFAULT ALL RST PROC RST	N/A
F	Switch Access **	+ Locked - (h) Unlocked	ACCESS LOCKED UNLOCKED	LOCKED

* Indicates Proc Amp controls that are affected by position E, Factory Defaults function.

** Locking Switch Access shuts off the Heads-up Display. Unlocking will not restore the display if it was previously enabled. This must be performed manually.

[m] Stored in non-volatile memory

Bank B Function Table

Table 4. Function Select: Bank B Function Table

Function Select	Function	Mode Select Options	Heads-Up Display On-Screen Label and Value	Default Value
0	Bank Select	+ A B - C	BANK A B C	A
1	Setup [m]	+ On - Off	SETUP ON OFF	ON *
2	N/A			
3	VI Blanking [m]	+ Blank - Pass Through	VI BLANK BLANK PASS	PASS
4	VI End [m]	+ 21 20 - 19	VI END 21 20 19	19
5	SuperBlack [m]	+ Clip - Pass Through	SUPER BLK CLIP PASS	PASS
6	V Bit Location [m] (525 only)	+ Line 20 - Line 10	V BIT LOC 20 10	20
7	N/A			
8	N/A			
9	N/A			
A	H Crop [m]	+ On - Off	H CROP ON OFF	OFF
B	Crop Left [m]	+ Increase - Decrease	CROP LEFT (##)	8
C	Crop Right [m]	+ Increase - Decrease	CROP RIGHT (##)	8
D	N/A			
E	N/A			
F	N/A			

* Indicates Proc Amp controls that are affected by position E, Factory Defaults function.

[m] Stored in non-volatile memory

Bank C Function Table

Table 5. Function Select: Bank C Function Table

Function Select	Function	Mode Select Options	Heads-Up Display On-Screen Label and Value	Default Value
0	Bank Select	+ A B - C	BANK A B C	A
1	Timing Mode [m]	+ Frame Sync * Frame Delay * Line Sync - Line Delay	TIME MODE FS FD LS LD	LS (FS on S model)
2	H Delay [m]	+ Increase - Decrease	H DELAY (####)	0
3	H Reset	+ Zero - No action	H RESET ZERO	N/A
4	V Delay [m]	+ Increase - Decrease	V DELAY (###)	0
5	V Reset	+ Zero - No action	V RESET ZERO	N/A
6	Set Min. Delay	+ Zero No action	MIN DELAY ZERO	N/A
7	N/A			
8	Freeze Mode [m]	+ Frame Field 2 - Field 1	FREEZE MODE FRM FLD 2 FLD 1	FLD 1
9	Forced Freeze	+ Freeze ** - Pass Through	FORCE FREEZE ON OFF	OFF
A	Input Timing Loss [m]	+ Freeze ** ‡ No Output - Black ***	IN TMG LOSS FRZ NONE BLK	BLK
B	N/A			
C	Forced Black [m]	+ On - Off	FORCE BLK ON OFF	OFF
D	Forced Mono [m]	+ On - Off	FORCE MONO ON OFF	OFF
E	N/A			
F	Reference Select [m]	+ BNC 5 - Frame	REF SELECT BNC 5 FRM	FRM

* Only available on ADC-8033A-S.

** When Freeze mode is activated the freeze is determined by C-8 (Freeze Mode).

[m] Stored in non-volatile memory

‡ Only available in Frame Sync Timing Mode and only if a valid reference is present.

*** Only available in Frame or Line Sync Timing Modes and only if a valid reference is present.

Using Bank A Functions

The following topics are discussed in this section:

- Heads-Up Display
- Input Video Standard
- Input Timing
- Test Pattern
- Video Gain
- Black Level Offset
- Chroma Gain
- C_B Gain
- Factory Defaults
- Switch Access

Important

The card defaults with switch access set to the locked position. To unlock the access, refer to "**Bank A-F: Switch Access**" before attempting to make any adjustments.

Bank A-1: Heads-Up Display

Use the following procedure to enable or disable the Heads-Up Display:

1. Select Bank A, and rotate **Function Select** to position 1.
2. Choose the desired display mode:
   - Hold **Mode Select** *up* for one second to enable the display.
   - Toggle **Mode Select** *down* to disable the display.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	1	+ (h) On - Off	HEADS UP ON OFF	OFF

Note

The display is superimposed over all ADC-8033A(-S) video outputs. Do not use this feature with "on-air" signals.

Bank A-2: Input Video Standard

The Input Video Standard function allows you to select from six input video standards.

Use the following procedure to select a video standard:

1. Select Bank A, and rotate **Function Select** to position 2.
2. Toggle **Mode Select** *up* or *down* to select from the available video standards.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	2	+ YUV BETA YUV MII YUV SMPTE RGB NTSC RGB MII - RGB SMPTE	IN STD YUV BETA YUV MII YUV SMPTE RGB NTSC RGB MII RGB SMPTE	YUV BETA

Bank A-4: Input Timing

The Input Timing function selects where the input signal timing will come from.

Normally, the card obtains synchronization from the Y or G channel of the input signal. However, if the input does not contain sync, an external sync source must be used. The timing of any external reference must be ± 1µs relative to the normal position of sync on the input signal.

Use the following procedure to select a timing source:

1. Select Bank A, rotate **Function Select** to position 4.
2. Toggle **Mode Select** up or down to select from the available timing sources.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	4	+ Frame BNC 5 - Y/G	IN TIMING FRM BNC 5 Y/G	Y/G

Important

Setting both Input Timing (bank A-4) and Reference Select (bank C-F) to the same source disables the synchronizing operation of the ADC-8033A-S. Refer to "**Input/Output Timing"** on page 4-17 for further details.

Bank A-5: Test Pattern

The **Test Pattern** function allows you to select from two test pattern types or disable the test pattern option.

In Line Delay and Frame Delay modes a valid Input Timing signal (Bank A-4) must be present.

In Line Sync and Frame Sync modes a valid Input Timing signal (Bank A-4) or a valid reference signal (Bank C-F) must be present.

Use the following procedure to select or disable the test pattern function:

1. Select Bank A, and rotate **Function Select** to position 5.
2. Toggle **Mode Select** *up* or *down* to select the desired test pattern.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	5	+ SDI Check Field Full Field Color Bars - Off	TEST PTN PATH FF BARS OFF	OFF

Note

When using the SDI Check Field test pattern, the Heads-Up Display must be Off for the test pattern to provide accurate results.

Bank A-8: Video Gain

Use the following procedure to adjust the output video gain:

1. Select Bank A, and rotate **Function Select** to position 8.
2. Adjust video gain up or down as required:
   - Toggle **Mode Select** *up* to increase video gain incrementally.
   - Hold **Mode Select** *up* to increase video gain continuously.
   - Toggle **Mode Select** *down* to decrease video gain incrementally.
   - Hold **Mode Select** down to decrease video gain continuously.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	8	+ Increase - Decrease	VID GAIN (###.#)%	100%

Note

Video Gain is one of the Proc Amp controls that can be reset using **Factory Defaults** (Bank A-E).

Bank A-9: Black Level Offset

This setting is a black level offset that is *not* affected by the **Setup** function (Bank B-1). For example, with **Black Level Offset** at 1 IRE, a setup level of 7.5 IRE, and **Setup** off, the black level will be 8.5 IRE. With **Setup** on and a setup level of 7.5 IRE, the black level will be 1.0 IRE.

Use the following procedure to change the output black level:

1. Select Bank A, and rotate **Function Select** to position 9.
2. Choose the desired Black Level Offset setting:
   - Toggle **Mode Select** *up* to increase the black level offset incrementally.
   - Hold **Mode Select** *up* to increase the black level offset continuously.
   - Toggle **Mode Select** *down* to decrease the black level offset incrementally.
   - Hold **Mode Select** down to decrease the black level offset continuously.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	9	+ Increase - Decrease	BLK OFF (##.#) IRE	0 IRE

Note

Black Level Offset is one of the Proc Amp controls that can be reset using **Factory Defaults** (Bank A-E).

Bank A-A: Chroma Gain

Use the following procedure to adjust the output chroma gain:

1. Select Bank A, and rotate **Function Select** to position A.
2. Adjust chroma gain up or down as required:
   - Toggle **Mode Select** *up* to increase chroma gain incrementally.
   - Hold **Mode Select** *up* to increase chroma gain continuously.
   - Toggle **Mode Select** *down* to decrease chroma gain incrementally.
   - Hold **Mode Select** *down* to decrease chroma gain continuously.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	A	+ Increase - Decrease	CHROMA (###.#)%	100%

Note

Chroma Gain is one of the Proc Amp controls that can be reset using **Factory Defaults** (Bank A-E).

Bank A-C: C_B Gain

Use the following procedure to adjust the ADC-8033A(-S)'s output C_B gain:

1. Select Bank A, and rotate **Function Select** to position C.
2. Adjust C_B Gain up or down as required:
   - Toggle **Mode Select** *up* to increase C_B gain incrementally.
   - Hold **Mode Select** *up* to increase C_B gain continuously.
   - Toggle **Mode Select** *down* to decrease C_B gain incrementally.
   - Hold **Mode Select** *down* to decrease C_B gain continuously.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	C	+ Increase - Decrease	CB GAIN (###.#)%	100%

Note

C_B Gain is one of the Proc Amp controls that can be reset using **Factory Defaults** (Bank A-E).

Bank A-E: Factory Defaults

This function allows you to return all controls to their default values, or simply the four "Proc Amp" controls by themselves.

Use the following procedure to select factory default values:

1. Select Bank A, and rotate **Function Select** to position E.
2. Select the desired default settings:
   - Hold **Mode Select** up for one second to reset all adjustments to their default values.
   - Hold **Mode Select** down for one second to reset the "Proc Amp" adjustments to their default values (**Video Gain**, **Black Level Offset**, **Chroma Gain**, and **C_B Gain**).

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	E	+ (h) Reset All - (h) Reset Proc Amp	DEFAULT ALL RST PROC RST	N/A

Bank A-F: Switch Access

The **Switch Access** function allows you to lock or unlock user access to all adjustment parameters. The "lock" function should be performed after installation to secure all settings, and to prevent anyone from accidentally changing the settings. Note the following rules:

- When access is locked, all menu items are locked, no adjustments can be made and the Heads-Up Display is automatically turned off.
- When you unlock switch access and you wish to use the Heads-Up Display, you must manually enable it (Bank A-1).

Use the following procedure to lock or unlock switch access:

1. Select Bank A, and rotate **Function Select** to position F.
2. Choose the desired access mode:
   - Toggle **Mode Select** *up* to lock switch access. Adjustments cannot be made, and the display is disabled. The **ACCESS** LED is off.
   - Hold **Mode Select** *down* for one second to unlock switch access. Adjustments can now be made. The **ACCESS** LED is on.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
A	F	+ Locked - (h) Unlocked	ACCESS LOCKED UNLOCKED	LOCKED

Using Bank B Functions

The following topics are discussed in this section:

- Setup
- Vertical Interval Blanking
- Vertical Interval End
- SuperBlack
- Vertical Bit Location
- Horizontal Line Crop
- Horizontal Line Crop Left
- Horizontal Line Crop Right

Bank B-1: Setup

If your analog input video has setup, it must be removed in order for the ADC-8033A(-S) to convert it to valid SDI output. Use this function to remove any setup that may exist on the analog input signal.

1. Select Bank B, and rotate **Function Select** to position 1.
2. Choose the desired setup value:
   - Toggle **Mode Select** *up* to remove setup from the input signal.
   - Toggle **Mode Select** *down* if there is no setup on the input signal.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	1	+ On - Off	SETUP ON OFF	OFF

Bank B-3: Vertical Interval Blanking

Use the following procedure to blank the vertical interval, or allow the signals in the vertical interval to pass through the **ADC-8033A(-S)**. The last line of the vertical interval is set in Bank B-4.

1. Select Bank B, and rotate **Function Select** to position 3.
2. Choose the desired blanking mode:
   - Toggle **Mode Select** *up* to blank the vertical interval.
   - Toggle **Mode Select** *down* to pass the vertical interval.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	3	+ Blank - Pass Through	VI BLANK BLANK PASS	PASS

Bank B-4: Vertical Interval End

In 525 mode, the **ADC-8033A(-S)** has a programmable Vertical Interval that allows you to set where the VI ends. The line chosen in this function is considered the last line in the Vertical Interval.

Note

> Video setup is not removed in the vertical interval even if the Setup Bank (B-1) is set to ON.

Use the following procedure to select the end point for vertical blanking:

1. Select Bank B, and rotate **Function Select** to position 4.
2. Toggle **Mode Select** *up* or *down* to select the desired vertical interval end.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	4	+ 21 20 - 19	VI END (##) 21 20 19	19* or 22**

* 525 – line mode

** 625 – line mode, value fixed at 22

Bank B-5: SuperBlack

Use the following procedure to enable or disable the SuperBlack clipping function:

1. Select Bank B, and rotate **Function Select** to position 5.
2. Choose the desired SuperBlack setting:
   - Toggle **Mode Select** *up* to clip any value below black.
   - Toggle **Mode Select** *down* to allow the active input signal to pass through unaltered.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	5	+ Clip - Pass Through	SUPER BLK CLIP PASS	PASS

Bank B-6: V Bit Location

Use the following procedure to force the V bit to be asserted on line 10 or line 20.

Note

V Bit Location is only available in 525. V-BIT LOC cannot be changed in 625.

1. Select Bank B, and rotate **Function Select** to position 6.
2. Choose the desired line:
   - Toggle **Mode Select** *up* to have the V bit set to line 20.
   - Toggle **Mode Select** *down* to have the V bit set to line 10.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	6	+ Line 20 - Line 10	V BIT LOC 20 10	20

Bank B-9: Horizontal Line Crop

The active video portion of an SDI video line is wider than that of an analog component video line. The smaller active analog video is centered on that of the SDI video. Use this card to crop the leading, the trailing, or both video samples on the output SDI video line. This will avoid possible errors downstream if converting back to analog component video.

Use the following procedure to enable or disable horizontal line cropping.

1. Select Bank B, and rotate the **Function Select** to position 9.
2. Toggle the Mode Select *up* or *down* to select the desired cropping option.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	9	+ On - Off	H CROP ON OFF	OFF

Bank B-A: Horizontal Crop Left

The output SDI video line can be cropped starting at the beginning of the line in increments of one pixel up to 350.

Use the following procedure to select the desired number of pixels cropped.

1. Select Bank B, and rotate **Function Select** to position A.
2. Toggle **Mode Selec**t *up* or *down* to select the desired number of pixels cropped.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	A	+ Increase - Decrease	CROP LEFT (#)	8

Bank B-B: Horizontal Crop Right

The output SDI video line can be cropped from the end of the line backwards toward the beginning of the line in increments of one pixel up to 350.

Use the following procedure to select the desired number of pixels cropped.

1. Select Bank B, and rotate **Function Select** to position B.
2. Toggle **Mode Selec**t *up* or *down* to select the desired number of pixels cropped.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
B	B	+ Increase - Decrease	CROP RIGHT (#)	8

Timing Modes

The ADC-8033A and ADC-8033A-S offer two sets of timing modes; Line Delay/Sync and Frame Delay/Sync.

ADC-8033A Timing Mode Features

- Line Delay and Line Sync timing modes
- Two lines of memory
- Can be timed within one line in 37ns increments
- Can be field-upgraded to the Frame Sync version

ADC-8033A-S Timing Mode Features

- Frame Delay and Frame Sync as well as Line Delay and Line Sync timing modes
- One frame of memory
- Can be timed within one frame in 37ns increments

Line Delay (ADC-8033A & ADC-8033A-S)

Line Delay mode uses the signal selected in bank A-4 to generate the output timing. There is a constant delay between the input and the output. The external reference is not used. This is useful in applications where a constant delay through the card is required.

The delay through the card has a minimum value, as described in Chapter 6, "**Specifications**". Output timing can be adjusted from this minimum delay up to an additional two lines in half-pixel increments.

Line Sync (ADC-8033A & ADC-8033A-S)

Line Sync mode uses the external reference to generate the output timing on a line-by-line basis, but uses the timing from the signal selected in Bank A-4 to decide when a frame begins.

Whenever a signal is received, the output-timing generator waits for the next falling edge of H Sync on the external reference before displaying the incoming line. The advantage of this mode is that as long as all input sources are timed to be on the same line, the output timing stays constant, regardless of which input is selected. This is very useful in that all sources to the ADC-8033A(-S) (for example, from a routing switcher) only need to be lined up to the same line.

The **Line Sync** mode has internal latency, so that using minimum delay still means that the output video will not be lined up with the external reference. To do so would have added even more latency, which would not be desirable. However, output timing can be delayed by up to two lines from the minimum delay point on, in half-pixel increments, so that the output video can be lined up as required.

Note

If two input sources are not on the same line, then switching from one source to the other causes a jump in the output timing by an exact number of lines. For example, if the two sources are 2.5 lines apart, the output will jump by either 2 or 3 lines depending on the position of the sources with respect to the external reference.

Threshold Point

As the input signal is delayed in time, there comes a point where the output timing will have to jump by exactly one line (the output must always come after the input). This point is called the **threshold point**. In 525 line video format, when comparing the input signal with the external reference, the threshold point is 1.9 microseconds after the falling edge of the external reference. In other words, if the falling H sync edge of the input signal is 1.9 microseconds after the falling H sync edge of the external reference, the input signal is said to be on the threshold. In 625 line video formats, the threshold point is at 1.6microseconds.

In addition, there is built in hysteresis so that if an input source is near the threshold point, the output timing will be constant and will not jump back and forth by a line if the input signal varies slightly. However, if the input signal is exactly on the threshold point, the output timing may vary from one power up sequence to the other. In other words, the card may power up with *different timing* than the previous time it was powered-up. To avoid this condition, it is recommended to keep the input signal away from the threshold point. Two microseconds can be considered a safe distance.

Note

In **Line Sync** mode, you should keep the falling sync edge of the incoming video away from the threshold point.

Frame Delay (ADC-8033A-S)

The **Frame Delay** mode is identical to the **Line Delay** mode, except that the output timing can be delayed by up to a full frame of video. By using almost a full frame of delay, it is possible to set apparent negative timing, making it look like the output occurs before the input, although delayed by one frame.

Frame Sync (ADC-8033A-S)

The **Frame Sync** mode makes it possible to use asynchronous sources. The output timing is generated entirely based on the external reference. Whether a synchronous or an asynchronous source is used, output timing is constant. The delay range through the card will be from the minimum processing delay (in the order of microseconds) up to a full frame.

Timing Modes Summary

This section provides a summary of all Timing Modes.

Line Delay

Use when you do not have a -S version and need constant delay through the card.

- Output timing based on the Input Timing Menu (A-4)
- Ignores external reference
- Has the lowest minimum delay through the card
- Two-line output timing adjustment window

Line Sync

Use when you do not have a -S version and need constant output timing even though input timing may change. **This is the recommended mode for the non-S version.**

- Output timing based on external reference (line by line only)
- If input sources are timed to be on the same line, the output timing will be constant
- Keep input timing away from the threshold point

Frame Delay

Use when you have a -S version and need constant delay through the card.

- Output timing based on Input Timing menu (A-4)
- Ignores external reference
- Has the lowest minimum delay through the card
- Output timing adjustment window has infinite phasing over a full frame

Frame Sync

Use when you have a -S version and need constant output timing, or when the input is asynchronous to house reference.

- Input can be asynchronous
- Output timing is constant, regardless of input timing
- Output phasing is infinite over a full frame, and the delay through the card varies from a minimum of one field to a maximum of three fields.

Input/Output Timing

The most common use of the ADC-8033A(-S) model is to convert an asynchronous analog component source to house referenced SDI. In this case the analog component source is clocked into the card with the sync source selected in Input Timing Menu (A-4) and the output is clocked out of the card relative to a house reference source selected in Reference Select Menu (C-F).

For the purposes of this timing discussion, the ADC-8033A(-S) is split up into input and output sections. The input timing refers to how the card times input analog component signals. The output timing refers to how the output SDI serial stream is clocked.

Input timing is usually obtained from the G/Y channel of the input signal, on BNC IN. If the input G/Y signal does not contain sync then the user can input an analog timing signal into either BNC 5 or the Frame Reference. The BNC 5 or Frame Reference input timing selection is made in menu **A-4**. The ADC-8033A(-S) must have a valid input timing source (e.g. locked and timed to the INPUT signal) to operate correctly.

The output timing is obtained from an analog reference signal, input either into BNC 5 or the Frame Reference. The BNC 5 or Frame Reference output timing selection is made in menu **C-F**. If there is no valid output timing source, the ADC-8033A-S will use the input timing source for output timing.

Note

If the same source is selected for both the input and output timing, then the SDI output stream will be timed to the input analog component signal. In this case the synchronizing feature of the ADC-8033A-S will not work. The card will default to Line Delay mode even if it is set to Line Sync mode, and Frame Delay mode even if it is set to Frame Sync mode.

Tracking Delay Pulse

The ADC-8033A-S offers a positive 5V tracking delay output that pulses at frame rate on BNC 6. The pulse width is a measurement of the video delay through the card. This is useful when connecting with devices which accept this type of measurement signal, such as the RossGear ADL-8520 AES Audio Delay module. Typically, this pulse is useful when operating in Frame Delay or Frame Sync Timing Modes only.

Using Bank C Functions

The following topics are discussed in this section:

- Timing Mode
- Horizontal Delay
- Horizontal Delay Reset
- Vertical Delay
- Vertical Delay Reset
- Set Minimum Delay
- Freeze Mode
- Forced Freeze
- Input Timing Loss
- Forced Black
- Forced Monochrome
- Reference Select

Bank C-1: Timing Mode

Use the following procedure to set the timing mode:

1. Select Bank C, and rotate **Function Select** to position 1.
2. Select the desired timing mode according to the following table.
    - Toggle **Mode Select** *up* or *down* to select the desired timing mode.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	1	+ Frame Sync * Frame Delay * Line Sync - Line Delay	TIME MODE FS FD LS LD	LS (FS on -S models)

* Indicates ADC-8033A-S only

Note

In Frame Sync mode, the ADC-8033A-S buffers slightly less than a full frame of signal in memory to allow any input variation to be corrected on the output.

Bank C-2: Horizontal Delay

Use the following procedure to adjust the output Horizontal Delay:

1. Select Bank C, and rotate **Function Select** to position 2.
2. Increase or decrease the Horizontal Delay as required:
    - Toggle **Mode Select** *up* to increase Horizontal Delay by half a pixel (one 27MHz-clock period) with each toggle.
    - Hold **Mode Select** *up* to increase Horizontal Delay continuously.
    - Toggle **Mode Select** *down* to decrease Horizontal Delay by half a pixel (one 27MHz-clock period) with each toggle.
    - Hold **Mode Select** *down* to decrease Horizontal Delay continuously.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	2	+ Increase - Decrease	H DELAY (#)	0

Please note the following important points regarding Horizontal Delay:

- If you cross over the maximum Horizontal Delay, the value returns to 0 (zero) and the Vertical Delay value increments by 1.
- Crossing the minimum delay returns the Horizontal Delay value to 1715 (525) or 1725 (625) and decrements the Vertical Delay value by 1.

Note

Crossing from 0 to maximum or from maximum to 0 will affect the **Vertical Delay** setting in Bank C-4.

Bank C-3: Horizontal Delay Reset

Use the following procedure to reset just the Horizontal Delay value to 0 (zero). This function is particularly useful if your adjustment range is far off the mark, or if you simply want to quickly return to zero.

1. Select Bank C, and rotate **Function Select** to position 3.
2. Reset Horizontal Delay as required:
    - Toggle **Mode Select** *up* to reset Horizontal Delay to 0.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	3	+ Zero - No action	H RESET ZERO	N/A

Bank C-4: Vertical Delay

Use the following procedure to adjust the output Vertical Delay:

1. Select Bank C, and rotate **Function Select** to position 4.
2. Increase or decrease the Vertical Delay as required:
    - Toggle **Mode Select** *up* to increase Vertical Delay by one line, and wrap around from the maximum to 0 if necessary.
    - Hold **Mode Select** *up* to increase Vertical Delay continuously.
    - Toggle **Mode Select** *down* to decrease Vertical Delay by one line, and wrap around from 0 to the maximum if necessary.
    - Hold **Mode Select** *down* to decrease Vertical Delay continuously.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	4	+ Increase - Decrease	V DELAY (#)	0

Bank C-5: Vertical Delay Reset

Use the following procedure to reset just the Vertical Delay value to 0 (zero).

1. Select Bank C, and rotate **Function Select** to position 5.
2. Reset Vertical Delay as required:
    - Toggle **Mode Select** *up* to reset Vertical Delay to 0.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	5	+ Zero No action	V RESET ZERO	N/A

Bank C-6: Set Minimum Delay

Use the following procedure to reset both the Horizontal Delay and Vertical Delay values to 0 (zero).

1. Select Bank C, and rotate **Function Select** to position 6.
2. Reset all delays as required:
    - Toggle **Mode Select** *up* to reset Horizontal Delay and Vertical Delay to 0.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	6	+ Zero - No action	MIN DELAY ZERO	0

Bank C-8: Freeze Mode

The input image can be frozen (**ADC-8033A-S** only) if any of the following conditions occur:

- The user manually freezes the input (Forced Freeze, Bank C-9).
- There is a loss of the input timing signal (Input Timing Loss, Bank C-A).

The **Freeze Mode** function allows you to set what will be output when a freeze occurs: the last Field 1, the last Field 2, or the last Full Frame. Use the following procedure to set the Freeze Mode:

1. Select Bank C, and rotate **Function Select** to position 8.
2. Toggle **Mode Select** *up* or *down* to select the desired Freeze Mode.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	8	+ Frame Field 2 - Field 1	FREEZE MODE FRM FLD 2 FLD 1	FLD 1

Bank C-9: Forced Freeze

The output can be manually frozen (**ADC-8033A-S** only) using the **Forced Freeze** mode. When enabled, the freeze will use either field 1, field 2 or the entire frame (as determined by the **Freeze Mode** function, Bank C-8).

Use the following procedure to enable or disable the Forced Freeze mode:

1. Select Bank C, and rotate **Function Select** to position 9.
2. Select the desired mode:
   - Toggle **Mode Select** *up* to freeze the image. The **FREEZE** LED is on.
   - Toggle **Mode Select** *down* to un-freeze the image, and allow input video to pass through. The **FREEZE** LED is off.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	9	+ Freeze - Pass Through	FORCE FREEZE ON OFF	OFF

Bank C-A: Input Timing Loss

Use this function to select what type of video appears at the four outputs when the Input Timing signal (Bank A-4) is lost or invalid. These choices are available:

- **Black** - SDI black.
- **No Output** - flat line, no signal present.
- **Freeze** - the last valid image is automatically frozen (**ADC-8033A-S** only). The freeze is determined by the **Freeze Mode** function (Bank C-8).

Use the following procedure to set the Input Timing Loss:

1. Select Bank C, and rotate **Function Select** to position A.
2. Toggle **Mode Select** *up* or *down* to select the desired Input Timing Loss option.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default

C	A	+	Freeze ** ‡	IN TMG LOSS FRZ	
			No Output	NONE	BLK
		-	Black ***	BLK	

** When Freeze mode is activated the freeze is determined by C-8 (Freeze Mode).
‡ Only available in Frame Sync Timing Mode and only if a valid reference is present.
*** Only available in Frame or Line Sync Timing Modes and only if a valid reference is present.

Bank C-C: Forced Black

Use this selection to force the output to SDI black.

In Line Delay and Frame Delay modes a valid Input Timing signal (Bank A-4) must be present.

In Line Sync and Frame Sync modes a valid Input Timing signal (Bank A-4) or a valid reference signal (Bank C-F) must be present.

Use the following procedure to enable or disable the Forced Black mode:

1. Select Bank C, and rotate **Function Select** to position C.
2. Select the desired mode according to the table below:
   - Toggle **Mode Select** *up* to force the output to SDI black.
   - Toggle **Mode Select** *down* to disable the Forced Black mode.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	C	+ On - Off	FORCED BLK ON OFF	OFF

Bank C-D: Forced Mono

Use this selection to force the output to monochrome (SDI). Use the following procedure to enable or disable the Forced Monochrome mode:

1. Select Bank C, and rotate **Function Select** to position D.
2. Select the desired mode according to the table below:
   - Toggle **Mode Select** *up* to force the output to monochrome.
   - Toggle **Mode Select** *down* to disable the Forced Monochrome mode.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
C	D	+ On - Off	FORCED MONO ON OFF	OFF

Bank C-F: Reference Select

Use the following procedure to select a reference input source:

1. Select Bank C, and rotate **Function Select** to position F.
2. Select the desired reference according to the table below:
   - Toggle **Mode Select** *up* to choose BNC 5 input.
   - Toggle **Mode Select** *down* to choose frame input.

Bank	Function Select	Mode Select	Heads-Up Display Label	Default
F	Reference Select	+ BNC 5 - Frame	REF SELECT BNC 5 FRM	FRM

Important

Setting both Input Timing (bank A-4) and Reference Select (bank C-F) to the same source disables the synchronizing operation of the ADC-8033A-S. See the "**Input/Output Timing**" section on page 4-17 for further details.

Upgrades

In This Chapter

This chapter provides instructions to properly upgrade your ADC-8033A(-S) for the following:

- Frame Synchronization Upgrade
- Software Upgrade
- Firmware Upgrade

To order any ADC-8033A(-S) Upgrade kit, contact Ross Video Technical Support.

This chapter contains the following sections:

- Equipment Supplied
- Record Settings
- Upgrade Procedures
- Confirm Upgrade

Equipment Supplied

- 1 ADC-8033A(-S) User Manual
- Required upgrade chip(s)

Record Settings

Before performing the upgrade, use the following tables to record the configurations and settings you have selected in bank A, B, and C of the ADC-8033A(-S). The card must be reconfigured after the upgrade is complete.

Table 6. Function Select: Bank A Function Table

SW1 Function Select	Function	Bank A Settings
0	Bank Select	
1	Heads-Up Display	
2	Video Standard	
3	N/A	
4	Input Timing	
5	Test Pattern	
6	N/A	
7	N/A	
8	Video Gain	
9	Black Level Offset	
A	Chroma Gain	
B	N/A	
C	C_B Gain	
D	N/A	
E	Factory Defaults	
F	Switch Access	

Table 7. Function Select: Bank B Function Table

SW1 Function Select	Function	Bank B Settings
0	Bank Select	
1	Setup	
2	N/A	
3	VI Blanking	
4	VI End	
5	SuperBlack	
6	V Bit Location	
7	N/A	
8	N/A	
9	N/A	
A	H Crop	
B	Crop Left	
C	Crop Right	
D	N/A	
E	N/A	
F	N/A	

Table 8. Function Select: Bank C Function Table

SW1 Function Select	Function	Bank C Settings
0	Bank Select	
1	Timing Mode	
2	Horizontal Delay	
3	Horizontal Delay Reset	
4	Vertical Delay	
5	Vertical Delay Reset	
6	Set Min. Delay	
7	N/A	
8	Freeze Mode	
9	Forced Freeze	
A	Input Timing Loss	
B	N/A	
C	Forced Black	
D	Forced Mono	
E	N/A	
F	Reference Select	

Upgrade Procedures

This section contains procedures for the following upgrade options:

- Chip Removal
- Frame Synchronizer Upgrade
- Software or Firmware Upgrade
- Confirm Frame Synchronizer Upgrade
- Confirm Software or Firmware Upgrade

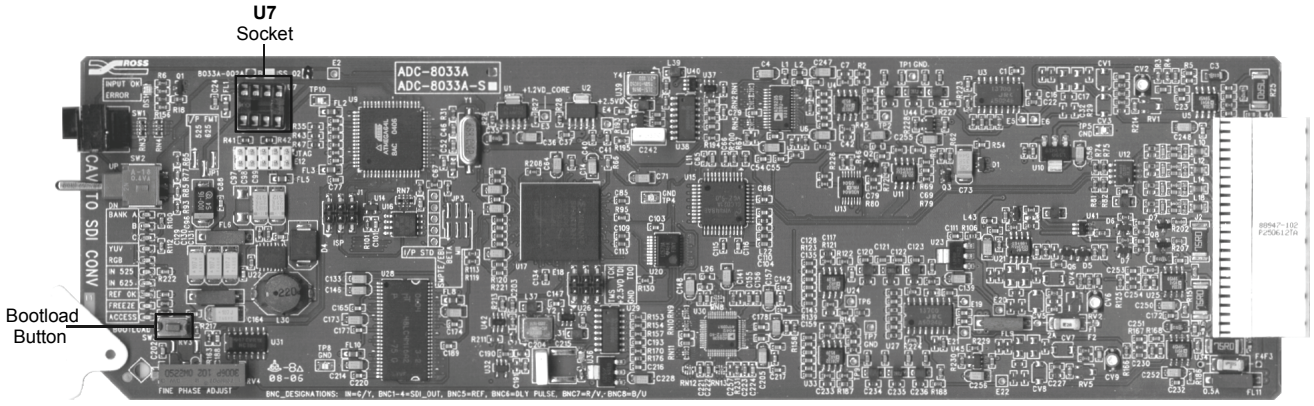


Figure 4. ADC-8033A(-S) Upgrade Socket and Label Locations

Chip Removal

The three possible upgrades to the ADC-8033A(-S) all use socket **U7**. If there is a chip already inserted into **U7**, remove it as in the following procedure:

1. Record your settings on the tables provided in the previous section.
2. With the card out of the frame, refer to Figure 4 and the card labeling to locate chip socket **U7**.
3. Use a tong-type IC chip removal tool (not supplied) to grab the chip by the un-legged ends and gently pry the chip out of the socket.
4. Store the chip in a labeled static free container. You may need to return it to the socket later if it is a Frame Synchronizer upgrade chip. The card cannot operate as a Frame Synchronizer without a synchronizer chip in the socket.

Frame Synchronizer Upgrade

1. Remove the card from the frame.
2. Verify the card issue level matches the issue level of the upgrade kit.
3. Refer to Figure 4 and the card labeling to locate socket **U7**.
4. If the socket is occupied, complete the Chip Removal procedure on the previous page.
5. Align the new chip over the socket with the keyed sides together and the legs over the socket holes.
6. Gently and firmly press the chip into the socket.
7. Perform the Confirm Frame Synchronizer Upgrade procedure on the following page.
8. Refer to the relevant chapters in this user manual for information on the operation of the full frame synchronizer.

Software or Firmware Upgrade

This procedure applies to any software or firmware upgrade you may perform on the ADC-8033A(-S). If you are upgrading multiple cards, repeat this procedure for each card to be upgraded.

1. With the card out of the frame, refer to Figure 4 and the card labeling to locate the **U7** socket.
2. If the socket is occupied, complete the Chip Removal procedure.
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. Alternately, you can insert the card and power up the frame if it is off.

   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. Complete the Confirm Software or Firmware Upgrade procedure on the following page.
8. Remove the card from the frame and complete the Chip Removal procedure on the previous page.
9. If your card had the Frame Synchronizer upgrade installed, you will have to reinstall that chip using the Frame Synchronizer Upgrade procedure above.

Confirm Upgrade

Depending on whether you upgraded to the Frame Synchronizer option or upgraded the card software or firmware, use the relevant upgrade confirm procedure below.

Confirm Frame Synchronizer Upgrade

With the card installed in the frame and powered up:

1. Rotate **Function Select** to the **0** position, toggle **Mode Select** to Bank A, and rotate **Function Select** to position **F**.
2. Hold **Mode Select** *down* for one second to unlock switch access.

   The **ACCESS** LED is on.
3. Rotate **Function Select** to position **1**.
4. Hold **Mode Select** *up* for one second to enable the Heads-Up Display.
5. Rotate **Function Select** to position **0**.
6. Toggle **Mode Select** *down* to position **C**.
7. Hold **Mode Select** *down* for several seconds to display the card model installed.

   On the Heads-Up Display, "**ADC-8033A-S**" is displayed, indicating that the upgrade was successful.
8. If you are upgrading multiple cards, repeat the relevant upgrade procedures as necessary.

Confirm Software or Firmware Upgrade

With the card installed in the frame and powered up:

1. Rotate **Function Select** to the **0** position, toggle **Mode Select** to Bank A, and rotate **Function Select** to position **F**.
2. Hold **Mode Select** *down* for one second to unlock switch access.

   The **ACCESS** LED is on.
3. Rotate **Function Select** to position **1**.
4. Hold **Mode Select** *up* for one second to enable the Heads-Up Display.
5. Rotate **Function Select** to position **0**.
6. Hold **Mode Select** *up* for several seconds to display the card software and hardware versions installed.

   On the Heads-Up Display, "**SW V #.## HW V #.#**" is displayed, indicating that the upgrade was successful. Confirm that the displayed numbers match the upgrade versions you have performed.
7. If you are upgrading multiple cards, repeat the relevant upgrade procedures as necessary.

Specifications

Technical Specifications

Table 9. ADC-8033A(-S) *- Technical Specifications*

Category	Parameter	Specification
Analog Component Input	Number of Inputs	3 RGB/YUV
	Input Impedance	75Ω
	Return Loss	>42dB to 5MHz
SDI Output	Signal Standards	SMPTE 259M-C, 270Mb/s 525/625 lines
	Number of Outputs	4
	Output Impedance	75Ω
	Output Return Loss	>18dB to 270MHz
	Signal Level	800mV ± 10%
	DC Offset	<40mV
	Rise and Fall Time	>800pS (20 - 80%, ±15%)
	Overshoot	<10% typical
Analog Reference	Signal Standards Accepted	NTSC, PAL, Composite Sync (2V, 4V)
	Number of Inputs	1
	Input Impedance	75Ω
	Return Loss	>40dB to 5MHz
Performance	Group delay	<5ns to 4.2MHz
	RMS Noise, Luma Channel	>60dB to 5MHz unweighted
	RMS Noise, Chroma Channels	>60dB to 5MHz unweighted
	Quantization	12 bits
Minimum Delay	For Line/Frame Delay Mode	25.9µS

Category	Parameter	Specification
Tracking Delay Pulse	ADC-8033A-S	up to 2 video fields
Power Consumption	Total	4.7W

Specifications are subject to change without notification

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 *ADC-8033A(-S)*, 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. A valid sync source must be present for Heads-Up Display and video output.
2. **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.
3. **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.
4. **Reseat the Card in the Frame** — Eject the card and reinsert it in the frame.
5. **Check Control Settings —** Refer to the Installation and Operation sections of the manual and verify all user settings.
6. **Input Signal Status —** Verify that source equipment is operating correctly and that a valid signal is being supplied.
7. **Output Signal Path –** Verify that destination equipment is operating correctly and receiving a valid signal.
8. **Module Exchange** — Exchanging a suspect module with a module that is known to be working correctly is an efficient method for localizing problems to individual modules.

Warranty and Repair Policy

The ADC-8033A(-S) 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 ADC-8033A(-S) 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 ADC-8033A(-S) has failed after your warranty period has expired, we will repair your defective product for as long as suitable replacement components are 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 ADC-8033A(-S) Analog Component to SDI Video Converter User Manual of our Digital Products line provides all pertinent information for the safe installation and operation of your Product. Ross Video policy dictates that all repairs to the ADC-8033A(-S) 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 ADC-8033A(-S), 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 ADC-8033A(-S). A temporary replacement module, if required, 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 this equipment.

Ordering Information

ADC-8033A(-S) and Related Products

Your **ADC-8033A(-S)** Analog Component to SDI Video 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, AES, Keyers, switches, as well as analog audio and video products

Standard Equipment

- **ADC-8033A** Analog Component to SDI Video Converter
- **ADC-8033A-S** Analog Component to SDI Video Converter with Frame Synchronizer

Optional Equipment

- **8033ADR-004** Analog Component to SDI Video Converter (additional User Manual)
- **EXT-8100** Extender Board (module servicing extension)
- **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)

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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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