

# 5100-AVD 4K/HD/SD Profanity Delay

## Dual Channel Audio-Video Broadcast Delay and Profanity Elimination System

### Operations Manual



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## 5100-AVD • Audio-Video Delay Operations Manual

- Cal Media Engineering Part Number: **5100-AVD-OM**
- Document Version: 0.5.0
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## Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the “Important Safety Instructions” listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these Specific requirements.

### Symbol Meanings



This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.



**Warning**

The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



**Caution**

The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



**Notice**

The symbol with the word “**Notice**” within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.



**ESD  
Susceptibility**

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

### Important Safety Instructions



**Caution**

This product is intended to be a component product of the openGear™ series frame. Refer to the openGear™ 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

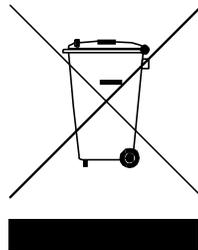
Routine maintenance to this openGear™ product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the contact information on the last page of this manual. All Cal Media Engineering openGear™ products 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 Engineering 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 Engineering for more information on the environmental performances of our products.

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# Introduction

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## 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 Engineering's **5100-AVD Dual Channel Audio-Video Broadcast Delay and Profanity Elimination System** for openGear™ series frames. The 5100-AVD is part of a product line of media gear for broadcast and production facilities.

Should you have a question pertaining to the installation or operation of your 5100-AVD, please contact us at the numbers listed on the back cover of this manual, or through our web site at [www.calmedia.com](http://www.calmedia.com).

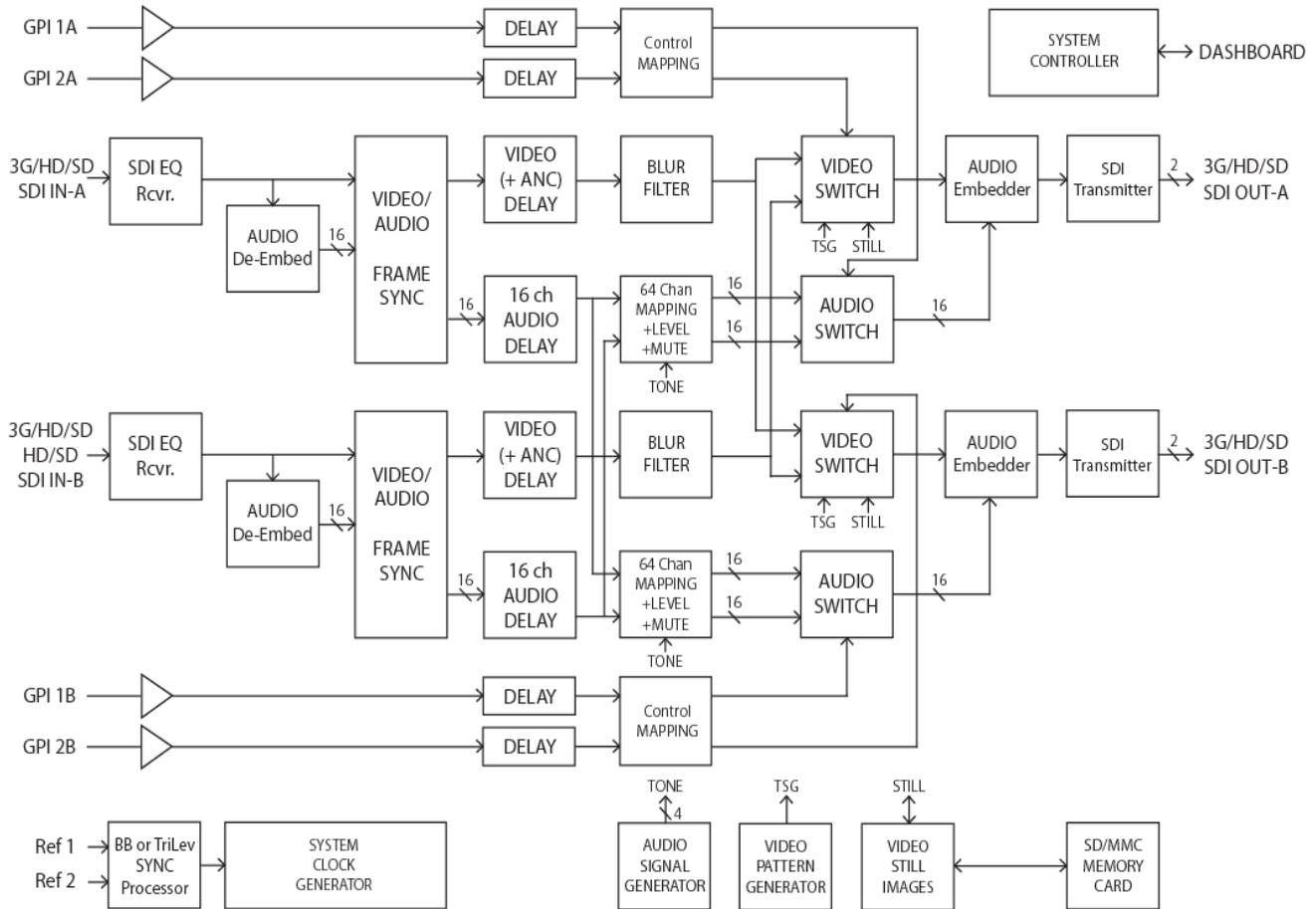
## Overview

The 5100-AVD is a Dual Channel Audio-Video Profanity/Broadcast Delay providing everything needed to manage objectionable material during live events. The 5100-AVD is user configurable as two independent delays, a two operator delay, a single delay with "safe" input, or slaved with one or more cards to support 4K/UHD-60. The 5100-AVD provides over 12 seconds of adjustable delay for two 1080p signals.

Each delay channel has 2 GPI ports to activate built-in switching with customizable reaction times. Objectionable material may be eliminated by individually switching the video and each audio channel to alternate signals. Aux A/V input (safe), video blur, freeze frame, user defined images, test patterns, black, other audio channels (shuffle), audio tones, and mute, are all possible switch sources.

The 5100-AVD is designed for use in the openGear™ series frames, and is controlled through the Dashboard™ control software (Windows, Linux and Mac platforms). Optional remote control units are available from Cal Media Engineering.

## DUAL CHANNEL A/V DELAY - BLOCK DIAGRAM



## Detailed Description

### Configuration

The 5100-AVD can be configured to operate in 3 basic modes:

#### Single Channel Delay

The A channel is the primary delay. The B channel is used as the “safe” input with adjustable delay.

#### Dual Channel Delay

The A channel and B channel operate as independent delays, and can also be different formats.

#### Two Operator Delay

The A channel is the primary delay. The B channel’s SDI output provides a “Tap” from the primary delay for a second operator to monitor and censor the signal. The B channel’s SDI input is used as the “safe” input (with no delay).

# Audio-Video Processing

The 5100-AVD has two channels each composed of a SDI input, audio-video synchronizer, variable delay, audio and video GPI controlled switches, and a SDI output. Each channel can operate independently at two different formats (same frame-rate), or combined for switching between channels. For each input synchronizer, the audio is de-embedded and processed separately from the video and VANC data. The 5100-AVD contains a powerful audio processor providing individual mapping, level adjustments, and clean switching of all 32 audio channels.

## Delay Memory

The 5100-AVD uses solid-state digital memory to delay the audio-video signals. The memory is shared between both A and B channels. A user control allocates a portion of the memory to each channel to allow for maximum delay in one channel or equal delays in both. Each channel's delay is adjustable in frame increments from 0 to a maximum value dependent on the format. Sixteen audio channels are delayed the same amount as each video signal, but with an adjustable offset. The audio delay may be offset from video +/- 500ms.

|          | 60/59.94 Fps          | 50 Fps                | 24/23.98 Fps         |
|----------|-----------------------|-----------------------|----------------------|
| 3G-1080p | 25 seconds 36 frames  | 30 seconds 36 frames  | N/A                  |
| HD-1080i | 51 seconds 6 frames   | 61 seconds 11 frames  | 64 seconds 00 frames |
| HD-720p  | 57 seconds 4 frames   | 68 seconds 24 frames  | N/A                  |
| SD       | 255 seconds 29 frames | 255 seconds 24 frames | N/A                  |

Table 1a: Maximum Delay for single channel (Allocation = 100/0).

|          | 60/59.94 Fps          | 50 Fps                | 24/23.98 Fps         |
|----------|-----------------------|-----------------------|----------------------|
| 3G-1080p | 12 seconds 48 frames  | 15 seconds 18 frames  | N/A                  |
| HD-1080i | 25 seconds 18 frames  | 30 seconds 18 frames  | 32 seconds 00 frames |
| HD-720p  | 28 seconds 32 frames  | 34 seconds 12 frames  | N/A                  |
| SD       | 131 seconds 22 frames | 132 seconds 12 frames | N/A                  |

Table 1b: Maximum Delay for two channels (Allocation = 50/50).

## Aux “safe” Input

The B channel's SDI input may be used as alternate sources when configured as “Single Channel Delay” or “Two Operator Delay”.

The video signal will appear as “Aux” source.

The Embedded audio signals will appear as “Aux-Emb” channels.

## Video Output Source

The video output source select determines the primary path from which the video output originates.

- Delay: the output comes from the Delayed input synchronizer.
- Aux:\* the output comes from the Aux input synchronizer.
- Black: the output goes to black.
- Test Signal: the output comes from the internal test signal generator.
- Still: the output comes from one of four still image buffers.

\*Aux is only available in “Single Channel Delay” and “Two Operator Delay” modes.

## Video Output Switch

Regardless of the Video Output Source settings, the active picture portion can be switched to any other source via the Video “Switched Source” control. This switch is engaged by the GPI input(s) and/or the control panel.

*Note: The active picture is defined to be the actual picture information within the total signal. The horizontal and vertical ancillary data space is not part of the active picture area, and is not affected by the switch.*

## Ancillary Data (VANC, Timecode, and Captions)

The video output will always pass the ancillary data from the primary path selected by the Output Source Select.

When the Video-Switch is selecting an alternate video source during the active picture time, the output continues to pass the primary path’s ancillary data, and does not pass any of the alternate source’s ancillary data. This method preserves timecode, closed captions, and other data when switching the video to another source.

## Still Image Buffer

The 5100-AVD 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 5100-AVD card to save and load still images.*

## Memory Card

The 5100-AVD 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 5100-AVD conforms to the FAT32 specification so firmware and still image files may be exchanged easily with most computers.

## Audio Output Mute.

Each output channel may be individually muted. The “Mute” control overrides channel mapping, levels, and switching.

## 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. Four internal tone generators and silence are also available as sources.

## Audio Output Levels.

The mapping function also provides individual level adjustment for all output channels. The level of each channel may be adjusted –40 to +20 dB with the “Gain” control.

## Audio Output Switch

Regardless of the Audio Output Source settings, each output channel can be switched to any other source via the Audio “Switched Source” control. This switch is engaged by the GPI input(s) and/or the control panel. The switched outputs also have different level settings than those used for the primary outputs via the Audio “Switched Gain” control.

# 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 5100-AVD 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 5100-AVD 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 Engineering directly.

# Rear Module Installation

The 5100-AVD is compatible with DFR series and OG 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 may be required depending on the openGear™ frame you are using.

## Rear Modules for the 5100-AVD

The Rear Module for the 5100-AVD depends on the openGear™ frame you are installing the card into.

- **DFR-8310** series frames — When installing the 5100-AVD in the DFR-8310 series frames, the **RM1-5100A** Rear Module is required. The 5100-AVD is also compatible with the DFR-8310-BNC frame.
- **DFR-8320** and **OG** series frames —When installing the 5100-AVD in the DFR-8320 or OG series frames, the **RM2-5100A** is required.

## Installing the Rear Module

If you received a Rear Module with your 5100-AVD, you will need to install the module in your DFR or OG series frame before you can install the 5100-AVD in the frame, or connect cables to the slot you have chosen for the 5100-AVD. Skip this section if you are installing the 5100-AVD 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 or OG series frame:

1. Refer to the DFR or OG 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 5100-AVD 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.

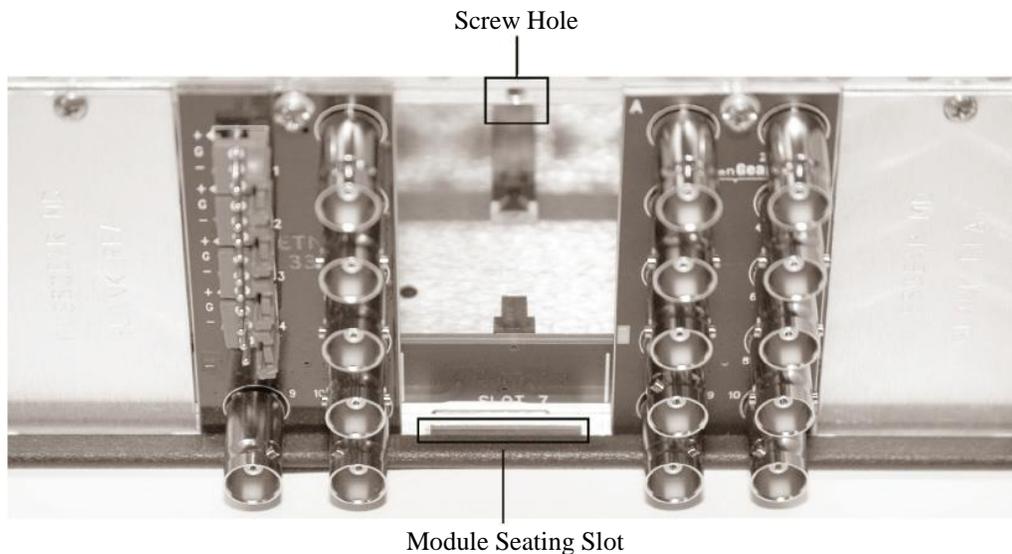


Figure 2-1. Rear Module Installation in a DFR Series Frame (5100-AVD not shown)

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 or OG series frame User Manual, and contact your openGear™ sales representative.

This completes the procedure for installing the Rear Module in a DFR or OG series frame.

## Board Installation

Use the following procedure to install the 5100-AVD in a DFR or OG series frame:

1. Refer to the User Manual of your DFR or OG series frame to ensure that the frame is properly installed.
2. After selecting the desired frame installation slot, hold the 5100-AVD 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 5100-AVD in a DFR or OG series frame.

## Cable Connections

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

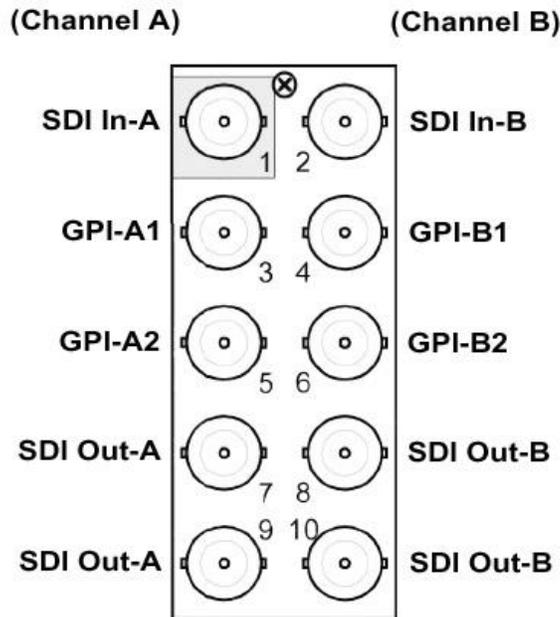


Figure 2-2. Cable Connections for the Rear Module

## **Multiple Card Connections (Master/Slave)**

This section to be completed in future version.

# 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 5100-AVD.

## Hot Swappable

The memory cards are “hot-swappable”, which means they can be installed and removed while the 5100-AVD 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 5100-AVD 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 5100-AVD 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 5100-AVD’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 not 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.

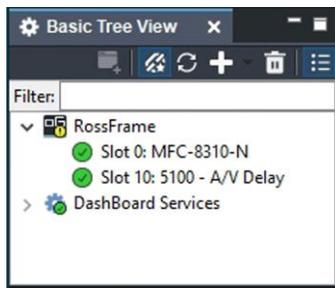
To prevent damage to the socket, do **not** pull on the SD/MMC card when it is locked into the socket.

# Operation

## DashBoard™ Control System

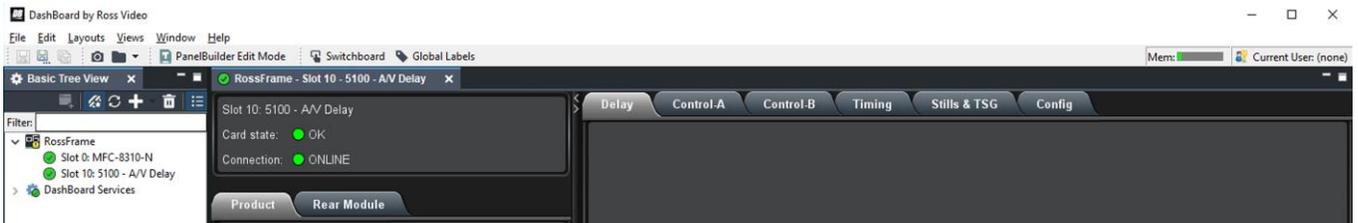
The 5100-AVD is controlled using the DashBoard™ Control System.

When the card is installed in an openGear™ frame, DashBoard™ will identify it as “5100 - A/V Delay”.



Open the selected card’s control panel by right-clicking the mouse and selecting “Open”.

## Menu Tabs



Controls for the 5100-AVD are divided among five or six menu tabs (depending on mode):

- Delay
- Control (for Single Channel and Two Operator modes)
- Control-A (for Dual Channel mode)
- Control-B (for Dual Channel mode)
- Timing
- Stills & TSG
- Config

Card status for the 5100-AVD:

- Product
- Rear Module

# Config Menu

The Config tab contains the menu of controls used to configure the 5100-AVD.



## Rename Card as:

This control allows for the 5100-AVD to be identified by a custom name (up to sixteen characters).

## Configuration

These controls configure the operating mode of the 5100-AVD.

### System

The 5100-AVD can operate as a single stand-alone delay card at resolutions up to 1080p, or it can be combined with additional cards to achieve 4K UHD resolution with Quad-link SDI.

4K Quad-link can be achieved with either two or four cards.

Two cards will provide a 4K *Single Channel Delay*, but without an Aux “safe” input.

Four cards will provide a 4K *Single Channel Delay + Aux*, or a *Two Operator Delay + Aux*.

For resolutions up to 1080p, select “Single Card”.

When using multiple cards, one card must be designated “Master” and all others “Slave”.

See *Multiple Card Connections (Master/Slave)* under *Installation and Setup*.

**\*Warning – Do not change this setting while on air. Changing this setting may cause a disruption to the output video and/or audio.**

## Mode

The 5100-AVD can be configured to operate in 3 basic modes:

### Dual Channel Delay

The A channel and B channel operate as independent delays, and can also be different formats.

### Single Channel Delay + Aux Input

The A channel is the primary delay. The B channel is used as the “safe” input with adjustable delay.

### Two Operator Delay + Aux Input.

The A channel is the primary delay. The B channel’s SDI output provides a “Tap” from the primary delay for a second operator to monitor and censor the signal. The B channel’s SDI input is used as the “safe” input (with no delay).

**\*Warning – Do not change this setting while on air. Changing this setting may cause a disruption to the output video and/or audio.**

## Time & Date

This menu is used to adjust the system time and date. The 5100-AVD has a real time clock that is used when writing files (such as still images) to the SD/MMC memory card. The real time clock continues running even when the 5100-AVD is unpowered (typically over six weeks without power). Changing any of the time and date parameters automatically updates the real time clock.

### Set Hours

This control sets the Hours setting. Range: 1 – 12.

### Set Minutes

This control sets the Minutes setting. Range: 0 – 59.

### Set AM/PM

This control sets the time of day setting. Range: AM or PM.

### Set Month

This control sets the Month setting. Range: January through December.

### Set Day

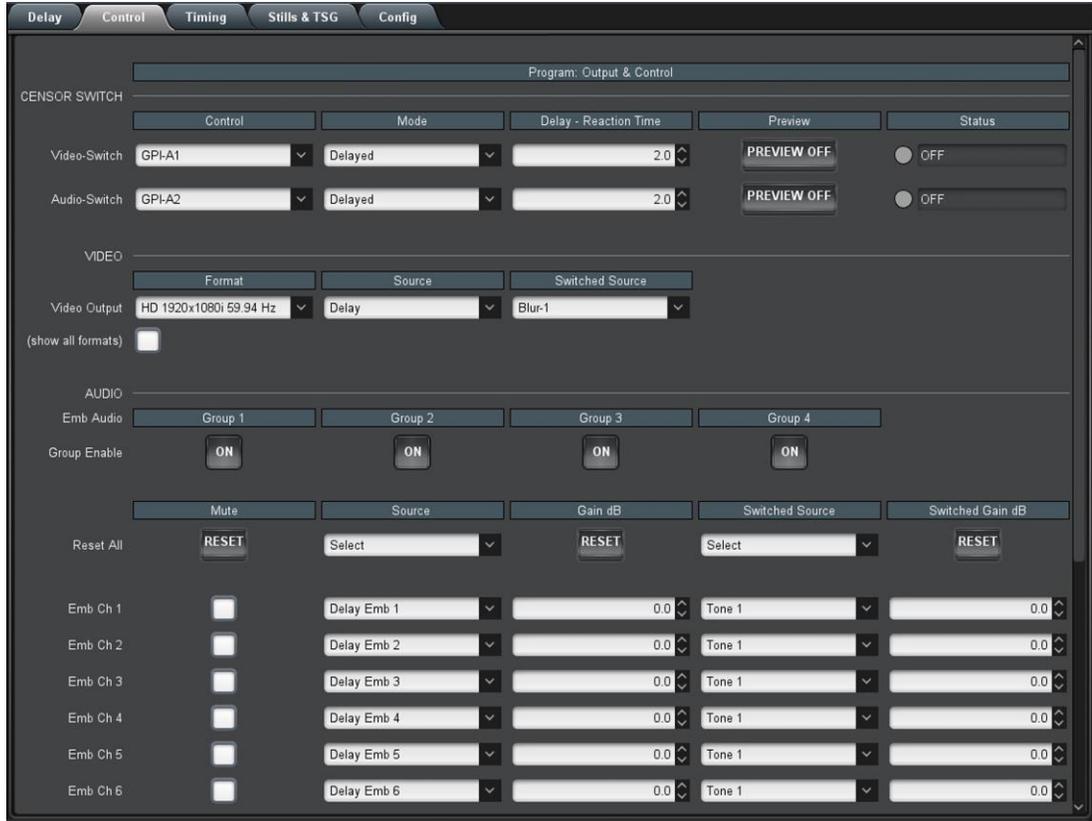
This control sets the Day of the Month setting. Range: 1 – 31.

### Set Year

This control sets the Year setting. Range: 2000 – 2099.

# Control Menu

The Control tab contains the menu of all controls that affect the outputs of the 5100-AVD.



### Single Channel Delay – Control Menu:

For *Single Channel Delay*, there is one tab labeled **Control**.

All outputs, SDI Out-A and SDI Out-B, are the same signal and controlled from this menu.

### Dual Channel Delay – Control-A and Control-B Menus:

For *Dual Channel Delay*, there are two tabs labeled **Control-A** and **Control-B**.

The SDI Out-A output signal is controlled from the **Control-A** menu.

The SDI Out-B output signal is controlled from the **Control-B** menu.

Each channel is an independent delay, and may have different formats, such as 720p and 1080i (both channels must have the same base frame rate).

### Two Operator Delay – Main Control and 2nd Op Control Menus:

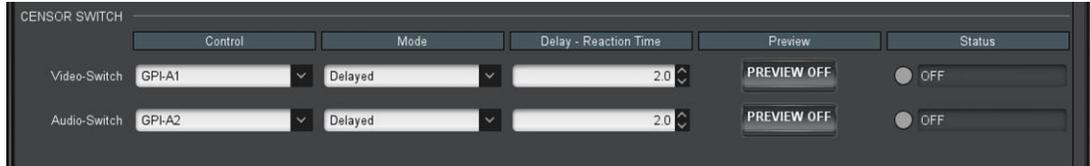
For *Two Operator Delay*, there are two tabs labeled **Main Control** and **2nd Op Control**.

The **Main Control** menu has the primary signal controls for the SDI Out-A output.

The **2nd Op Control** menu has additional censor controls for the tap output at SDI Out-B.

## Censor Switch

The top section of the menu contains controls for configuring the Video and Audio Switches.



### Switch Control

The **Control** drop-down box assigns a GPI port to externally control the Video and Audio Switches.

For example, when **GPI-A1** is selected for **Video Switch**, then a closure to ground on the GPI-A1 BNC will activate the video switch.

### Switch Mode & Delay-Reaction Time

The **Mode** drop-down control configures how each switch behaves.

In **Instant** mode, the switch activates simultaneously with the GPI closure (**Delay - Reaction Time** is ignored).

In **Delayed** mode, the activation of the switch is delayed by the programmed Audio/Video Delay time (see Delay menu). This allows the switch to activate in time with the delayed Audio/Video output. In this mode the **Delay - Reaction Time** control is used to advance the start time of the switch activation. This feature is used to compensate for human response time in recognizing an objectionable incident. The Reaction Time has a range of 0 to 6 seconds in 0.1 second steps.

The **Delayed** mode with **Reaction Time** is designed for censoring applications where profanity and other objectionable material must be removed. In this mode, the operator monitors the input source (non-delayed). When an incident occurs the operator immediately engages a GPI-switch and holds the GPI-switch until the incident has passed. Since the operator may not recognize the incident until after it has occurred, a **Reaction Time** is selected to compensate. If more than enough **Reaction Time** is selected, when viewing the delayed A/V outputs the main program will switch away to some other “safe” material before the offending incident occurs and will switch back to the main program after the incident is over.

### Switch Preview

The **Preview** buttons can be used to test each Switch’s configuration instead of using the GPI.

**PREVIEW ON** engages the Switch as if the GPI port has a closure to ground.

**PREVIEW OFF** releases the Switch as if the GPI port is open.

### Switch Status

The **Status** indicator shows the real time status of the Video or Audio switch.

**ON** indicates that the switch is engaged, either by a GPI port, or the Preview button. When ON, the Video and/or Audio outputs come from the “Switched Source” control setting.

**OFF** indicates that the switch is not engaged. The Video and/or Audio outputs come from the “Source” control.

# Video Output

This section of the menu contains controls for configuring the Video Output.

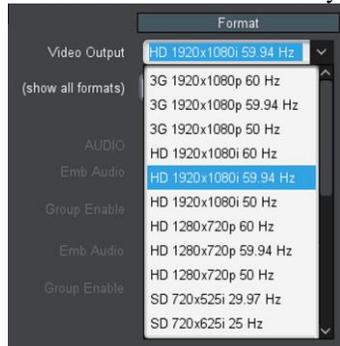


## Video Output Format

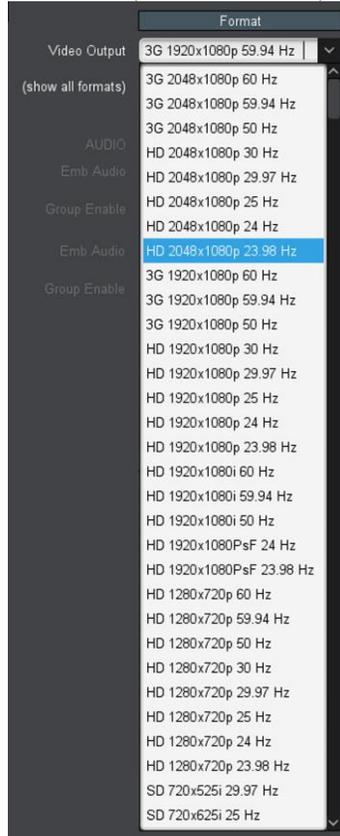
The Video Output **Format** control selects the video format and frame rate for the video output.

*Note: input video signals must be the same format and frame rate as the output.*

The default list of formats only includes broadcast standards:



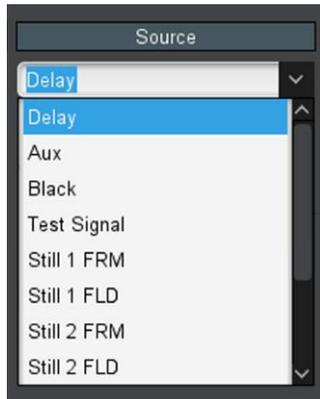
When the “(Show all formats)” box is checked, then all possible formats are available:



*Note: In Dual Channel Delay mode, the Control-B Format selection only includes formats with the same base frame rate as what has been selected for the Control-A Format.*

## Video Output Source

The Video Output *Source* control selects the primary source for the video output (when the Video Switch is OFF).

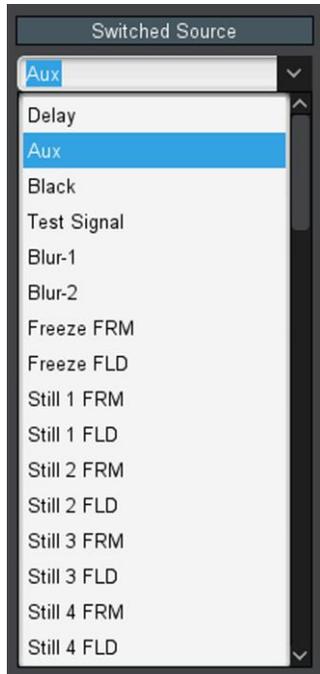


- Delay = Delayed Video input (default).
- Aux = Aux Video input. (not available in *Dual Channel Delay* mode)
- Black = Black Video (0 IRE).
- Test Signal = **Video Test Signal** generator (see *Stills & TSG* menu).
- Still # FRM = Display Full Frame Still image (see *Stills & TSG* menu).
- Still # FLD = Display Field mode Still image (see *Stills & TSG* menu).

**Note: This is also the source of the ancillary data that will pass to the output even when the Video Switch is engaged.**

## Video Switched Source

The Video Output *Switched Source* control selects the “safe” source for the video output when the Video Switch is engaged (ON).

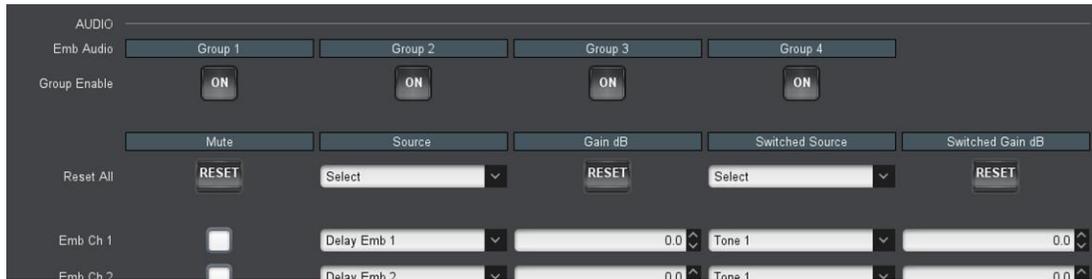


- Delay = Delayed Video input.
- Aux = Aux Video input. (not available in *Dual Channel Delay* mode)
- Black = Black Video (0 IRE).
- Test Signal = **Video Test Signal** generator (see *Stills & TSG* menu).
- Blur-1 = Blur Filter (normal).
- Blur-2 = Blur Filter (high).
- Freeze FRM = Full Frame Freeze of output video while the switch is active.
- Freeze FLD = Field mode Freeze of output video while the switch is active.
- Still # FRM = Display Full Frame Still image (see *Stills & TSG* menu).
- Still # FLD = Display Field mode Still image (see *Stills & TSG* menu).

**Note: Only the active portion of video is switched. All ancillary data from the primary source (Closed Captions, Time Code, etc) will pass undisturbed.**

# Audio Outputs

This section of the menu contains controls for configuring the Audio Outputs.



## Embedded Audio Group Enable

This section contains controls for each embedded audio group on the video output.



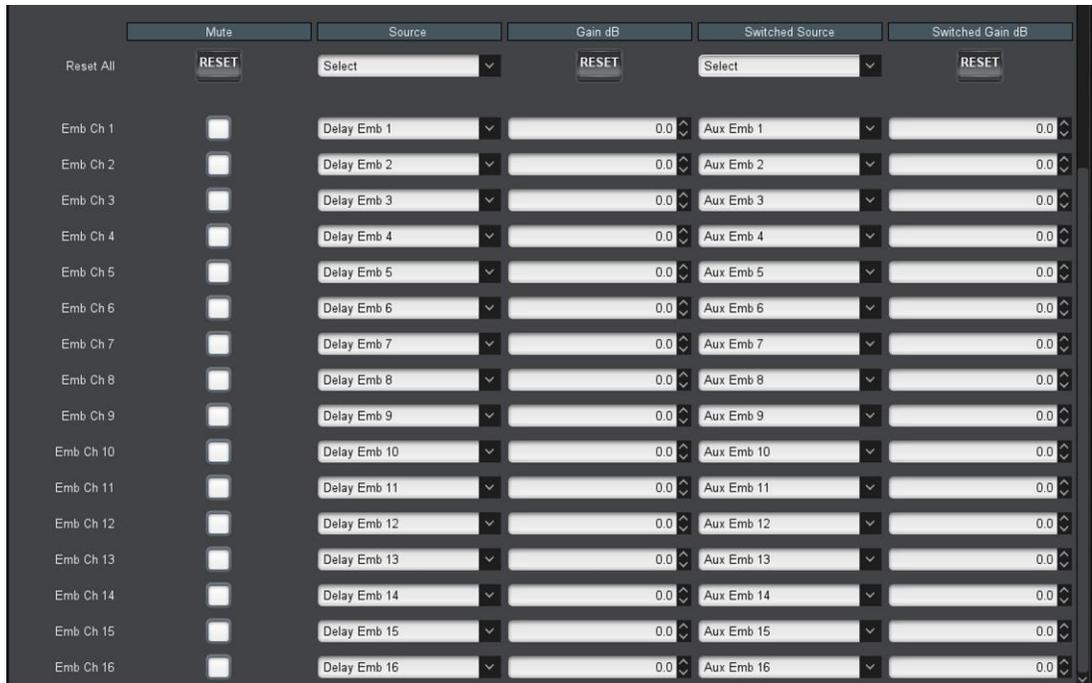
Use the **Group Enable** buttons to enable (**ON**) or disable (**OFF**) each of the four audio groups.

*Note: the 5100-AVD strips all ancillary embedded audio from the video input(s) 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.*

## Audio Control Array

This menu provides an array of five controls and sixteen audio channels to allow easy control of any channel parameter. At the top of the array, there are global reset controls which apply to all channels.

**Note: Some channels may not be visible without scrolling the DashBoard™ Control screen down.**



## Audio Output Mute

Each output channel may be individually muted. When checked, the **Mute** checkbox silences the corresponding audio channel and overrides all other settings including during switching. The **Reset All - Mute** reset button will uncheck (unmute) all audio channels.

## Audio Output Source (Mapping)

For each audio channel, the **Source** drop-down control is used to select a signal that will be present on that embedded output channel (when the Video Switch is OFF).

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. Silence (mute) and four internal tone generators are also available as sources.

*Example: Delay Emb 1 signal can be output on Emb Ch 4, and Emb Ch5.*

The **Reset All - Source** drop-down control will quickly assign all 16 channels to the selected source.

Source 1:1 – This will assign all Source channel#s to their corresponding output channel#s.  
*Source Ch1 to Output Emb Ch1, ....., Source Ch16 to Output Emb Ch16.*

If the **Audio Switch** is activated, then the output audio will change to the source selected by the **Audio Switch Source** control.

## Audio Output Level (Gain dB)

The level of each channel may be adjusted –40 to +20 dB with the **Gain** control.

The **Reset All - Gain** reset button will adjust all audio channels to 0dB (default).

## Audio Output Switch

When the Audio Switch is engaged (ON), the embedded audio outputs will switch to the sources selected by the Audio **Switched Source** control. The Audio Switch is engaged by the GPI input(s) and/or the control panel. The switched outputs may also have different level settings than those used for the primary outputs via the Audio **Switched Gain** control.

## Audio Switched Source (Mapping)

The Audio **Switched Source** control selects the “safe” source for the audio output when the Audio Switch is engaged (ON).

Full Audio Mapping is possible with the **Switched Source** control. Any source may be selected for any output channel, including one source feeding multiple output channels. Silence (mute) and four internal tone generators are also available as sources.

*Example: Aux Emb 5 signal can be output on Emb Ch 1, and Emb Ch2.*

The **Reset All – Switched Source** control will quickly assign all 16 channels to the selected source.

Source 1:1 – This will assign all Source channel#s to their corresponding output channel#s.  
*Source Ch1 to Output Emb Ch1, ....., Source Ch16 to Output Emb Ch16.*

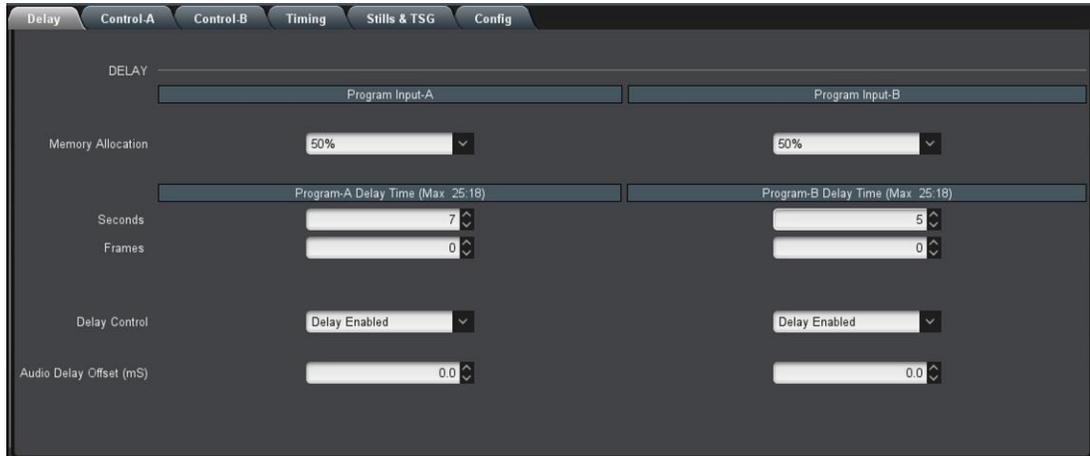
## Audio Switched Level (Gain dB)

The level of each channel may be adjusted –40 to +20 dB with the **Switched Gain** control.

The **Reset All – Switched Gain** reset button will adjust all audio channels to 0dB (default).

# Delay Menu

This menu provides all controls for setting the Audio/Video Delay. The controls will vary depending on the 5100-AVD's operating mode.



## Memory Allocation

The 5100-AVD uses solid-state digital memory to delay the audio/video signals. The memory is shared between both A and B channels. The **Memory Allocation** control allocates a portion of the memory to each channel. The control allows adjustments of 1/8 (12.5%) increments. When adjusting one channel, the opposite channel will automatically adjust to always produce 100%.

The **Memory Allocation** control is not available in *Two Operator* mode.

## Maximum Delay

The Delay menu indicates the maximum audio/video delay available for each channel. The maximum value is calculated based on the memory allocation and the format selected for each channel.

## Delay Time

Each channel's audio/video delay is adjustable from 0 to the maximum delay value.

*Note: these settings apply equally to both the Audio and Video signals.*

### Seconds of Delay

This control adjusts the audio/video delay in one second increments.

### Frames of Delay

This control adjusts the audio/video delay in one frame increments.

## Delay Control

Each channel's audio/video delay can be enabled or disabled remotely by a GPI port. To make use of this feature, select a GPI port with this control. The audio/video delay selected by the **Seconds & Frames** setting will be enabled only if the selected GPI port is ON (closure to ground). The delay will be disabled (0) when the selected GPI port is OFF (open).

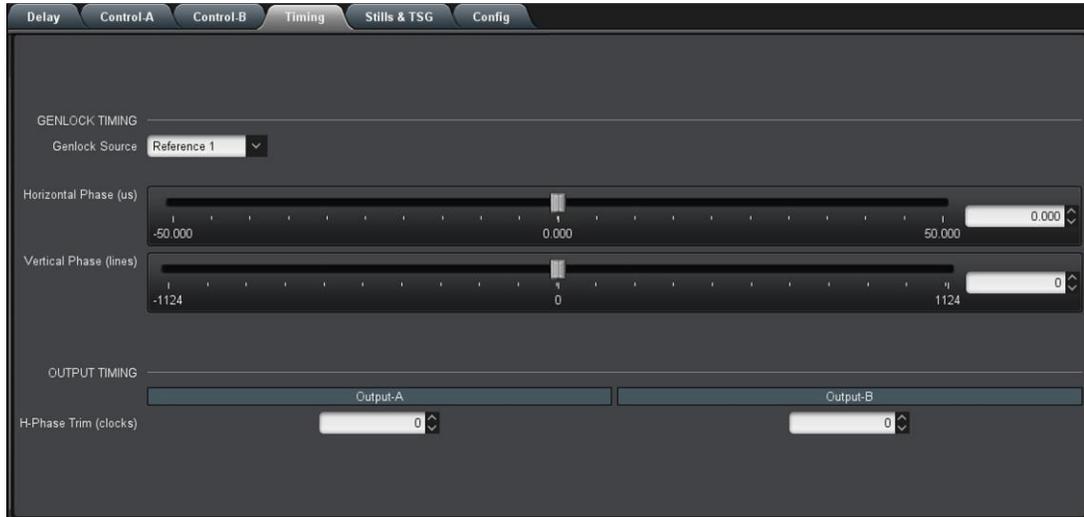
Select "Delay Enabled" when not using this feature.

## Audio Delay Offset

To correct for lip-sync errors in source materials or downstream equipment, a fixed offset can be added to the audio path. The offset range is +/- 500ms (milliseconds) in 0.25ms steps.

# Timing Menu

This menu contains all controls for timing the 5100-AVD outputs to a genlock reference.



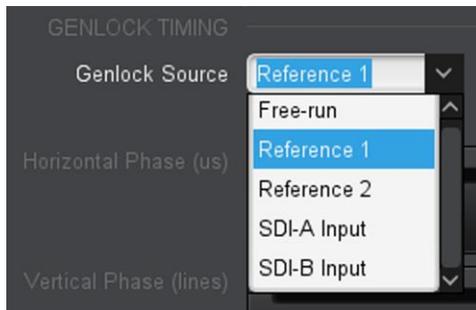
## Genlock Timing

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

## Genlock Source

Use the *Genlock Source* drop-down control to choose which signal will be used as the genlock reference. The 5100-AVD can lock to composite sync, black-burst, tri-level sync, or the embedded timing signals from one of the SDI inputs.

*Note: the outputs may become unstable if there is no signal applied to a SDI Input and it is chosen to be the Genlock Reference.*



“Reference 1” and “Reference 2” refer to the “REF1” and “REF2” BNC loops on the back of the openGear™ chassis. **There is no genlock reference BNC on the 5100-AVD rear module.**

The genlock “Lock” status for the selected source is shown on the Product menu (Card Status).

## Horizontal Phase (us)



This control adjusts the horizontal phase of all the SDI outputs with respect to the selected genlock reference. The horizontal phase resolution is 0.00673 micro-seconds per increment, regardless of the output video format.

## Vertical Phase (lines)



This control adjusts the vertical phase of all the SDI outputs with respect to the selected genlock reference. The control adjusts the output in video line increments, and may be advanced or delayed up to 1124 lines. This control may be used to advance the output one or more lines to compensate for equipment delays down-stream.

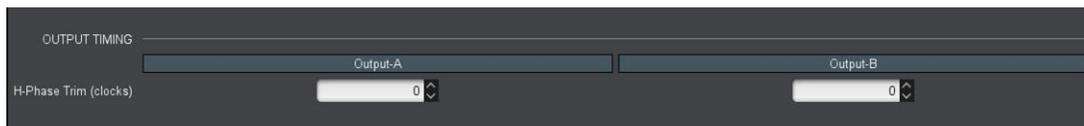
The number of lines per frame is determined by the Channel-A output format.

Note: The maximum number of lines is dependent 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 a value of 530 for a NTSC channel-A output will actually produce 5 (530 – 525).

## Output Timing

The 5100-AVD provides a *Horizontal Phase Trim* on each channel to use in compensating for varying cable lengths, or to align Quad-link signals.

## H-Phase Trim (clocks)

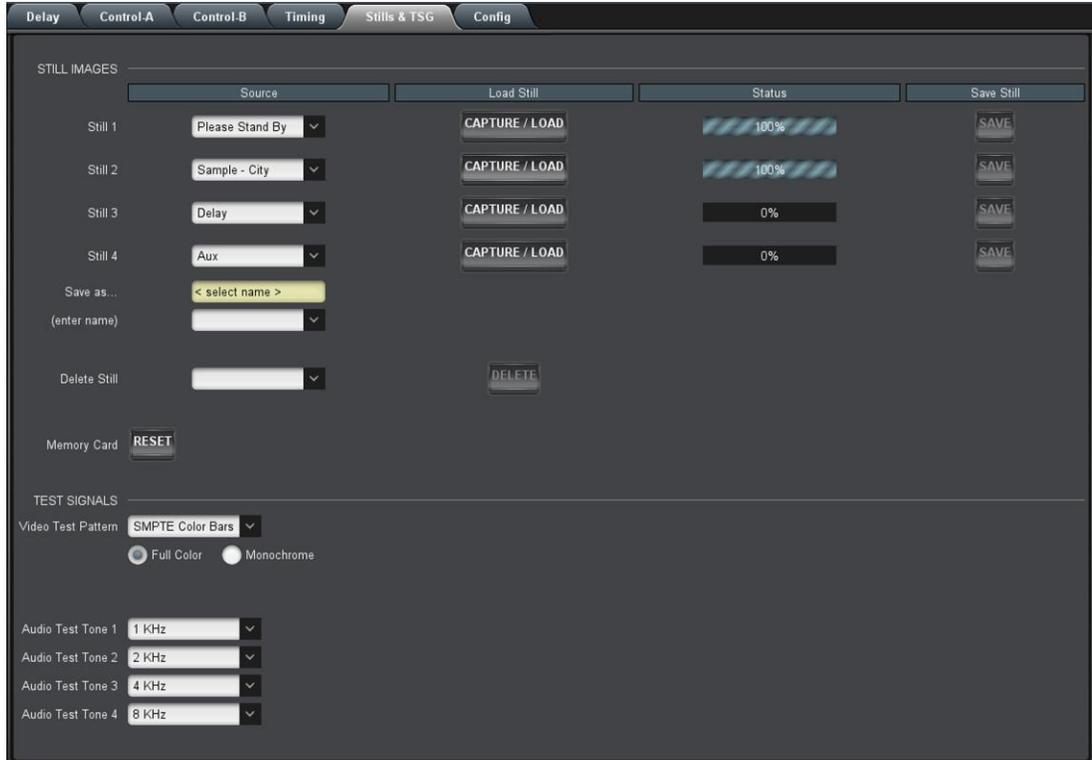


This control is used to adjust each channel's SDI output phase. Each channel can be adjusted +/-254 clock cycles. Note: the frequency or period of the clock cycle will depend on the output format selected for each channel.

It is recommended that the user set this control to 0 before aligning the output's genlock timing with the *Horizontal Phase* control. Then use this control for critical timing alignment when referencing the end receiver.

# Stills & TSG Menu

The *Stills & TSG* menu provides all controls for managing Still Images and Test Signals.



## Still Images

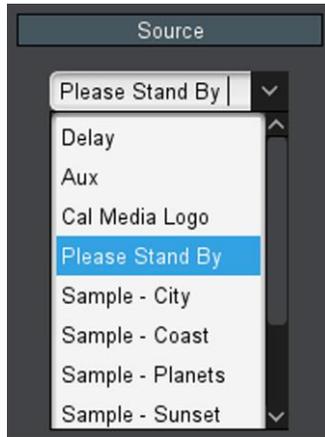
The 5100-AVD has four still image buffers. Each buffer may be selected for viewing with the Control menu's *Video Output Source* control, or used as a “safe” source with the *Video Switched Source* control, when switching away from objectionable material. Each buffer may contain captured images from 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 MMC, SD or SDHC card must be installed on the 5100-AVD 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 two selections are always *Delay* and *Aux*, followed by a list of any still image files stored on the SD/MMC card.

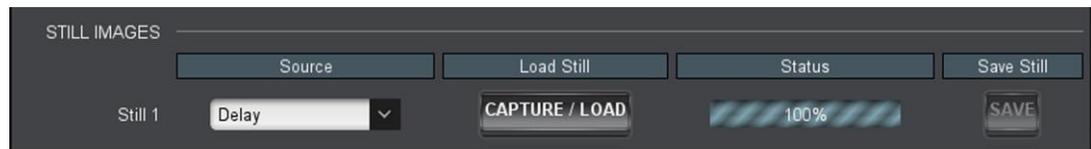


Selecting *Delay* allows an image to be captured from the Delayed video input.

Selecting *Aux* allows an image to be captured from the Aux video input.

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

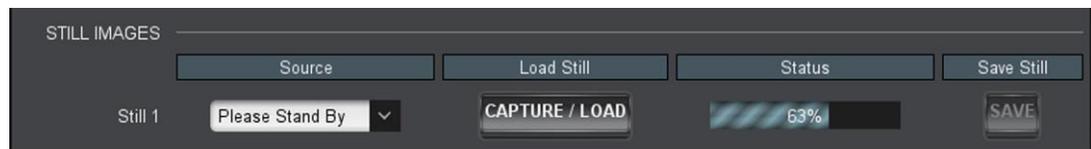
The *Capture/Load* button is used to transfer the image into the buffer.



### Capturing an Image from the Video Input

Use the Source control to select the Delayed (*Delay*) or Aux (*Aux*) video input.

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 must be entered.



A filename must be entered 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: **\$ % ' + - = \_ , ; @ ~ ` ! ( ) { } [ ] ^ # & .**

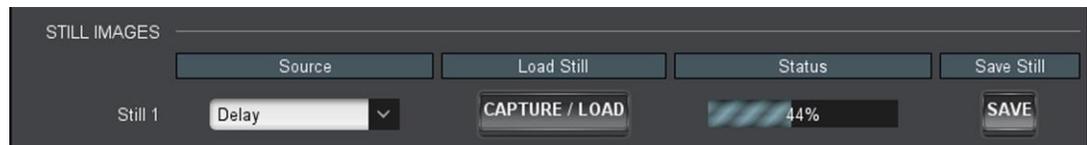
The *Save as...* status box provides confirmation that a valid filename has been entered, or indicates possible problems that prevent the still image from being saved.

|                    |   |
|--------------------|---|
| < select name >    | A name must be selected or typed into the ( <i>enter name</i> ) 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.   |
| < 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 5100-AVD’s clock and date are used for the creation date and time of the saved image file.

*See **Time & Date** section of the **Config** menu for details on setting the real time clock.*

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

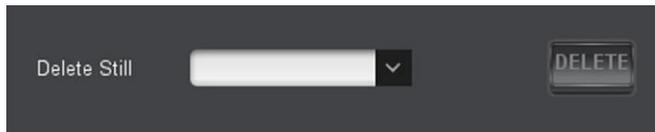


The Status bar shows the progress of the still image file being saved, and will display 100% when the image file is completely saved.

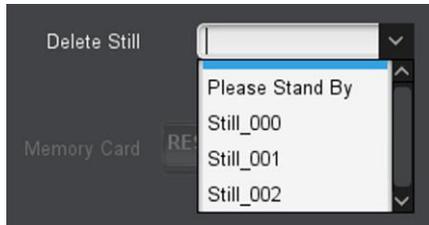
*Note: Loading times are typically 1-10 seconds depending on the format and the SD/MMC card that is used.*

## 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.



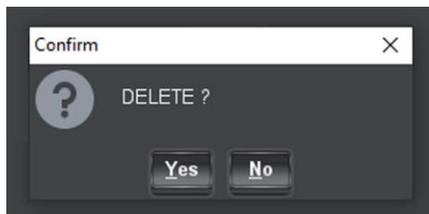
To enable the *Delete* button, use the drop-down control to select a filename to be deleted.



Once a filename has been selected, click on the *Delete* button.



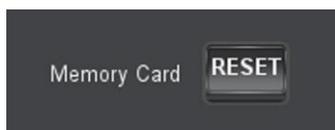
A dialog box will appear confirming if the file is to be deleted.



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.



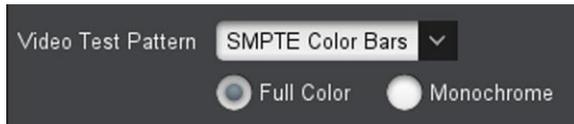
If the SD/MMC card still fails to be detected or function correctly, the memory card may have to be ejected and re-installed on the 5100-AVD card to regain proper operation.

## Test Signals

The 5100-AVD has built-in Test Signal generators for both video and audio.

### Video Test Patterns

Use the **Video Test Pattern** drop-down control to choose which test pattern will be displayed when “Test Signal” is selected as the video output or is selected as a safe source for the censor switch.



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.



# Product Menu (Card Status)

The *Product* menu displays various information about the 5100-AVD.



**Configuration** indicates the card’s operating mode.

**Name, Version Numbers and Serial Number.**

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

**Card Status** indicates the card’s operating condition. Green indicates the card is operating correctly. Yellow indicates an unusual condition such as “Loading Firmware”. Red indicates that a failure has been detected.

**Memory Card** indicates the type of memory card. Green indicates the memory card is working. Gray indicates no memory card detected.

The **Genlock Status** indicator shows the current genlock condition. Green indicates the 5100-AVD is successfully locked to the selected Genlock Reference. Red indicates an unlocked condition. The wrong reference may be selected, or may be incorrect frame rate, or no signal is preset. Yellow indicates Free-run mode.

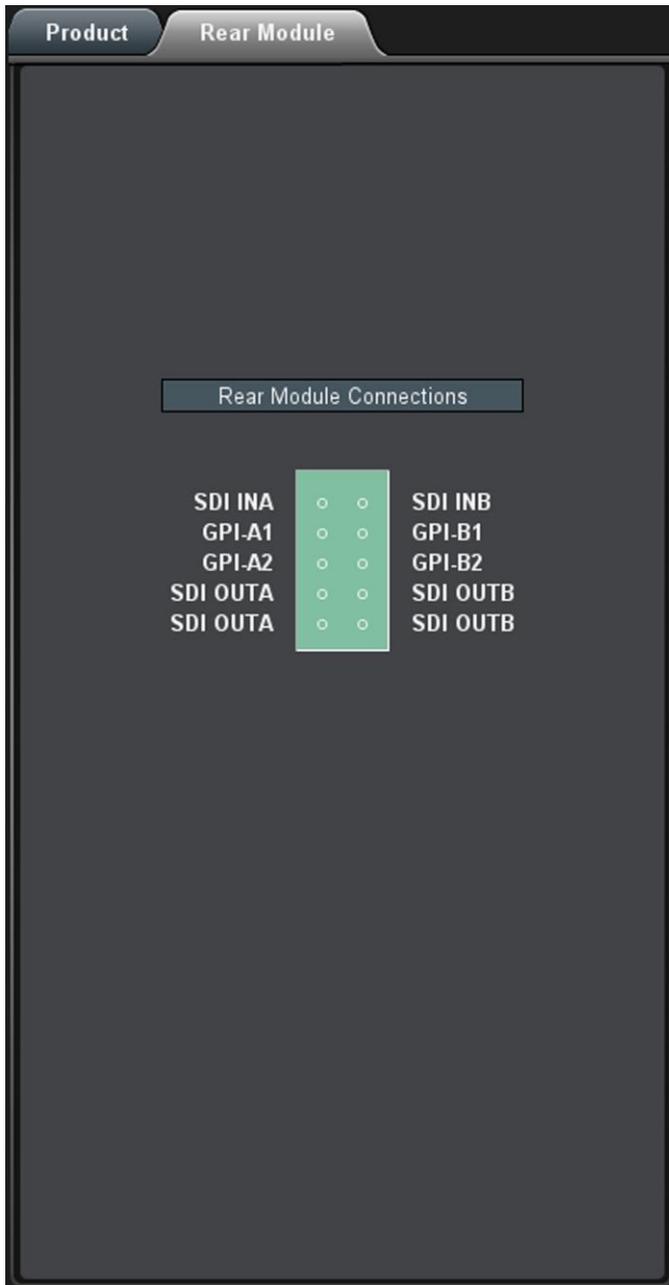
The **SDI Input** indicators shows the current signals detected at the SDI inputs.

The **GPI Status** indicators show the current state of each GPI port. Gray indicates the port is OFF (open). Green indicates the port is ON (closed to ground).

**Time & Date.** This is the 5100-AVD’s real time clock status.

# Rear Module Menu

This menu displays the signal connections for the 5100-AVD at the Rear panel module.



# Updating the Firmware

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

**Note:** The 5100-AVD should not be used on-air during the firmware installation process. The card will stop communicating with Dashboard™ and will re-boot upon completion.

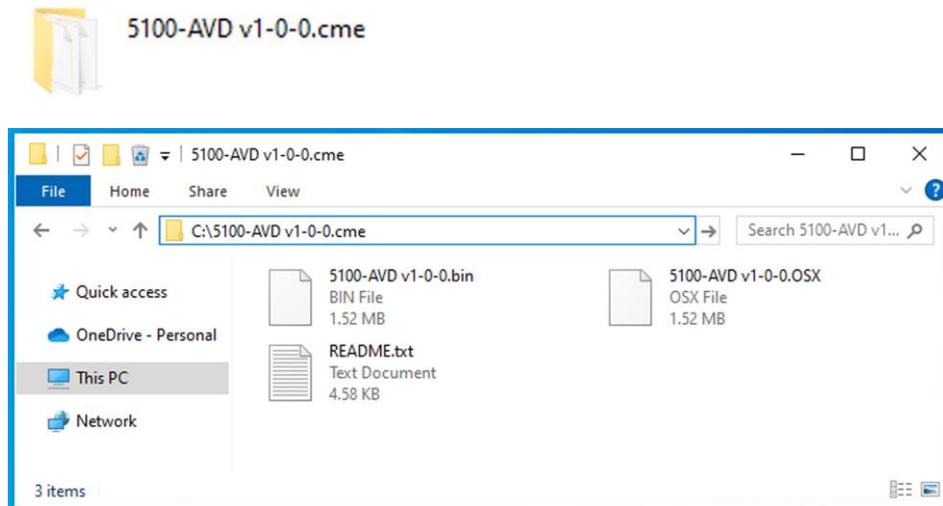
## Obtaining New Firmware

The current version of firmware can be obtained from California Media Engineering ([www.calmedia.com](http://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 5100-AVD using Dashboard™, copy or move the folder to a location accessible from Dashboard™.

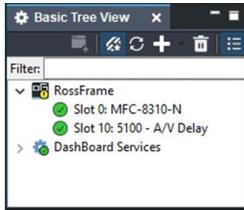
To update the 5100-AVD using a MMC or SD memory card, copy the entire folder to a MMC or SD memory card's root directory.

**Note:** The 5100-AVD 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 5100-AVD will only read the first “.osx” file it finds.

# Installing Firmware using Dashboard™

Note: This process typically takes about 90 seconds.

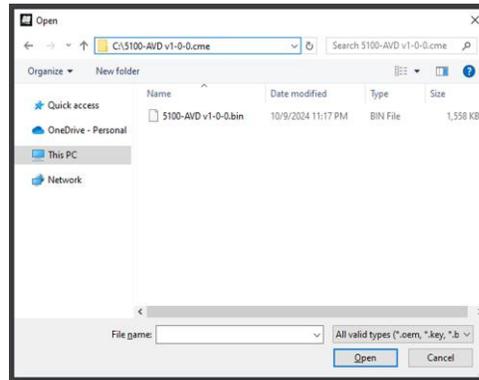
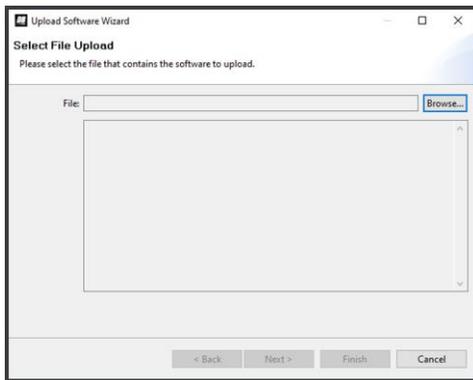
1. Launch the Dashboard™ application and open the **5100-A/V Delay** card listed in the Basic Tree View.



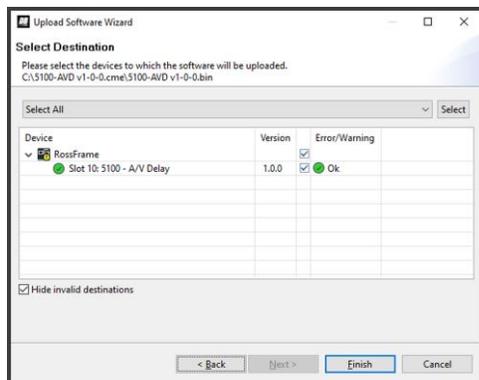
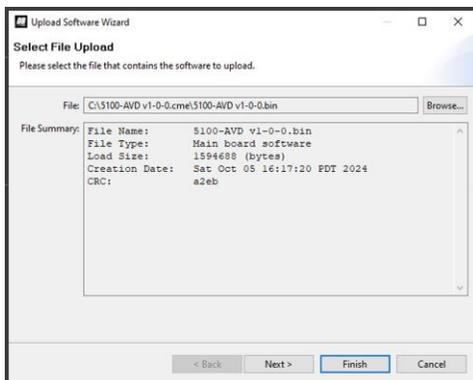
2. Click on the **Upload** button at the bottom of the Dashboard™ control screen.



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 5100-AVD card should be selected to receive this file. If other 5100-AVD 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 5100-AVD 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 5100-AVD 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 5100-AVD (see section *Installation and Setup* for details).

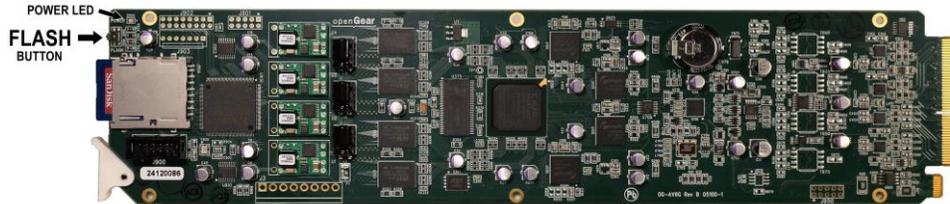


Figure 4-1. FLASH button and POWER LED location.

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 5100-AVD 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 5100-AVD card from the frame slot and wait a few seconds.
2. Install the memory card on the 5100-AVD.
3. Press and hold in the “FLASH” button while fully inserting the 5100-AVD 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 5100-AVD 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 5100-AVD card from the frame slot.
2. Install a jumper on J900 (pins 1-2) as shown (*right*).
3. Perform the power-cycle firmware installation as described above under *Retrying Firmware Installation*.
4. Once the 5100-AVD has booted, again unseat the card from the frame slot and remove the jumper and memory card.
5. Re-install the 5100-AVD into the frame slot.
6. Once installed, the 5100-AVD 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 5100-AVD should successfully reboot.



Figure 4-2 Boot-Loader jumper location

# 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 5100-AVD card becomes unresponsive, try the following:

1. Unseat the 5100-AVD card from the frame slot and wait a few seconds.
2. Reinstall the 5100-AVD card into the frame slot.
3. If Dashboard™ is able to open the control panel for the 5100-AVD, repeat the installation process using Dashboard™.
4. If Dashboard™ is not able to open the control panel for the 5100-AVD, perform the installation using a SD or MMC memory card (*see previous section*).
5. If the 5100-AVD still does not properly operate after trying all suggestions, contact customer support at [support@calmedia.com](mailto: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 5100-AVD.
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 5100-AVD as long as the POWER LED is not rapidly flashing red (10 flashes a second).

If the 5100-AVD still does not properly operate after trying all suggestions, contact customer support at [support@calmedia.com](mailto:support@calmedia.com).

# Specifications

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## Maximum Delay (for single channel mode)

|                    |   |
|--------------------|---|
| 4K*x2160p-60/59.94 | 12 seconds 0 frames (two cards required)  |
| UHDx2160p-60/59.94 | 12 seconds 48 frames (two cards required) |
| 4K*x2160p-50       | 14 seconds 20 frames (two cards required) |
| UHDx2160p-50       | 15 seconds 18 frames (two cards required) |
| 2K*x1080p-60/59.94 | 24 seconds 0 frames                       |
| 1080p-60/59.94     | 25 seconds 36 frames                      |
| 2K*x1080p-50       | 28 seconds 40 frames                      |
| 1080p-50           | 30 seconds 36 frames                      |
| 1080i-60/59.94     | 51 seconds 6 frames                       |
| 1080i-50           | 61 seconds 11 frames                      |
| 1080PsF-24/23.98   | 64 seconds 0 frames                       |
| 720p-60/59.94      | 57 seconds 4 frames                       |
| 720p-50            | 68 seconds 24 frames                      |
| SD 483i (NTSC)     | 255 seconds 29 frames                     |
| SD 576i (PAL)      | 255 seconds 24 frames                     |

\* 2K and 4K formats are 10bit 4:2:2

## Delay Adjust

|              |                    |
|--------------|--------------------|
| Video        | 1 frame increments |
| Audio offset | 0.25ms increments  |

## Video Processing

|             |  |
|-------------|--|
| Signal:     | 3G - 2.97Gb/s (SMPTE 424M)<br>HD - 1.485Gb/s (SMPTE 292M)<br>SD - 270Mb/s (SMPTE 259M)   |
| Inputs:     | 2 BNCs, 75ohm, 800 mVpp<br>3G - Auto EQ to 120 meters (Belden 1694A)<br>HD - Auto EQ to 200 meters (Belden 1694A)<br>SD - Auto EQ to 400 meters (Belden 1694A) |
| Output:     | BNC, 75ohm, 800 mVpp<br>3G Timing Jitter < 0.3UI<br>HD Timing Jitter < 0.25UI<br>SD Timing Jitter < 0.2UI  |
| Formats:    | 1080p-60/59.94/50/30/29.97/25/24/23.98<br>1080i-60/59.94/50<br>1080PsF-24/23.98<br>720p-60/59.94/50/30/29.97/25/24/23.98<br>483i-59.94<br>576i-50              |
| Resolution: | 10 bit, 4:2:2  |

*Specifications subject to change without notice.*

## Audio Processing

Signal: Embedded  
SD (SMPTE 272C)  
HD (SMPTE 299M)

Sample Rate: 48KHz-synchronous

Resolution: 24 bit HD, 20bit SD

## Genlock Reference

Signals: Bi-Lev (Black Burst) , Tri-Level

Inputs: 2 BNC loops, Hi-Z (REF-1 and REF-2 on openGear™ frame)

## Control

GPI Inputs: 4 BNCs, internal pullup  
Activates on closure to ground

Remote Input: RJ-45 Ethernet connector (on openGear™ frame)

## 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

12 Watts

*Specifications subject to change without notice.*

# 5 YEAR LIMITED WARRANTY

California Media Engineering Inc. warrants that this product (5100-AVD 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 its option replace the defective product without charge.

This warranty does not cover the openGear™ Frame, Network cards or 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 5100-AVD openGear™ card, please contact Cal Media Engineering's Technical Support Department at [support@calmedia.com](mailto: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 Engineering's Technical Support Department will continue to provide advice on any product manufactured by Cal Media Engineering, beyond the warranty period without charge, for the life of the product.

**California Media Engineering Inc.**

(805) 931-0857

[info@calmedia.com](mailto:info@calmedia.com)

[support@calmedia.com](mailto:support@calmedia.com)

