California Media Engineering Inc.

5010-AVS

Audio-Video Synchronizer +

Operations Manual

5010-AVS · Audio-Video Sync+ Operations Manual

- Cal Media Part Number: **5010-AVS-OM**
- Document Version: 1.0.0
- Printed in U.S.A.

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

Copyright

Notice

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 openGear™ 8300 series frame. Refer to the openGear™ 8300 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.

Maintenance/User Serviceable Parts

Routine maintenance to this openGear™ 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 contact information on the last page of this manual. All Cal Media openGear™ products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. Refer to the "Warranty" and "Repair Policy" sections 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, Cal Media 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.
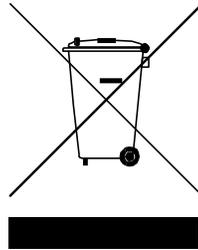
If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Cal Media 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
- Overview
- Functional Block Diagram
- Detailed Description

A Word of Thanks

Congratulations on choosing Cal Media's **5010-AVS Audio-Video Synchronizer** + for the openGear™ system. The 5010-AVS is part of a full line of media gear for broadcast and production facilities.

Should you have a question pertaining to the installation or operation of your 5010-AVS, please contact us at the numbers listed on the back cover of this manual, or through our web site at www.calmedia.com.

Overview

The 5010-AVS is a professional broadcast Audio-Video full frame synchronizer for high definition and standard definition signals.

In addition to synchronization, the 5010-AVS also provides several additional features including:
Audio embedding and de-embedding with full channel mapping; Individual audio level and phase adjustments; 2 x 1 SDI input auto switch; Auto Freeze on loss of input; Video Proc Amp controls; Test pattern and test tone generators; "Frame grabbing" and "still storage" with SD/MMC card; Easily controlled using openGear's™ Dashboard™ control software (Windows, Linux and Mac platforms).

The 5010-AVS is designed for use in the openGear™ DFR-8300 series frames.

HD/SD AUDIO-VIDEO SYNCHRONIZER - BLOCK DIAGRAM
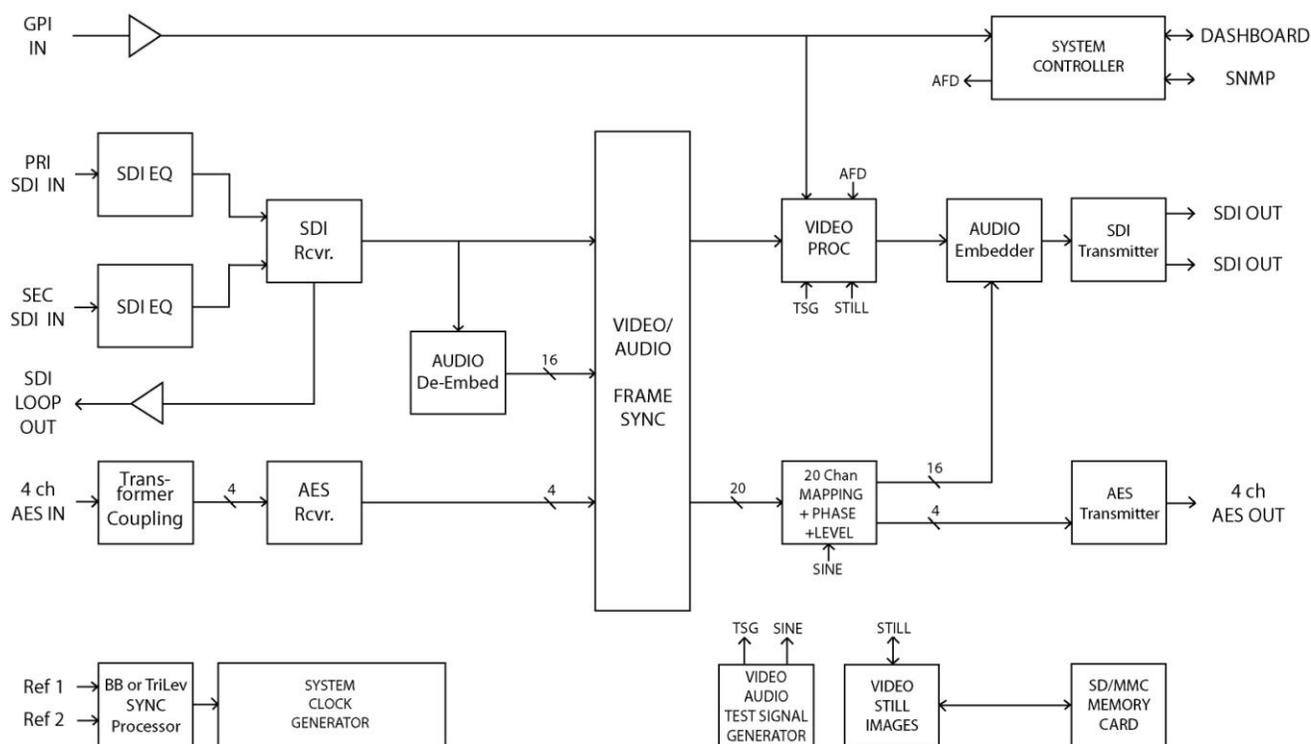
Detailed Description

Video Processing

The 5010-AVS is a HD/SD full frame audio-video synchronizer.
The audio is de-embedded and processed separately from the video and VANC data.

Video Inputs

Two inputs (*Primary* and *Secondary*) are used to provide the SDI source. A 2 x 1 switch is used to select the SDI input that will be used for the video and embedded audio source. The switch may be manually controlled or placed in "Auto" mode. If "Auto" mode is chosen, the *Primary* SDI input is selected if a signal is detected on that input. If the *Primary* signal is not present, then the *Secondary* SDI input is automatically selected. (Note: the "Auto" detector simply looks for the presence of a serial digital signal and will switch even if the signal is a different format or standard from that selected). A re-clocked version of the selected input is provided on the *Loop* output.

On Loss of Input (Auto Freeze)

When the selected input's sync signal is lost, one of the following options is available:

Freeze Frame: the last good video frame will be displayed.
Black: a black frame will be displayed.
Test Signal: the internal video test pattern generator will be displayed.
Still: one of the selected still image buffers will be displayed.

Video Proc Amps

The selected SDI input has full color processing controls.

Setup: adjusts the brightness of the picture
Video Level: adjusts the contrast of the picture
Chroma: adjusts the color saturation of the picture
Hue: adjusts the tint or phase of the picture

Video Output Select

The video output select determines the source for the output video.

SDI Input: the output comes from the Synchronized SDI input.
Black: the output goes to black.
Test Signal: the output comes from the internal video test pattern generator.
Still: the output comes from one of four still image buffers.

VANC Data

The video output will pass the Vertical Ancillary Data from the selected SDI input.

Still Image Buffer

The 5010-AVS has four still image buffers which may be used as alternate sources for output video. Each buffer may contain captured images from video, or images loaded from the SD/MMC card. Images in each buffer may be saved to the SD/MMC card for future use.
Note: A memory card must be installed on the 5010-AVS card to save and load still images.

Memory Card

The 5010-AVS has a socket located at the front edge of the card to support SD or MMC memory cards. The memory card is used for updating the firmware, and for storage of still images.

Compatible cards include MMC (multi-media card), SD (secure digital), and SDHC (high capacity). To support still images, the SD/MMC cards must be formatted with a FAT16 or FAT32 file structure (most cards greater than 64MB come pre-formatted as either FAT16 or FAT32). The 5010-AVS conforms to the FAT32 specification so firmware and still image files may be exchanged easily with most computers.

Audio Processing

The 5010-AVS contains a powerful audio processor providing individual mapping, level adjustments, and phase settings of all 20 output channels.

Audio Inputs

The 4 AES input channels (AES12 and AES34) and the 16 SDI-Embedded input channels are all passed along with video through an audio-video synchronizer.

When used as a standard A/V synchronizer, the AES inputs must be synchronous with the SDI input video ("Locked to Input"). However, a special mode is provided for the AES inputs that bypasses the input synchronizer and instead require the AES inputs be synchronous with the genlock reference used ("Locked to Genlock"). This mode is useful in audio embedding applications where the input audio does not match the input video, or the video signal is absent.

Audio Output Mapping

Full Audio Mapping is possible with the Audio Output Source control. Any source may be selected for any output channel, including one source feeding multiple output channels. Simultaneous Embedding and De-embedding is also realized with the Source control, since AES inputs may be selected for Embedded outputs while Embedded inputs are selected for AES outputs. In addition to the AES and Embedded inputs, four internal tone generators and silence are available as sources.

Audio Levels and Phase.

The mapping function also provides individual level adjustment and phase control for all output channels. The level of each channel may be adjusted –40 to +20 dB, and the phase of each channel may be inverted (180 degree phase shift).

Installation and Setup

In This Chapter

This chapter contains the following sections:
- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- Cable Connections
- SD/MMC Memory Card Installation (Optional)

Static Discharge

Whenever handling the 5010-AVS 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 5010-AVS 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 openGear™ sales representative or Cal Media directly.

Rear Module Installation (Optional)

The 5010-AVS is compatible with the DFR-8310 and DFR-8320 series frames. The procedure for installing the Rear Module in your openGear™ frame is the same regardless of the frame or module used. However, a different module is required depending on the openGear™ frame you are using.

Rear Modules for the 5010-AVS

The Rear Module for the 5010-AVS depends on the openGear™ frame you are installing the card into.

> • **DFR-8310** series frames — When installing the 5010-AVS in the DFR-8310 series frames, the **RM1-5000A** Rear Module is required. The 5010-AVS is also compatible with the DFR-8310-BNC frame.

> • **DFR-8320** series frames —When installing the 5010-AVS in the DFR-8320 series frames, the Split Rear Module (**RMS-5000A**) or Full Rear Module (**RM2-5000A**) is required.

> Note: the Split Rear Module (**RMS-5000A**) may be used for SDI ONLY applications (no AES inputs or outputs).

Installing the Rear Module

If you received a Rear Module with your 5010-AVS, you will need to install the module in your DFR-8300 series frame before you can install the 5010-AVS in the frame, or connect cables to the slot you have chosen for the 5010-AVS. Skip this section if you are installing the 5010-AVS in a DFR-8310-BNC frame, or the Rear Module is already installed.

Use the following procedure to install the Rear Module in a DFR-8300 series frame:

> 1. Refer to the DFR-8300 series frame User Manual, to ensure that the frame is properly installed according to instructions.

> 2. On the rear of the frame, locate the card frame slot.

> 3. Remove the Blank Plate from the rear of the slot you have chosen for the 5010-AVS installation. If there is no Blank Plate installed, proceed to the next step.

> 4. As shown in **Figure 2-1**, seat the bottom of the rear module in the seating slot at the base of the frame's back plane.
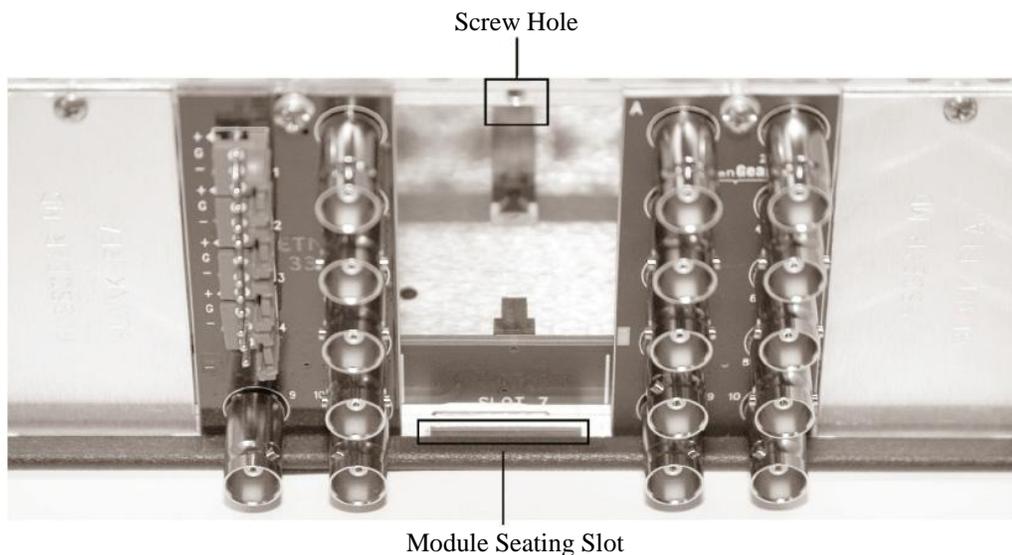

Figure 2-1. Rear Module Installation in a DFR-8310 Series Frame (5010-AVS not shown)

5. Align the top hole of the rear module with the screw hole on the top edge of the frame back plane.

6. Using a Phillips driver and the supplied screw, fasten the rear module to the back plane. Do not over tighten.

7. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Module or blank metal plates. If you need blanks, refer to the chapter, "**Ordering Information**" in your DFR-8300 series frame User Manual, and contact your openGear™ sales representative.

This completes the procedure for installing the Rear Module in a DFR-8300 series frame.

Board Installation

Use the following procedure to install the 5010-AVS in a DFR-8300 series frame:

1. Refer to the User Manual of your DFR-8300 series frame to ensure that the frame is properly installed.

2. After selecting the desired frame installation slot, hold the 5010-AVS 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 plugs are properly seated on the midplane and rear modules.

This completes the procedure for installing the 5010-AVS in a DFR-8300 series frame.

Cable Connections

This section provides information for connecting cables to the installed Rear Module.

*Note: When using a Split Rear Module (**RMS-5000A**) in the DFR-8320 series frames, only the signals Pri SDI In, Loop Out, Sec SDI In, and SDI Out(s) are connected.*
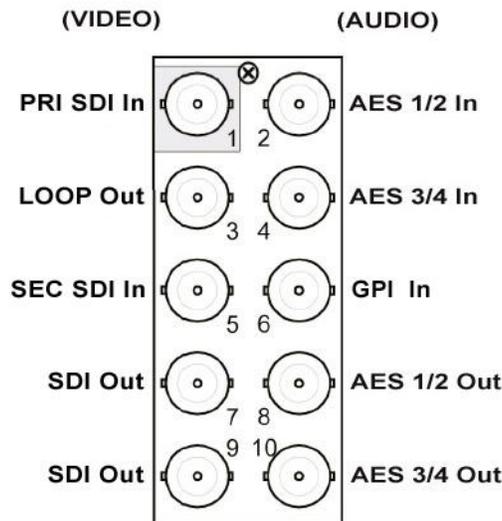

Figure 2-2. Cable Connections for the RM1-5000A Rear Module

SD/MMC Memory Card Installation (Optional)

The memory card is used for updating the firmware, and for storage of still images. This section provides information for installing a memory card on the 5010-AVS.

Hot Swappable

The memory cards are "hot-swappable", which means they can be installed and removed while the 5010-AVS card is powered and running, without causing interruption.

Compatible Cards

MMC (multi-media card)
SD (secure digital)
SDHC (secure digital high capacity)

Requirements

To support storage of still images, the SD/MMC cards must be formatted with a FAT16 or FAT32 file structure (most cards greater than 64MB come pre-formatted as either FAT16 or FAT32). The 5010-AVS conforms to the FAT32 specification so firmware and still image files may be exchanged easily with most computers.

Installation

Locate the SD/MMC socket on the front edge of the 5010-AVS card.

Figure 2-3. SD/MMC Socket location.

The SD or MMC card should be positioned as shown in figure 2-3 with the corner notch nearest the 5010-AVS's card ejector. Using gentle pressure, carefully slide the memory card all the way into the socket until it clicks. The memory card should now be locked into place.

If the socket will not accept the memory card then check if the card is backwards, upside-down, or damaged. **Do <u>not</u> force the memory card into the socket.**

Figure 2-4. SD/MMC Memory Card Installed.

Removal

To remove the SD or MMC card, press the memory card further into the socket until it clicks. Release the card and it should spring part way out. The memory card is now unlocked and should slide easily out of the socket.

To prevent damage to the socket, do <u>not</u> pull on the SD/MMC card when it is locked into the socket.

Operation

DashBoard™ Controls

The 5010-AVS is controlled using the DashBoard™ Control System.
When the card is installed in an openGear™ frame, DashBoard™ will identify it as "**5010-A/V Sync+**".
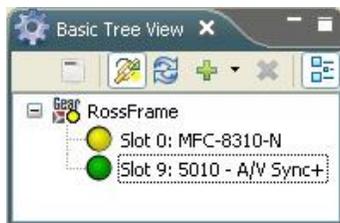
Open the selected card's control panel by right-clicking the mouse and selecting "Open".

Control Menus

The Controls for the 5010-AVS are divided into five menus:
- System
- Inputs
- Outputs
- Stills
- Test Signals

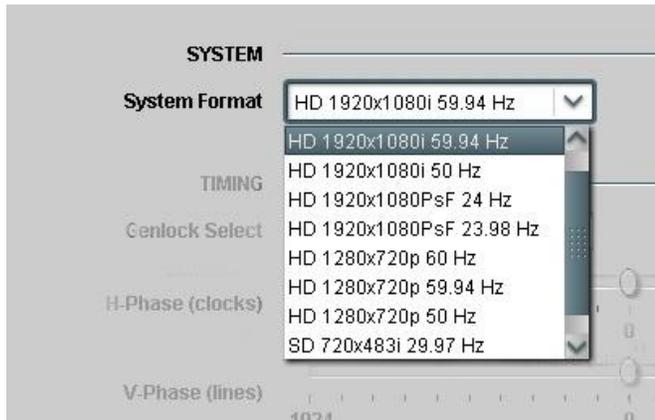# System Menu

System Video Format

The top section of the *System* menu contains the control for setting the Video Format.

Use the *System Format* drop-down control to select the video format for the 5010-AVS.
The operator may choose from a list of standard formats and frame rates.
Note: input video signals must be the same format and frame rate as the output.

Genlock Timing

The middle section of the *System* menu contains controls for timing the 5010-AVS to a genlock reference. The genlock reference does not have to be the same format as the 5010-AVS's system format, but it must be the same vertical rate. For example, a 59.94Hz 720p tri-level reference may be used with a system format of 29.97 483i (NTSC).

(Genlock Timing – continued)
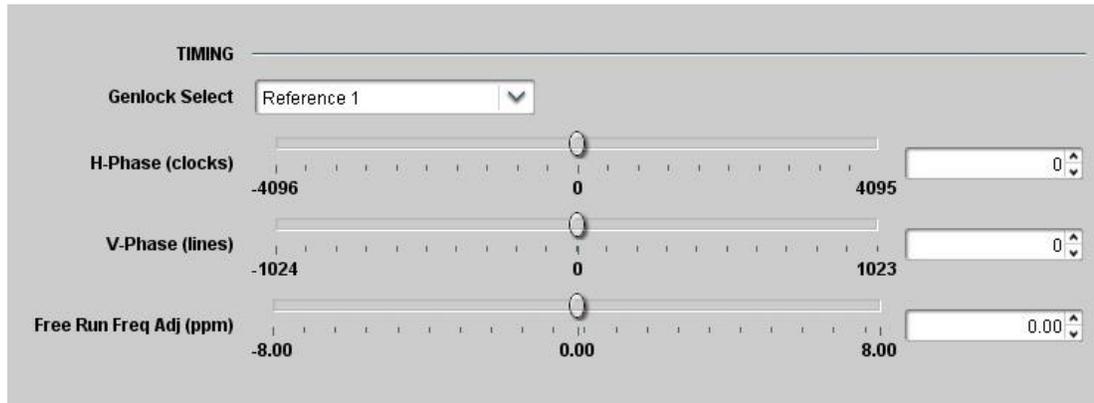
Use the **Genlock Select** drop-down control to choose which signal will be used as the genlock reference (The Product menu indicates the genlock status for the selected reference).
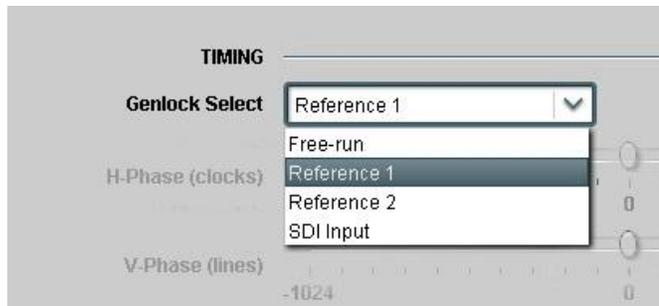*Note: the outputs may become unstable if there is no signal applied to the SDI Input and it is chosen to be the Genlock Reference.*

The following controls adjust the timing of the video frame synchronizers. Because of internal processing delays (approx. 3+ lines), a phase setting of zero clocks / zero lines will guarantee one frame of delay in the synchronizer.

Use the **H-Phase** control to adjust horizontal timing of the 5010-AVS's video output with respect to the selected genlock reference. This control adjusts the output in video clock increments, and may be advanced or delayed 4095 clocks.

Use the **V-Phase** control to adjust vertical timing of the 5010-AVS's video output with respect to the selected genlock reference. This control adjusts the output in video line increments, and may be advanced or delayed up to 1023 lines. This control may be used to advance the output some number of lines to compensate for equipment delays down-stream.
Note: The maximum number of lines is dependant on the video format selected. Values greater than the actual number of lines in one frame will roll-over to produce a minimum value. For example, in NTSC a value of 530 will actually produce 5 (530 – 525).

Free Run Freq Adj is used to trim the output clock frequency when the 5010-AVS is in Free-run mode. The range is +/- 8ppm (parts-per-million) which is equivalent to 0.0008%.

Ancillary Data

The bottom section of the *System* menu contains controls for any ancillary data which is processed by the 5010-AVS.

Embedded Audio Group Enable:
This section controls each embedded audio group on the video output (these controls are also available under the *Outputs* menu).

ANCILLARY DATA			
Emb Audio	Group 1	Group 2	Group 3	Group 4
Group Enable	ON	ON	ON	ON

Use the *Group Enable* buttons to enable (*ON*) or disable (*OFF*) each of the four audio groups.

Note: the 5010-AVS strips all ancillary embedded audio from the video input and processes this audio separately from video. In order to pass incoming embedded audio through the system, the stripped audio must be re-embedded and the appropriate audio group(s) must be enabled.

Inputs Menu

Input Source

The 5010-AVS has two SDI inputs (*Primary* and *Secondary*). A 2 x 1 switch is used to select the SDI input that will be used for the video and embedded audio source. The switch may be manually controlled or placed in *Auto Select* mode. If *Auto Select* mode is chosen, the *Primary* SDI input is selected if a signal is detected on that input. If the *Primary* signal is not present, then the *Secondary* SDI input is automatically selected.

Note: the *Auto Select* detector simply looks for the presence of a serial digital signal and will select the *Primary* input even if that signal is the wrong format or standard.
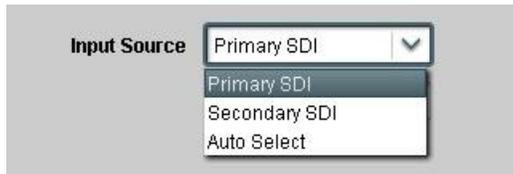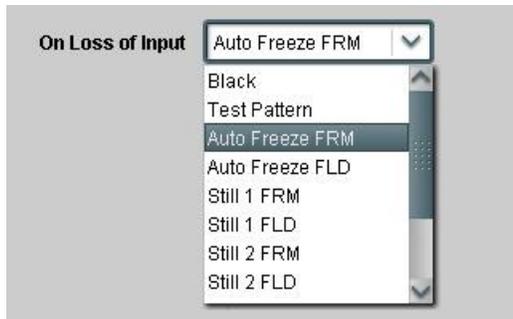
Use the ***Input Source*** drop-down control to select the SDI source for both video and embedded audio.

The operator may choose between the *Primary* or *Secondary* input, or choose *Auto Select*.

Primary	= "**Pri SDI In**" BNC
Secondary	= "**Sec SDI In**" BNC
Auto Select	= "**Pri SDI In**" BNC if signal present
	otherwise "**Sec SDI In**" BNC

Video - On Loss of Input

This control is used to select a default source that will appear at the video output if the selected SDI input is not present (input sync signal missing).

Use the ***On Loss of Input*** drop-down control to select the default video source.

Black	= Black Video (0 IRE).
Test Pattern	= defined by ***Video Test Pattern*** control
	(*see Test Signals* menu).
Auto Freeze FRM	= Display Full Frame Freeze of the last good video frame.
Auto Freeze FLD	= Display Field mode Freeze of the last good video frame.
Still # FRM	= Display a previously captured Full Frame Still image
	(*see Stills* menu).
Still # FLD	= Display a previously captured Field mode Still image
	(*see Stills* menu).

Video - Proc Amp Controls

The next section of the *Inputs* menu contains controls for adjusting the video input.
Note: these controls apply to the video signal before images are captured for stills or freezing.
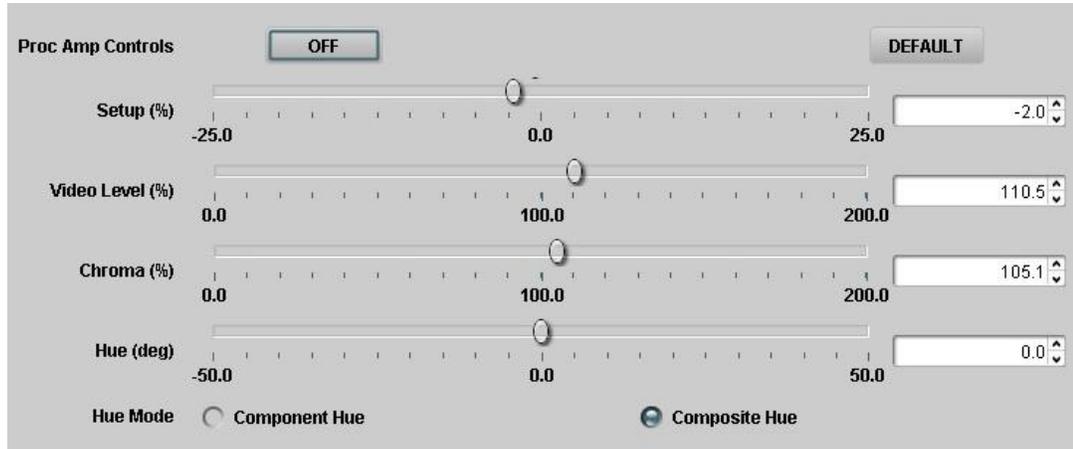
The *Proc Amp Controls* button is used to enable or disable all four Proc Amp controls.
When set to *ON*, the Proc Amp controls are active. When set to *OFF*, the Proc Amp controls are bypassed (unity gain) and any control settings are ignored.

Use the *Setup* control to adjust the video signal's brightness.

Use the *Video Level* control to adjust the video signal's contrast.

Use the *Chroma* control to adjust the video signal's color saturation.

Use the *Hue* control to adjust the video signal's color hue (or chroma phase).

Use the *Hue Mode* control to select which method is used to calculate hue.

> The *Component Hue* setting calculates the video hue based on equal scaling of the x,y color space. This method is typically used in component digital equipment.

> The *Composite Hue* setting calculates the video hue based on the unequal scaling of NTSC/PAL color space. This method more closely resembles a traditional NTSC hue control.

Clicking on the *Default* button will set all four Proc Amp controls to their default values (unity gain).

Audio – AES Input Mode

When the 5010-AVS is used as a standard A/V synchronizer, the AES inputs must be synchronous with the SDI input video ("Locked to Input"). However, a special mode is provided for the AES inputs that bypasses the input synchronizer and instead require the AES inputs be synchronous with the genlock reference used ("Locked to Genlock"). This mode is useful in audio embedding applications where the input audio does not match the input video, or the video signal is absent.
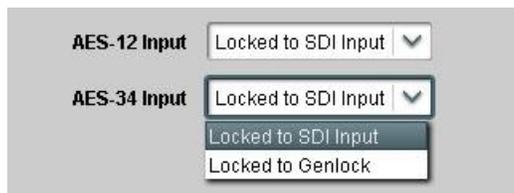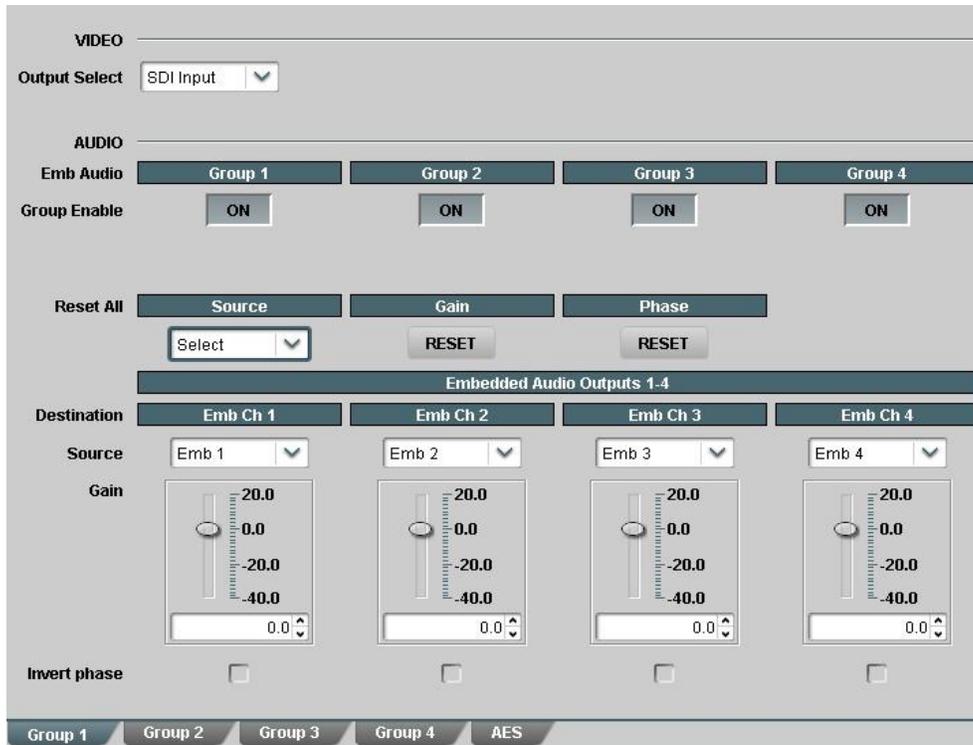

Locked to SDI Input = default mode
Locked to Genlock = Special applications

Use the *AES-12 Input* drop-down control to select the correct mode for the AES-12 input.
Use the *AES-34 Input* drop-down control to select the correct mode for the AES-34 input.
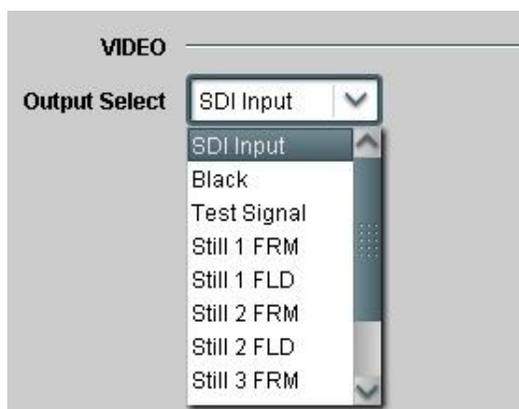

Outputs Menu

The 5010-AVS has one SDI output (video plus 16 embedded audio channels) and 2 AES outputs (4 audio channels).

Output Video Selection

The top section of the *Outputs* menu contains the control for video selection.

The *Output Select* drop-down menu allows the user to choose the source used for the video output. Choices include **SDI Input**, **Black Video**, a **Test Signal**, or one of 4 stored **Still Images** in either **Full Frame** or **Field** modes (*see Stills & Test Signals* menus for more information).

Output Embedded Audio Group Enable

The next section of the *Outputs* menu contains controls for each embedded audio group on the video output (these controls are also available under the *System* menu).

Use the *Group Enable* buttons to enable (*ON*) or disable (*OFF*) each of the four audio groups.

Note: the 5010-AVS strips all ancillary embedded audio from the video input and processes this audio separately from video. In order to pass incoming embedded audio through the system, the stripped audio must be re-embedded and the appropriate audio group(s) must be enabled.
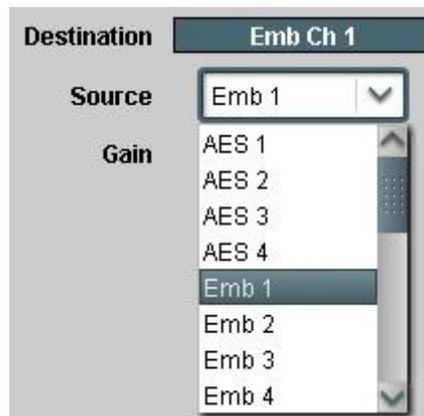
Output Audio Channel Page Selection

The Output Audio Channels are organized in groups of 4, including Embedded Audio channels 1-4 (Group 1), Embedded Audio channels 5-8 (Group 2), Embedded Audio channels 9-12 (Group 3), Embedded Audio channels 13-16 (Group 4), and AES audio channels 1-4 (AES). Each of these groupings may be accessed through the thumb-tabs at the bottom of the menu window:

Output Audio Selection (Mapping)

For each of the 20 possible audio output channels, the *Source* drop-down controls allows the user to select the audio **Source** which is to be output on each channel.

The choices include AES input channels 1 through 4, Embedded input channels 1 through 16, Audio Test Tones 1 through 4, and Silence.


(Output Audio Selection – continued)

Full Audio Mapping is possible with the *Source* control. Any source may be selected for any output channel, including one source feeding multiple output channels.

Simultaneous Embedding and De-embedding is also realized with the *Source* control, since AES inputs may be selected for Embedded outputs while Embedded inputs are selected for AES outputs.

If the user wants the AES Ch 1 input to be output on Embedded Ch 5, for example, then it is possible through this control.

Output Audio Channel Controls

For each of the 20 output audio channels, *Gain* and *Phase* controls allow the operator to adjust the selected source.
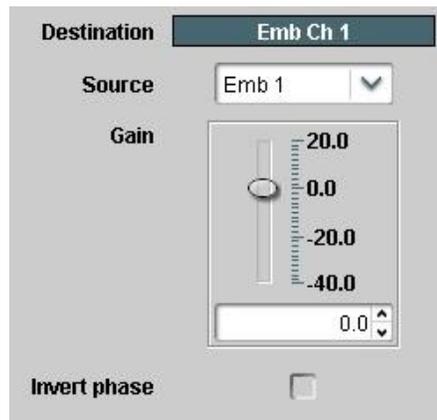
Gain is adjustable between –40 and +20dB.

Invert Phase can be checked to invert the phase of the audio source.

Output Audio Channel Resets

It is possible to *Reset All* of the audio channel settings to default values through a single control, instead of having to go through each control individually.

The *Source* selection under *Reset All* is used to quickly assign all 20 channels to the selected source.

Channel 1:1 – This will assign all input channels to their corresponding output channels.

            AES input Ch1 to Output AES Ch1,
            AES input Ch2 to Output AES Ch2…
            ……..
            Emb input Ch15 to Output Emb Ch15,
            Emb input Ch16 to Output Emb Ch16.

Silence – This will assign silence to all output channels.

Tone 1 – This will assign Tone 1 to all output channels.
Tone 2 – This will assign Tone 2 to all output channels.
Tone 3 – This will assign Tone 3 to all output channels.
Tone 4 – This will assign Tone 4 to all output channels.

The *Gain Reset* button under *Reset All* is used to quickly reset all 20 channels to 0.0 dB Gain.

The *Phase Reset* button under *Reset All* is used to uncheck all 20 channels' *Invert Phase* settings.

Stills Menu

The *Stills* menu provides all controls for managing still images.

(Output Video Selection)

The Video Output Select control (from the Output menu) is duplicated at the top of the *Stills* Menu. This makes it convenient to select the Still images for viewing as they are being captured or loaded.

Freeze SDI Input

The video input may be frozen by clicking on the *Freeze Image* button (FREEZE).
Live video may be restored by clicking on the button again (NORMAL).
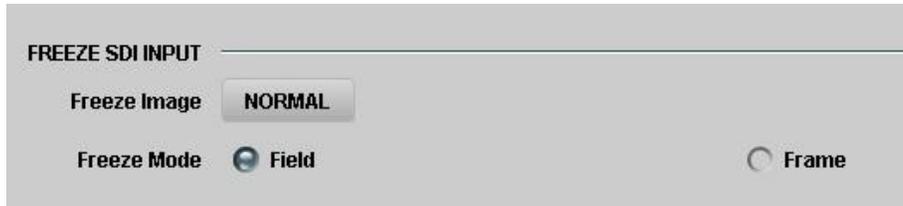
The *Freeze Mode* setting allows the frozen image to be displayed as a single field or a full frame.

Still Images

The 5010-AVS has four still image buffers. Each buffer may be selected for viewing with the *Output Select* control, or used as a "default" source when the input signal is missing.

Each buffer may contain captured images from input video, or images loaded from the SD/MMC card. Images in each buffer may be saved to the SD/MMC card for future use.
Note: A MMC, SD or SDHC card must be installed on the 5010-AVS card to save and load still images.

Loading Still Images

The *Source* drop-down control is used to select the image that will be loaded into the buffer. The first selection is always < *SDI Input* >, followed by a list of any still image files stored on the SD/MMC card.
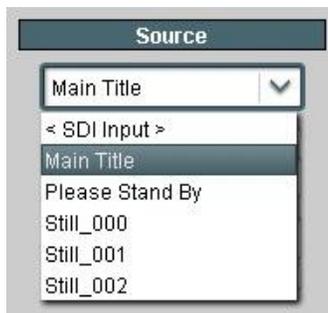
Selecting < *SDI Input* > allows an image to be captured from the video input.

Selecting a filename allows a still image to be loaded from the SD/MMC card.

(Loading Still Images – continued)

The *Capture/Load* button is used to transfer the image into the buffer.

Capturing an Image from the Video Input

Use the Source control to select the < *SDI Input* > video. Click on the *Capture/Load* button to instantly capture the current frame of video. The Status bar will display 100% when the video frame has been captured.

Loading a Still Image from the SD/MMC card

Use the Source control to select the filename of a still image.
Click on the *Capture/Load* button to begin loading the selected still image file. The Status bar shows the progress of the still image file loading, and will display 100% when the image file is completely loaded.

Note: Loading times are typically 1-5 seconds depending on the format and the SD/MMC card that is used.

Saving Still Images to the SD/MMC card

The contents of the still image buffer(s) may be saved to the SD/MMC card using the *Save Still* button. To enable the *Save Still* button, a valid filename, date, and time must be entered.

A filename must be <u>entered</u> in the *(enter name)* box. The name can be typed into the box, or the drop-down control can provide a default name. A valid filename must be a unique name between 1 and 16 characters long, and may contain upper and lower case letters, spaces, and some special characters: **$ % ' + - = _ , ; @ ~ ` ! ( ) { } [ ] ^ # &** .

The *Save as…* status box provides confirmation that a valid filename has been <u>entered</u>, or indicates possible problems that prevent the still image from being saved.

< select name >	A name must be selected or typed into the *(enter name)* box <u>followed by the Enter key</u>.
< already exists >	The filename entered already exists. Change to unique name.
< illegal name >	An illegal character has been used in the name.

(Saving Still Images – continued)

< no memory card >	The SD/MMC card is not detected. Install a SD/MMC card.
< mem card full >	The SD/MMC card is out of available memory space. Delete stills to free up memory, or replace the SD/MMC card.
< WR protected >	The SD/MMC card is write protected. Slide the "LOCK" tab on the SD/MMC card toward the top to enable writing.
< card too small >	The SD/MMC card has a FAT12 file structure, and is too small for still image files. Use only FAT16 and FAT32 formatted SD/MMC cards (typically > 64MB).
< mem card error >	An error has occurred with the SD/MMC card. Try resetting the SD/MMC card (see below) or replace the SD/MMC card.

The *File Date* and *File Time* controls are used for the creation date and time of the saved image file. The default values come from a real time clock, and should maintain the correct date and time as long as power is applied to the 5010-AVS.

> To edit the *File Date*, place the cursor in the control box using the mouse. Delete the current value, type in a new value, and <u>press Enter</u>.
> To be accepted, the date must be in the exact form: "YYYY-MM-DD"
>> where YYYY is the Year (>2000), MM is the month, and DD is the day.
>> *For example, July 4th 2010 is entered as "2010-07-04"*

> To edit the *File Time*, place the cursor in the control box using the mouse. Delete the current value, type in a new value, and <u>press Enter</u>.
> To be accepted, the time must be in the exact form: "HH:MM XM"
>> where HH is the Hour (1-12), MM is the minute, and XM is AM or PM.
>> *For example, 1:30 pm is entered as "01:30 PM"*

Click on the *Save* button to begin saving the selected still image to the SD/MMC card.

> The Status bar shows the progress of the still image file being saved, and will display 100% when the image file is completely saved.
>> *Note: Loading times are typically 1-10 seconds depending on the format and the SD/MMC card that is used.*

Deleting Still Images from the SD/MMC card

Unwanted Still Image files may be deleted from the SD/MMC card to free up memory for new stills.

To enable the *Delete* button, use the drop-down control to select a filename to be deleted.
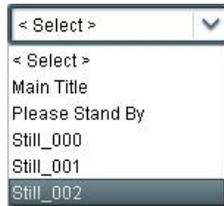
Once a filename has been selected, click on the *Delete* button.

A dialog box will appear confirming if the file is to be deleted.

Click on *Yes* to delete the selected file.

Resetting the SD/MMC Card

In the unlikely event that the SD/MMC card becomes unresponsive, clicking on the *Memory Card Reset* button should re-initialize the memory card.

If the SD/MMC card still fails to be detected or function correctly, the memory card may have to be ejected and re-installed on the 5010-AVS card to regain proper operation.

Test Signals Menu

The *Test Signals* menu provides controls for setting the video and audio test signals.

(Video Output Selection)

The Video Output Select control (from the Output menu) is duplicated at the top of the *Test Signals* Menu. This makes it convenient to view the selected video test signals.
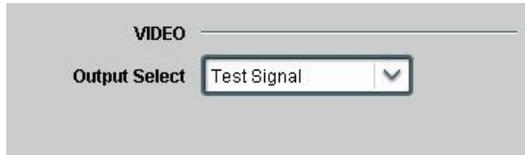
Video Test Patterns

Use the *Video Test Patterns* drop-down control to choose which test pattern will be displayed when *Test Signal* is selected as the video output or used as a "default" source when the input signal is missing.

Use the radio buttons to choose if the test pattern is to be displayed as *Full Color*, or *Monochrome*.

List of Video Patterns:

75% Color Bars
100% Color Bars
Bars Reversed
Tartan Bars
SMPTE Color Bars
RP219 (HD formats)
Composite (SD formats)
Alignment Chart
Multipulse
Multiburst
Horz Sweep
10 Step
100% Ramp
5% Shallow Ramp
Digital Ramp
75% Red Field
75% Green Field
75% Blue Field
50% Gray Field
F1-White/F2-Black
F1-Blue/F2-Yellow
SMPTE Checkfield
Digital Test

Audio Test Tones

Use the *Audio Test Tones* drop-down controls to choose a frequency for each of the audio tones. The available range for each tone is 16 Hz to 20 kHz.

Audio Test Tone 1	1 KHz ▾
Audio Test Tone 2	2 KHz ▾
Audio Test Tone 3	4 KHz ▾
Audio Test Tone 4	8 KHz ▾

Product Menu (Status)

The *Product* menu displays various information about the 5010-AVS.

Product	**Rear Module**
Product Name	5010 - A/V Sync+
Supplier Name	Cal Media Engineering
Software Version	1.0.0
Boot Version	2.0a
Serial Number	00000
Hours of Operation	000,432.50
Card Status 🟢	OK
Memory Card 🟢	SDHC
Genlock Status 🟢	Locked

Hours of Operation indicates how long this particular 5010-AVS card has been powered.
This is only an approximate time. The value is updated every 3.75 minutes.
Note: Brand new cards will have a typical value between 72 and 80 hours. This is due to standard 72 hour "burn-in" followed by final testing time.

The *Card Status* indicator displays the operating condition of the card.
> Green indicates the card is operating correctly.
> Yellow indicates an unusual condition such as "Loading Firmware".
> Red indicates that a failure has been detected.

The *Memory Card* indicator displays the type of memory card installed.
> Green indicates the memory card is working correctly.
> Gray indicates no memory card detected.

The *Genlock Status* indicator shows the current genlock condition for the 5010-AVS.
> Green indicates the 5010-AVS is successfully locked to the selected Genlock Reference.

Genlock Status 🔴	Unlocked

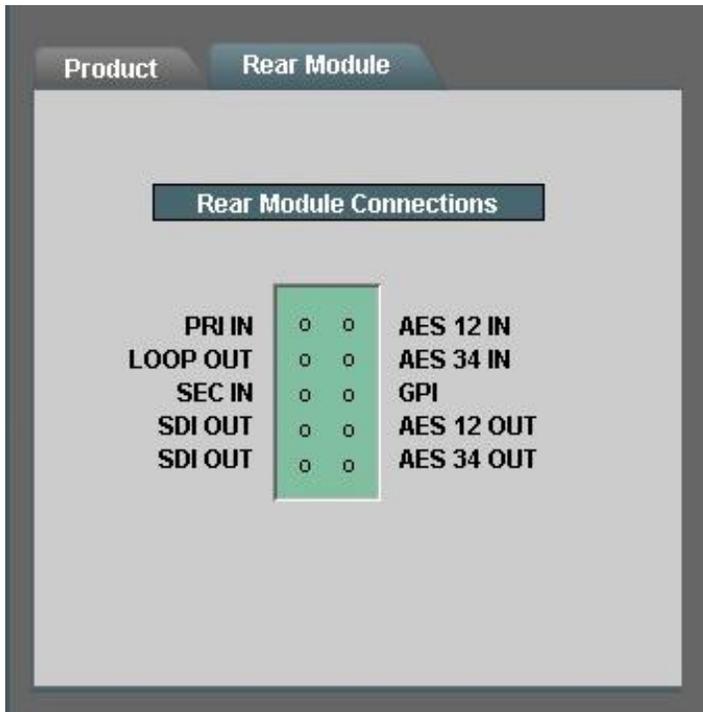> Red indicates an unlocked condition.
> Either the wrong reference is selected, the reference is incorrect, or no signal is preset.

Genlock Status 🟡	Free-run

> Yellow indicates the 5010-AVS is in Free-run mode.

Rear Module Menu

This menu displays the signal connections for the 5010-AVS at the Rear panel module.

Updating the Firmware

Cal Media cards can be quickly and easily updated through Dashboard, or using a MMC or SD memory card.

Note: **The 5010-AVS should not be used on-air during the firmware installation process. The card will stop communicating with Dashboard™ and will need to re-boot upon completion.**

Obtaining New Firmware

The current version of firmware can be obtained from California Media Engineering (www.calmedia.com).

Preparing Firmware Files

The firmware will be provided as a .zip file. Before it can be used, the file must be unzipped. **Be certain that no errors occur during the unzip process.**

Once unzipped, the firmware update should be a folder which contains several files.
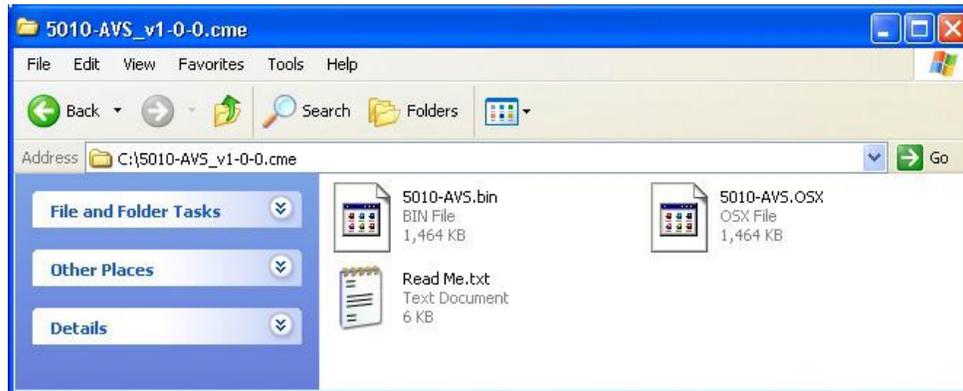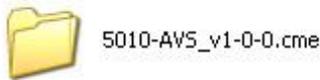
Be sure and open the *Read Me.txt* file for any additional instructions.

To update the 5010-AVS using Dashboard™, copy or move the folder to a location accessible from Dashboard™.

To update the 5010-AVS using a MMC or SD memory card, copy the entire folder to a MMC or SD memory card's root directory.

> **Note: The 5010-AVS can only recognize one folder with a ".cme" extension. If the memory card already has a ".cme" folder from an earlier version or another product, then that folder must be moved from the root directory or renamed or deleted. Do not combine files from other versions into the same ".cme" folder, as the 5010-AVS will only read the first ".osx" file it finds.**

Installing Firmware using Dashboard™ Version 3.0

Note: This process typically takes about 90 seconds.

1. Launch the Dashboard™ application and open the **5010-A/V Sync**+ card listed in the Basic Tree View.
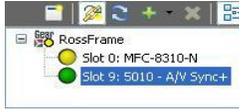
2. Click on the **Upload** button at the bottom of the Dashboard™ control screen.

3. The *Upload Software Wizard* will open. Click **Browse** and navigate to the location of the firmware file folder. Select the ".bin" file and click **Open**.
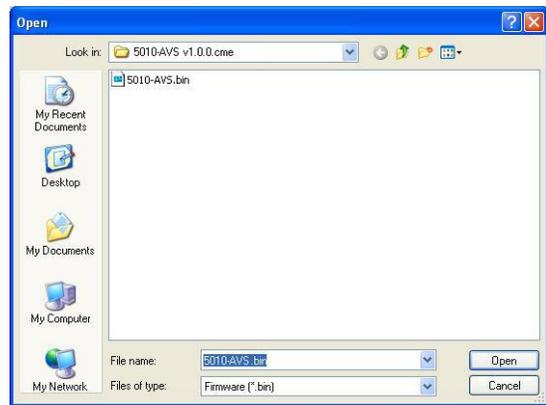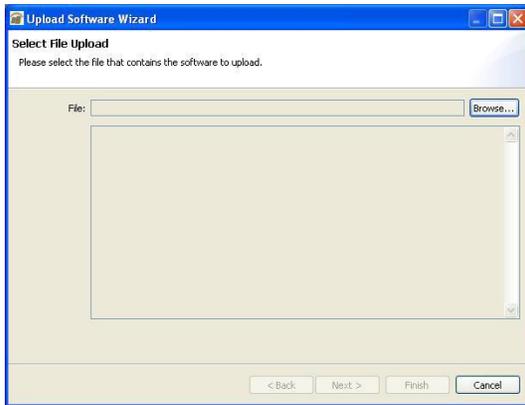
4. The *Upload Software Wizard* will now display the selected firmware file and its description. Click **Next**. The 5010-AVS card should be selected to receive this file. If other 5010-AVS cards are listed, check these cards too if they are to receive this firmware update.
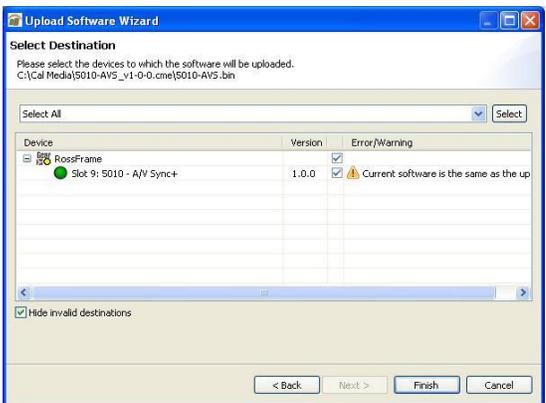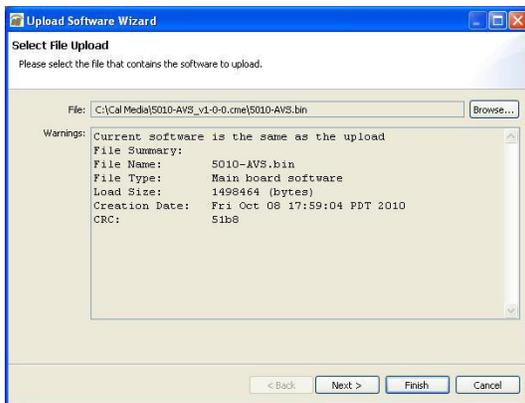
5. Click **Finish** to begin installing the new firmware. When the installation is complete Click **OK.** The Upload Wizard will close and the 5010-AVS will automatically reboot with the new firmware. Verify that the new version numbers are displayed on the Dashboard™ control *Product* menu.

Note: Some updates may require additional time for the initial reboot cycle (approx. 15 seconds).

WARNING! Do not cancel the upload or cycle power once the firmware begins copying until the firmware is completely loaded and the card has rebooted.

If the firmware installation process is interrupted then the 5010-AVS card may not be able to reboot. If Dashboard™ then fails to open the card, the firmware must be reinstalled using a memory card.

Installing Firmware using Dashboard™ Version 2.0

Note: This process typically takes about 90 seconds.

1. Launch the Dashboard™ application and open the **5010-A/V Sync**+ card listed in the Basic Tree View.
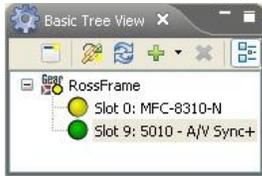
2. Click on the **Upload** button at the bottom of the Dashboard™ control screen.

3. The *Open* dialog window will appear. Click **Browse** and navigate to the location of the firmware file folder. Select the ".bin" file and click **Open**.
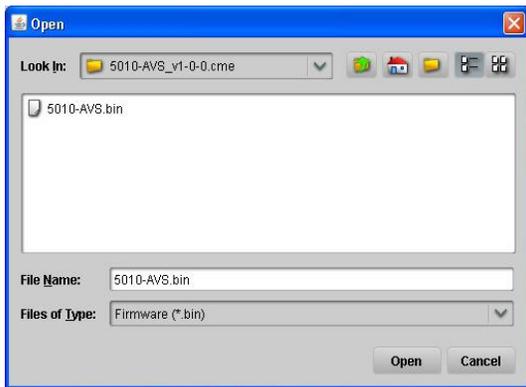
4. A confirmation window should now display the selected firmware file and its description.
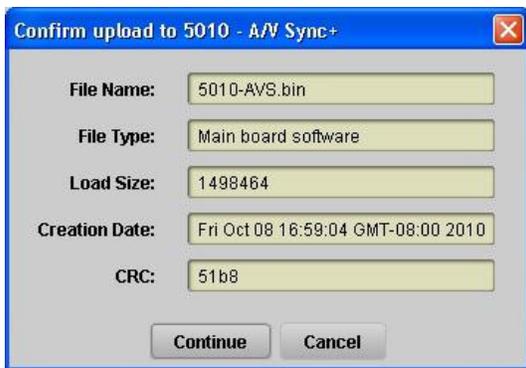
5. Click **Continue** to begin installing the new firmware. When the installation is complete the 5010-AVS will automatically reboot with the new firmware. Verify that the new version numbers are displayed on the Dashboard™ control *Product* menu.

   Note: Some updates may require additional time for the initial reboot cycle (approx. 15 seconds).

WARNING! Do not cancel the upload or cycle power once the firmware begins copying until the firmware is completely loaded and the card has rebooted.

If the firmware installation process is interrupted then the 5010-AVS card may not be able to reboot. If Dashboard™ then fails to open the card, the firmware must be reinstalled using a memory card.

Installing Firmware using a SD or MMC Memory Card

Note: This process typically takes about 30 seconds.

1. Install the memory card containing the firmware update folder on the 5010-AVS
    (see section *Installation and Setup* for details).

Figure 4-1. FLASH button and POWER LED location.

2. Press and hold in the "FLASH" button for approximately 2 seconds until the POWER LED begins flashing.
    The LED will rapidly **flash red** as the new firmware file is being copied (approximately 20 seconds).
    The LED will then rapidly **flash green** as the new file is verified (approximately 10 seconds).
    Once it has finished, the card will automatically re-boot.

    Note: Some updates may require additional time to process the new firmware file.
    During this time the LED will again rapidly flash red (approximately 10 seconds), and
    then rapidly flash green (approximately 5 seconds). Once it has finished, the card will
    automatically re-boot.

3. Verify that the new version numbers are displayed on the Dashboard™ control *Product* menu.

WARNING! Do not remove the memory card or cycle power once the firmware begins copying until the firmware is completely loaded and the card has rebooted.

If the firmware installation process is interrupted, then the update must be performed again.

Retrying Firmware Installation

If the first attempt has failed or was interrupted, the 5010-AVS may not function correctly or even boot.
To install the firmware under these conditions, a power-cycle firmware installation may be required.

1. Unseat the 5010-AVS card from the frame slot and wait a few seconds.
2. Install the memory card on the 5010-AVS.
3. Press and hold in the "FLASH" button while fully inserting the 5010-AVS card into the slot.
4. Keep holding in the "FLASH" button until the POWER LED begins flashing.
    (The firmware update should now continue as a normal installation described above).

Firmware Installation if Boot File has failed

In the unlikely event that the 5010-AVS card will not boot, and will not accept a firmware installation,
a jumper may be installed which will force the card to use the factory default boot file.

1. Unseat the 5010-AVS card from the frame slot.

2. Install a jumper on J905 (pins 1-2) as shown *(right)*.

3. Perform the power-cycle firmware installation as described
    above under *Retrying Firmware Installation.*

4. Once the 5010-AVS has booted, again unseat the card from
    the frame slot and remove the jumper and memory card.

5. Re-install the 5010-AVS into the frame slot.

Figure 4-2 Boot-Loader jumper location

6. Once installed, the 5010-AVS should automatically generate a new boot file. This should take
    approximately 15 seconds as the POWER LED will rapidly flash red, then green.

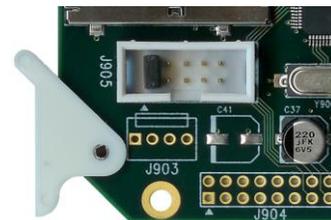7. Upon completion, the 5010-AVS should successfully reboot.

Troubleshooting Firmware Installation

Troubleshooting Dashboard™ Firmware Installation

Use the following information if the firmware upload process has failed:

• If the "**Selected file does not exist**" or "**Selected file is not a valid upload file**" error conditions are displayed in the **Upload Failed** dialog box, select **OK** from the dialog box and re-start the upload process and select the correct file.

• If a "**No response from device**" condition is encountered, the upload failed while in progress due to loss of power or communications. Verify that the card is powered up and there is communication with the openGear™ frame. Restart the upload process.

In the unlikely event the 5010-AVS card becomes unresponsive, try the following:

1. Unseat the 5010-AVS card from the frame slot and wait a few seconds.

2. Reinstall the 5010-AVS card into the frame slot.

3. If Dashboard™ is able to open the control panel for the 5010-AVS, repeat the installation process using Dashboard™.

4. If Dashboard™ is not able to open the control panel for the 5010-AVS, perform the installation using a SD or MMC memory card *(see previous section)*.

5. If the 5010-AVS still does not properly operate after trying all suggestions, contact customer support at support@calmedia.com.

Troubleshooting Memory Card Firmware Installation

If the LED does not begin to rapidly flash red when the FLASH button is pressed, check the following:

1. The FLASH button is not being pressed continuously for 2 seconds.

2. Possible bad memory card. Check if the memory card is indentified on the Dashboard™ control *Product* menu. Try a different memory card.

3. Incorrect Firmware. Check that the Firmware files are meant for the 5010-AVS.

4. Incorrect Firmware files or folder. See *Preparing Firmware Files* section above.
   A single ".cme" folder must be located in the root directory of the memory card.
   A single file with a ".osx" extension must be located within the ".cme" folder.

If the POWER LED immediately changes from a rapidly flashing red (10 flashes a second) to a slower flashing red (2 flashes a second) and continues flashing for more than a minute, then the firmware file (".osx") is incorrect or damaged. Check the files. Try again with a different memory card.

If the card has not re-booted after several minutes, then the firmware update has probably failed. Try again with a different memory card.

Note: It is safe to remove the memory card and/or power cycle the 5010-AVS as long as the POWER LED is not rapidly flashing red (10 flashes a second).

If the 5010-AVS still does not properly operate after trying all suggestions, contact customer support at support@calmedia.com .

Specifications

Video Processing

Signal:	HD - 1.485Gb/s (SMPTE 292M)
	SD - 270Mb/s (SMPTE 259M)
Inputs:	2 BNCs, 75ohm, 800 mVpp
	HD - Auto EQ to 100 meters (Belden 8281)
	SD - Auto EQ to 280 meters (Belden 8281)
Output:	2 BNCs, 75ohm, 800 mVpp
	HD Timing Jitter < 0.3UI
	SD Timing Jitter < 0.2UI
Formats:	1080i-60/59.94/50
	1080PsF-24/23.98
	720p-60/59.94/50
	483i-59.94
	576i-50
Resolution:	10 bit, 4:2:2

Audio Processing

Signal:	Embedded, AES/EBU
	SD (SMPTE 272C)
	HD (SMPTE 299M)
Inputs:	2 BNCs, 75ohm
	Transformer coupled
Outputs:	2 BNCs, 75ohm
	Transformer coupled
Sample Rate:	48KHz-synchronous
Resolution:	24 bit

Genlock Reference

Signals:	Bi-Lev (Black Burst) , Tri-Level
Inputs:	2 BNC loops, Hi-Z

Specifications subject to change without notice.

Control

GPI Input:	1 BNC, internal pullup
	Activates on closure to ground
Remote Input:	RJ-45 Ethernet connector

Memory Card

Type:	MMC, SD, SDHC
Format:	FAT16 or FAT32 required for STILL storage
	(cards > 64MB are typically FAT16 or FAT32)

Still Files

File Folder Name:	STILLS
Capacity:	253 stills maximum for each file format
File Format:	.HD2 = 1920 x 1080, 10bit, 4:2:2
	.HD1 = 1280 x 720, 10bit, 4:2:2
	.SD2 = 720 x 576, 10bit, 4:2:2
	.SD1 = 720 x 487, 10bit, 4:2:2

Power

8 Watts

Specifications subject to change without notice.

5 YEAR LIMITED WARRANTY

California Media Engineering Inc. warrants that this product (5010-AVS openGear™ card) is free from defects in material or workmanship for a period of five (5) years from the date of original purchase. In the event this product becomes defective through normal usage, California Media Engineering Inc. agrees to repair or at it's option replace the defective product without charge.

This warranty does not cover the DFR-8310/8320/8321 Frame, Network card or PS8300 Power supply(s).

This warranty is limited to the original end-purchaser and is not assignable or transferable. This warranty does not apply to damage caused by negligence, accidents, or an act of God. Only a California Media Engineering Inc. factory representative is authorized to repair this product. Any unauthorized attempt to repair this product will immediately void the warranty. Any unauthorized alterations or modifications to this product will immediately void the warranty. This product is designed specifically for standard openGear™ chassis' and any attempt to operate this product outside of an openGear™ chassis will immediately void the warranty.

California Media Engineering Inc. shall not be responsible for incidental or consequential damages, nor damage due to misuse or the use of any unauthorized attachment or modification, nor damage by the use of an unspecified electrical circuit. In no event shall California Media Engineering Inc. be responsible or liable for any damages arising from the use of this product, whether such damages be direct, indirect, special, incidental, consequential, or otherwise. California Media Engineering Inc. shall not be liable for any loss of use, revenue or profit.

Any software provided for use with this product is provided "AS IS." California Media Engineering Inc. shall not be responsible or liable for any damages arising from the use of said software, whether such damages be direct, indirect, special, incidental, consequential, or otherwise.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Any implied warranty is limited in duration to five years provided in this, the only, expressed warranty.

Repair Policy

Should any problem arise with your 5010-AVS openGear™ card, please contact Cal Media's Technical Support Department at support@calmedia.com or use the contact information on the back cover of this manual.

If required, a Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions. Do not return any product before obtaining a RMA number. Any shipping costs incurred are the customer's responsibility. If available, a temporary replacement card may be provided at a nominal charge.

Cal Media's Technical Support Department will continue to provide advice on any product manufactured by Cal Media, beyond the warranty period without charge, for the life of the product.

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