AVENUE

Avenue™ signal integration system

Model 5330 A-D Video Converter with 6330 Audio Option Data Pack

ENSEMBLE DESIGNS

Revision 3.1 SW v2.2.6

This data pack provides detailed installation, configuration and operation information for the **5330 Analog to Digital Video Converter** module along with the **6330 Audio Processing** option submodule as part of the Avenue Signal Integration System.

The module information in this data pack is organized into the following sections:

- 5330/6330 Overview
- Applications
- Installation
- Installation
  - Configuring Rear BNCs
- Cabling
- Module Configuration and Control
  - Front Panel Controls and Indicators
  - Avenue PC Remote Control
  - Avenue Touch Screen Remote Control
- Troubleshooting
- Software Updating
- Warranty and Factory Service
- Specifications

5330/6330 OVERVIEW

The 5330 Analog to Digital Video Converter takes composite or component analog and converts the signal to serial digital component. Analog inputs are 4x oversampled at 12 bits of resolution, ensuring a clean signal that can be used in the most demanding applications. Composite signals are decoded using an adaptive comb filter. An infinitely adjustable timing system genlocks to the house reference.

The 5330 accepts asynchronous inputs and delivers serial outputs locked and timed to house reference. The input video is synchronized to a house reference by a TBC/Frame Synchronizer. Noisy and jittery analog sources are faithfully tracked to provide a steady, genlocked output, ensuring proper time base correction for virtually any source, even a consumer VHS machine.

The 5330 has a full-featured Proc Amp for adjustment of every signal parameter. Proc controls include Video and Chroma Gain, NTSC style hue rotation, Black Balance, and pedestal. Black and White clips can be set to prevent excessive signal excursions. To help optimize the settings in the Proc Amp, a Split Screen mode allows you to compare the processed output with the original material.

Selective (toothed) vertical blanking lets you choose to pass or strip content in the vertical interval on a line by line and field by field basis.

A Detail Enhancer recovers information that has been lost due to poor frequency response in upstream systems. Certain values represented in serial digital component may be illegal in the NTSC or PAL composite domains. The Predictive Composite Clipper mode identifies picture elements that would be illegal in analog composite, and limits color saturation and luminance excursions.

The 5330 delivers two dedicated SDI outputs. In addition, two BNCs on the rear module can be configured with onboard switches to be either AES or SDI outputs. Video outputs are fully timed to your house reference. On loss of output (such as noise), the 5330 can be set to mute to black or freeze on the last good frame of video.

The optional 6330 Audio Processor submodule provides embedding of analog or AES audio. Analog inputs are digitized at 24 bits of resolution. Two AES inputs provide four channels of digital audio to the input selector. Audio inputs may be mixed, shuffled or level controlled and any of the channels re-embedded and/or sent to the AES output connectors.

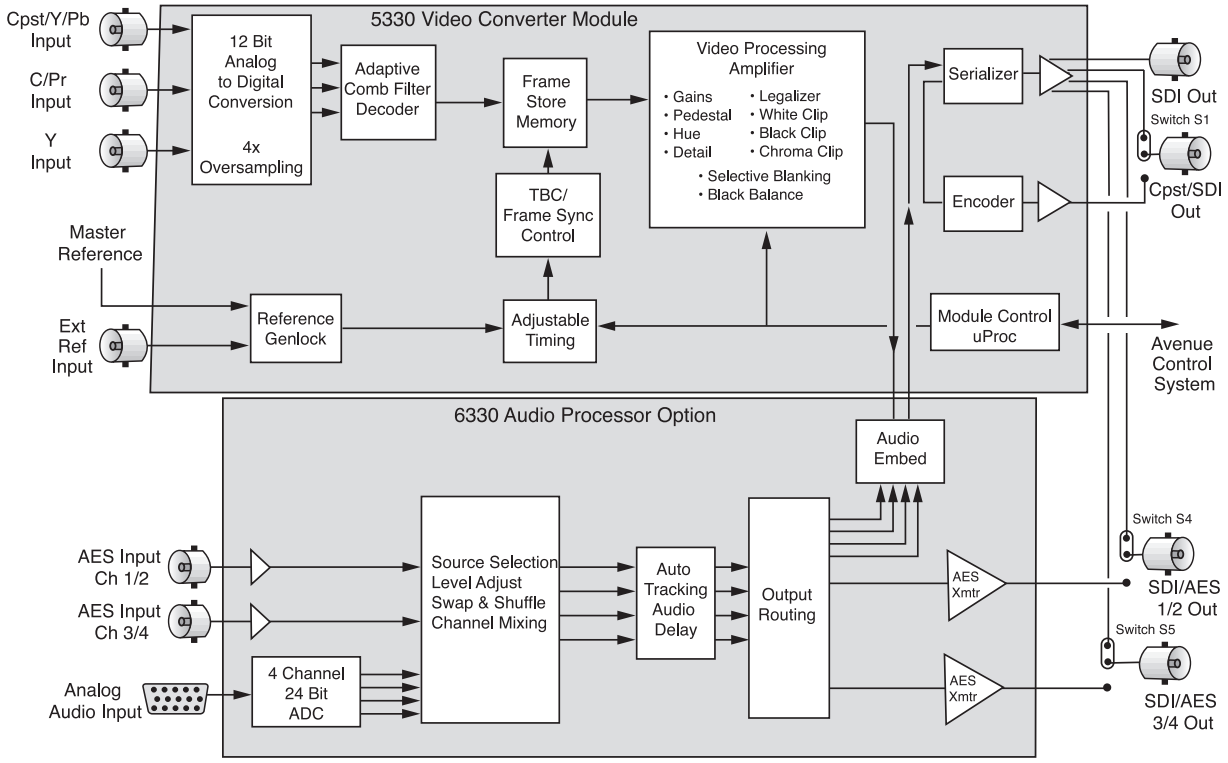
Full audio delay tracking is included as well as the provision to add fixed delay to correct incoming lip sync errors. There is built in sample rate conversion allowing usage of asynchronous AES inputs, while synchronous AC-3 or Dolby-E audio signals may also be used.

Because the 5330 is an Avenue module, every function and parameter can be controlled from an Avenue Touch Screen, Express Control Panel, or the Avenue PC Control Application.

While it can be used to control any Avenue module, the Express Panel really shines when used with the 5330 A-D Converter module. With dedicated video, chroma, pedestal, and hue knobs, live shading is easy. The continuous rotation velocity sensitive knobs are responsive and dependable. Audio levels for multiple groups are easily accessed as well. All other parameters, including timing and audio delay, are accessed through an intuitive menu interface.

5330 module emory registers can be used to save the complete configuration of the module, making it easy to change instantly between different configurations.

Modules at software version 2.2.0 or later support SNMP (Simple Network Management Protocol) monitoring. For each applicable signal processing module, module, signal, and reference status are reported. For complete details on using SNMP monitoring, refer to the **Avenue System Overview** in the manual that accompanies each frame.



5330/6330 Video Audio ADC Functional Block Diagram

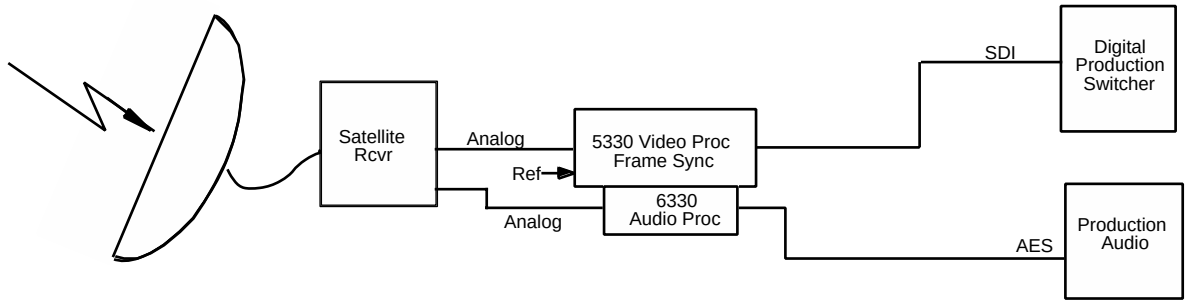
APPLICATIONS

This section provides some typical applications for using the 5330 Video ADC module and the optional submodule, the 6330 Audio Processor. Configuration of these applications is covered in the **MODULE CONFIGURATION AND CONTROL** section later in this manual.

Satellite Reception

As illustrated in the block diagram below, the 5330 will accept an input from an analog receiver, convert it to serial digital, then lock the signal to the house reference with full timing capability.

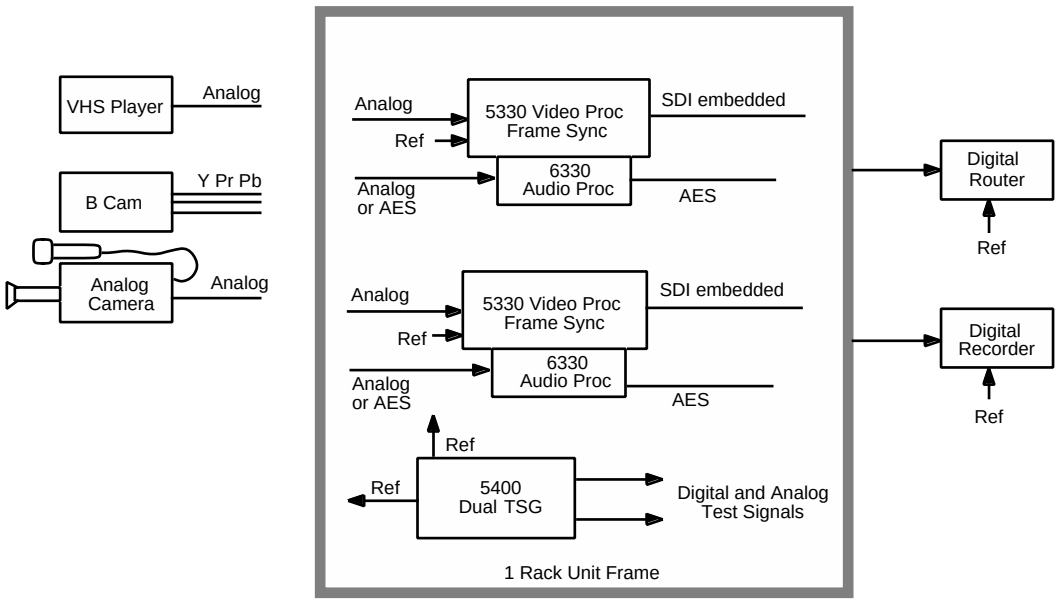
Proper audio/video timing can be assured when the tracking audio delay of the 6330 Audio Processor is employed. Any timing or delay modifications to the video are tracked by the 6330 whether you wish to use audio input from an analog or AES source. Properly timed audio from any of these sources is available directly when routed to the AES outputs, or it can be embedded onto the SDI video output stream. A fixed delay of up to 1000 mS can be inserted by the 6330 to correct for signals which have previously passed through frame stores without audio delay compensation.



Satellite Application Block Diagram

Compact Systems

A one rack unit (1 RU) Avenue chassis populated with a 5400 TSG and one or two 5330 modules makes an ideal signal acquisition system where small size and light weight are required. With the variety of analog input formats which the 5330 Frame Synchronizer accepts, it is equally at home with the Y/C feed from a VHS machine, Y/Pr/Pb from a BetaCam, or composite from an analog camera. The 5400 TSG feeds reference to the 5330 to allow stable frame sync operation, as well as providing analog and SDI reference signals for any of the acquisition equipment, along with a range of analog and SDI test signals. The 6330 Audio Processor can provide audio gain control, mixing and embedding to suit the needs of whatever range of requirements the recorder or microwave transmitter may have. This example is shown below.



Compact Systems Application Example

INSTALLATION

Rear Module BNC Configuration

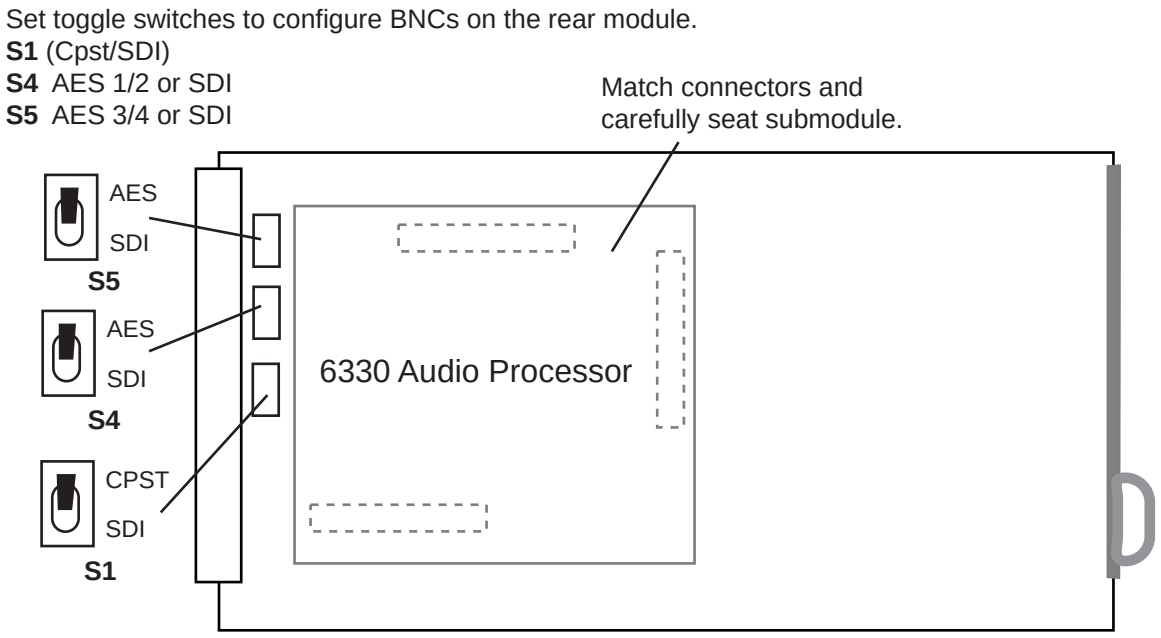
There are three configurable rear BNC connectors that can be set using onboard switches on the rear of the 5330 circuit board for the choices outlined below. AES outputs require that the 6330 submodule is installed. Refer to the illustration below.

- **Cpst/SDI Out BNC Configuration –** The BNC labeled **CPST/SDI** can be set with Switch S1 on the rear of the 5330 circuit board for either **CPST** (up) for a composite output or to **SDI** (down) for an SDI output.The default setting for this switch is **CPST** when shipped from the factory.
- **AES 1/2 Out /SDI Out BNC Configuration –** Switch S4 on the rear of the 5330 circuit board allows the BNC labeled **AES 1/2 Out/SDI** to output either AES audio or the processed SDI signal of the module (identical to the other SDI outputs). Set the toggle switch to **AES** to configure the BNC for AES out or set to **SDI** for the SDI output. The default setting for this switch set at the factory is **AES**.
- **AES 3/4 Out /SDI Out BNC Configuration –** Switch S5 on the rear of the 5330 circuit board allows the BNC labeled **AES 3/4 Out/SDI** to output either AES audio or the processed SDI signal of the module (identical to the other SDI outputs). Set the toggle switch to **AES** to configure the BNC for AES out or set to **SDI** for the SDI output. The default setting for this switch is **AES**.

6330 Submodule Installation

The optional 6330 submodule installs on the component side of the 5330 module circuit board. If the option is ordered with the 5330 module, it will come already installed.

To install the 6330 Audio submodule, locate the three connectors on the left side of the circuit board as shown in the illustration on the next page and line the connectors up, checking the alignment. Press carefully into place to seat the submodule.



Configure Rear BNCs and 6330 Submodule Installation

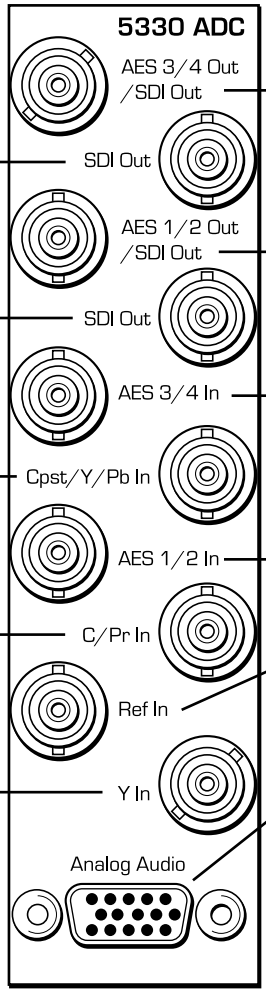
5330 ADC Module

Plug the 5330 module into any one of the slots in the 1 RU or 3 RU frame and install the plastic overlay provided onto the corresponding group of rear BNC connectors associated with the module location. Note that the plastic overlay has an optional adhesive backing for securing it to the frame. Use of the adhesive backing is only necessary if you would like the location to be permanent and is not recommended if you need to change module locations. This module may be hot-swapped (inserted or removed) without powering down or disturbing performance of the other modules in the system.

CABLING

Refer to the 3 RU and 1 RU backplane diagrams of the module on the following page for cabling instructions. Note that unless stated otherwise, the 1 RU cabling explanations are identical to those given in the 3 RU diagram.

3 RU Backplane



AES 3/4 Out or **SDI Out** – Set BNC to output AES 3/4 audio or SDI video with toggle switch S5 on circuit board.

SDI Out – Connect to SDI video destinations.

AES 1/2 Out or **SDI Out** – Set BNC to output AES 1/2 audio or SDI video with toggle switch S4 on circuit board.

Cpst/Y/Pb In – Connect the **Cmpt** (composite), **Y** (Y/C) or the **Pb** (component video) input depending on the type of video you are using.

AES 1/2 and 3/4 In – Connect AES digital audio to the AES 1/2 and AES 3/4 inputs.

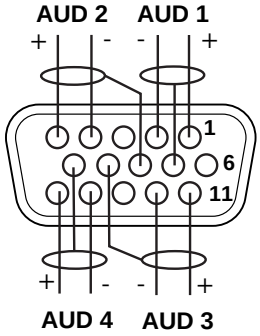
C/Pr In – Connect the **C** (Y/C) or the **Pr** (component video) input depending on the type of video you are using.

Ref In – Connect a composite video input (PAL or NTSC) if you are using an external reference.

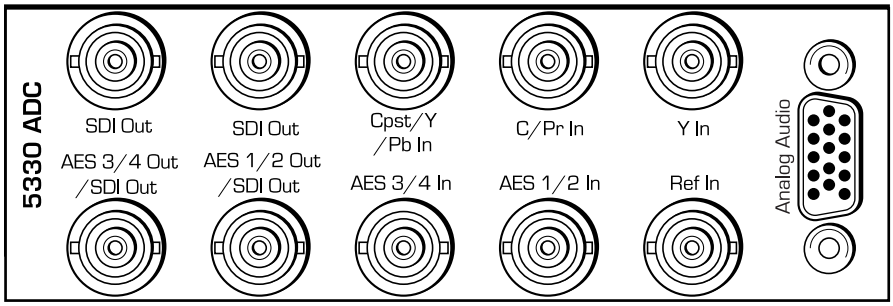
Y In – Connect the **Y** input for component video.

Analog Audio – Use the Analog Audio 15-pin D connector for cabling analog audio inputs when the 6330 option is installed. Refer to the pinout diagram and the table below for cabling information.

Analog Audio Pinouts		
Signal	**Pins**	**Input**
Aud 1 +, –, G	1, 2, 7	Input 1
Aud 2 +, –, G	5, 4, 8	Input 2
Aud 3 +, –, G	11, 12, 9	Input 3
Aud 4 +, –, G	15, 14, 10	Input 4



1 RU Backplane



MODULE CONFIGURATION AND CONTROL

The configuration parameters for each Avenue module must be selected after installation. This can be done remotely using one of the Avenue remote control options or locally using the module front panel controls. Each module has a **REMOTE/LOCAL** switch on the front edge of the circuit board which must first be set to the desired control mode.

The configuration parameter choices for the module will differ between **Remote** and **Local** modes. In **Remote** mode, the choices are made through software and allow more selections. The **5330/6330 Parameter Table** later in this section summarizes and compares the various configuration parameters that can be set remotely or locally and the default/factory settings. It also provides the default User Levels for each control. These levels can be changed using the Avenue PC application.

If you are not using a remote control option, the module parameters must be configured from the front panel switches. Parameters that have no front panel control will be set to a default value. The **Local** switches are illustrated in the **Front Panel Controls and Indicators** section following the **5330/6330 Parameter Table**.

Avenue module parameters can be configured and controlled remotely from one or both of the remote control options, the Avenue Touch Screen or the Avenue PC Application. Once the module parameters have been set remotely, the information is stored on the module CPU. This allows the module to be moved to a different cell in the frame at your discretion without losing the stored information. Remote configuration will override whatever the switch settings are on the front edge of the module.

For setting the parameters remotely using the Avenue PC option, refer to the **Avenue PC Remote Configuration** section of this document.

For setting the parameters remotely using the Avenue Touch Screen option, refer to the **Avenue Touch Screen Remote Configuration** section of this document following Avenue PC.

Express Panel operation is described in the data pack that accompanies the control panel option.

Configuration Summary

This section provides a general overview of the configuration for the 5330 module. The controls available for configuration with remote control are summarized and tips and examples are given for using particular controls to achieve the best results.

Video Processing

The 5330 has a full-featured Proc Amp for adjustment of every signal parameter. Proc controls include Video and Chroma Gain, NTSC style hue rotation, Black Balance, and pedestal. Black and White clips can be set to prevent excessive signal excursions. To help optimize the settings in the Proc Amp, a Split Screen mode allows you to compare the processed output with the original material.

Selective (toothed) vertical blanking lets you choose to pass or strip content in the vertical interval on a line by line and field by field basis.

The available video processing remote control menus are summarized below:

- **Proc Menu**: Gain, Chroma, Pedestal and Hue are standard Proc Amp controls. The Hue control gives phase rotation of the color vectors in the manner of an NTSC composite Proc Amp.
- **Clip**: The Legalizer is a predictive clipper which insures signal levels will not exceed those permitted in the composite domain. Thus its use can insure a television transmitter will not be presented illegal video input. If **Off** or **Legal** are selected other adjustments are grayed and may not be changed. While **Legal** automatically puts in values to insure signals will not exceed composite legal limits, selecting **Custom** allows the operator to insert a range of clip values.
- **Filter**: The Lum Sharp and Chr Sharp settings allow shaping of the passband for reduced or added sharpness. With both selections set to **Off** or **Normal** there is no modification of the video. Bandwidth reduction can be useful in reducing artifacts when using the 5330 for preprocessing of signals which will receive MPEG compression, while adding sharpness may benefit signals which arrive at the input with reduced bandwidth.
- **Timing**: The 5330's comprehensive range of timing allows complete flexibility in placement of the output picture relative to the applied reference input. Hor Timing takes the horizontal timing across the entire line. A Vert Timing adjustment completes the range in allowing any output timing desired by the operator.
- **Trims**: Cb and Cr offsets allow black balance to be corrected while Cb and Cr gains permit trimming of levels on these two axes. Y/C delay allows the operator to correct inaccuracy of timing of color information relative to luminance. These trims are functional regardless of the input or output formats in use.
- **Output**: The Bypass selection takes the 5330 out of the video path by routing around it. Split mode may be used to compare input and output signals to observe the effect of adjustments. Note that these are "live" modes and the bypassed or split video will be fed on downstream to following equipment.
- **Blanking**: There are Wide, Narrow or Custom blanking choices. Wide gives blanking through line 20 (NTSC) or line 22 (PAL), while narrow produces blanking through line 9 (NTSC) or Line 6 (PAL) of both fields. In the Custom mode any individual lines from 9 through 23 may be selectively blanked, with different choices allowed for each field. Some systems recognize position of the V-bit to control end of blanking. In the 525 standard V-bit position can be set to line 10, line 20 or line 23. In 625 mode V-bit is fixed at line 23 as this is the only position permitted by the 625 Standard.
- **Memory**: Up to five configurations of the 5330 may be saved into memory registers for later recall. All parameters – gains, input format, filters, blanking, etc. —are saved in each memory. Unique setups could be stored in memory registers and one or the other recalled for instant restoration of the required configuration.

6330 Audio Processor Configuration

The 6330 Audio Processor will accept audio from analog or AES input connectors. Between the input and output is a 4x4 audio mixer with tracking audio delay. Any incoming audio can be mixed, level controlled and/or shuffled to another output channel by means of the integrated audio router. The tracking audio delay allows synchronization and timing to be maintained with time base corrected video passing through the video frame synchronizer of the 5330.

A built in sample rate converter allows use of asynchronous AES input signals. The 6330 also supports encoded audio formats such as AC-3 and Dolby-E. Because these data streams cannot tolerate sample rate conversion, they must be input to the 6330 synchronous to the video. All audio processing is performed at the full 24 bit resolution of the system. At the output side of the 6330 submodule the four audio channels are simultaneously routed to the AES output connectors while also being embedded on the outgoing SDI video. An adapter is also available to allow the AES I/O to be converted from BNC to 110 ohm balanced.

The available audio processing remote control menus are summarized below:

- **Audio In**: Status indicators show presence of AES audio inputs. The In 1/2 Sel and In 3/4 Sel controls provide for selection of inputs to the 4x4 audio mixer. The choices for each are AES 1/2, Anlg 1/2, AES 3/4, and Anlg 3/4. Thus any pair of input audio signals can be routed to either pair of input buses of the 4 input 4 output audio mixer. As we will see shortly, this allows full flexibility of audio routing. If analog audio is in use the anticipated nominal level of this incoming audio can be set with the four Anlg Lvl controls.
- **Audio Mode**: The 5330 can handle both types of content present in AC-3 or Dolby-E signals. Some synchronizing requirements are necessary for supporting these protocols.

  Select the **Audio** mode when the input audio signal is a standard audio signal carrying two channels of linear audio. No special timing requirements are needed in this mode.

  Use the **Data** mode when the AES audio input is a non-audio, or data, signal. Some special synchronizing requirements must be observed in this mode as described in the following examples.
- **Audio Mix**: This menu gives full access to the 4x4 audio mixer controls. Any input channel can be routed to any or all output busses. Sliders or Touch Screen rotary knobs permit levels to be adjusted from -70dB to +12dB. Alternatively a value can be put in the numeric window, followed by the **Enter** key, and this will become the new gain setting. Default buttons are provided for return to zero level.

  The Tie function is used for stereo operation where gain of a pair of channels is usually desired to be the same. An invert selection allows inversion of a channel to permit phase correction.
- **Audio Delay**: With the Auto Track switched On, audio will be delayed the same amount as the video passing through the 5330 frame synchronizer thus preserving lip sync. If incoming audio is early due to signals passing through an upstream frame sync without a compensating audio delay, Bulk Delay can be used to correct the problem. Up to 1000 mS of fixed delay can be added to compensate for upstream timing errors.

Audio Operational Example

This section describes the audio configuration of the satellite application example given at the beginning of this manual.

Stereo analog audio is arriving from a satellite receiver as shown in the Satellite block diagram. We want to embed this audio on an outgoing SDI video stream. In addition we wish to provide audio for use in an audio console with AES inputs. Tracking audio delay will be used to maintain proper lip sync.

1. Bring the analog audio into channels 1 and 2. Refer to the connector drawing for pinout of the 15 pin D connector in the **Cabling** section.
2. With the In 1/2 Sel choose **Anlg 1/2** as the source for channels 1 and 2 of the 4x4 audio mixer.
3. Set Anlg 1 Lvl and Anlg 2 Lvl to the nominal level of the incoming audio.
4. In the Audio Mix menu Select **Ch1** for Output Bus 1 and **Ch2** for Output Bus 2. The mixer output buses automatically appear on the designated output pins of the 15 pin D connector in analog form, and on the AES output BNC's as AES audio.
5. In the Aud Delay menu turn **On** the Auto Track so audio delay will track the video timing.

5330/6330 Parameter Table

CONTROL	LOCAL	REMOTE	FACTORY DEFAULT	DEFAULT USER LEVEL
VIDEO IN/PROCESSING CONTROLS				
Input Select	Switch 1: Cpst or CAV If CAV: Switch 2: Beta or SMPTE	Composite Compst No Setup Y_C Y_C No Setup Beta Beta No Setup SMPTE	Composite	Level 1
Reference Source	Switch 4: TBC On (ext ref) or Off (self ref)	Ext Ref Master Ref Video In Ref	Ext Ref	Admin
Comb Mode	3 Line	3 line 5 Line	3 Line	Level 1
Gain	100%	0 – 150%	100%	Admin
Chroma	100%	0 – 150%	100%	Admin
Pedestal	0 IRE	+/– 30 IRE	0 IRE	Admin
Hue	0 IRE	+/– 180 degrees	0 degrees	Admin
Legalizer	Switch 5: On or Off	Off Legal Custom	Off	Admin
B/W Clip	Off	Off On	Off	Admin
Black Clip	–8 IRE	–8 to 6.2 IRE	–8 IRE	Admin
White Clip	110 IRE	95 – 110 IRE	110 IRE	Admin
Chr CLip Mode	Off	Off Chroma Cpst	Off	Admin
Chr Lo Clip	–40 IRE	–40 to 7.5 IRE	–40 IRE	Admin
Chr Hi Clip	–40 IRE	100 – 140 IRE	140 IRE	Admin
FILTER CONTROLS				
Chr Sharp	Off	Max 1/2 1/4 Off	Off	Admin
Luma Sharp	Off	Max 1/2 1/4 Off	Off	Admin

5330/6330 Parameter Table (Continued)

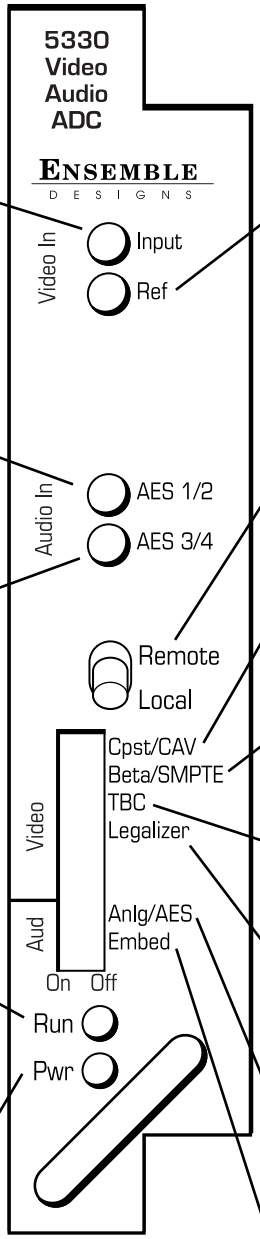
CONTROL	LOCAL	REMOTE	FACTORY DEFAULT	DEFAULT USER LEVEL
TIMING CONTROLS				
Horizontal Timing	0 clocks	+/– 1716 clocks	0 clocks	Admin
Vertical Timing	0 lines	+/– 525 lines	0 lines	Admin
VIDEO OUTPUT CONTROLS				
Bypass	Normal	Normal Bypass Split	Normal	Admin
Test Pattern	Off	Off Bars Black Pathological	Off	Admin
Signal Mute	No Muting	No Muting Mutes on Noise Freeze on Noise	No Muting	Level 1
BLANKING and TRIM CONTROLS				
Mode	Narrow	Narrow (PAL Lines 1-6< NTSC Lines 1-9) Wide (PAL Lines 1-22< NTSC Lines 1-20) Custom	Wide	Admin
V Bit Position	Line 20	Line 10 Line 20 Line 23	Line 20	Admin
Field 1/2 Toothed Blanking	N/A	< 9, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23		Admin
Cb Offset	0 IRE	+/– 300 IRE	0 IRE	Admin
Cr Offset	0 IRE	+/– 300 IRE	0 IRE	Admin
Cb Gain	0 IRE	+/– 20 IRE	0 IRE	Admin
Cr Gain	0 IRE	+/– 20 IRE	0 IRE	Admin

5330/6330 Parameter Table (Continued)

CONTROL	LOCAL	REMOTE	FACTORY DEFAULT	DEFAULT USER LEVEL
AUDIO CONTROLS (6330 Audio Submodule Installed)				
Ch 1-4 In (level)	–70 dB	–70 to +12 dB	–70 dB	Level 1
Ch 1-4 Output Bus	Ch 1 – Output 1 Ch 2 – Output 2 Ch 3 – Output 3 Ch 4 – Output 4	Output Bus 1 – 4	Ch 1 – Output 1 Ch 2 – Output 2 Ch 3 – Output 3 Ch 4 – Output 4 Tie	
1/2 Input	Switch 7: Anlg or AES If AES: Switch 8: Embed/No Embed	AES 1/2 Anlg 1/2 AES 3/4 Anlg 3/4	Anlg 1/2	Level 1
3/4 Input		AES 1/2 Anlg 1/2 AES 3/4 Anlg 3/4	Anlg 3/4	Level 1
1/2 Mode	Auto	Audio Data Auto	Auto	Level 1
3/4 Mode	Auto	Audio Data Auto	Auto	Level 1
Anlg In Level	+4 dB	–10 dB –6 dB –4 dB 0 dB +4 dB	+4 dB	Level 1
Auto Track	On	Off On	On	Level 1
Bulk Delay	0 msec	0 – 1000 msec	0 msec	Level 1
Audio Embed	Replace	Off Replace Cascade	Replace	Level 1
Mux Group	Group 1	Group 1 Group 2 Group 3 Group 4	Group 1	Level 1
Dig Ref Level	–20 dBFS	–20 dBFS –18 dBFS	–20 dBFS	Level 1

Front Panel Controls and Indicators

Each front edge indicator and switch setting is shown in the diagram below:



Input green LED:
On indicates input video signal is present and detected.
OFF no input video signal detected on the input.

Ref green LED:
On when the selected reference source is detected.
OFF when no reference signal is detected.

AES 1/2 green LED:
On when an AES input is detected on the AES 1/2 audio input.
OFF when no audio is detected on AES 1/2.

Remote/Local switch:
Set to the mode you will be using.

AES 3/4 green LED:
On when an AES input is detected on the AES 3/4 audio input.
OFF when no AES audio is detected on AES 3/4.

Cpst/CAV switch:
Select the type of analog video input as **Cpst** or **CAV**.

Beta/SMPTE switch:
For a CAV input selected above, select **Beta** or **SMPTE**.

TBC switch:
Turn time base corrector (external reference) **On** or **Off**.

Run green LED:
OFF:
A power fault or halted CPU
ON:
A halted CPU
FAST BLINK:
CPU Run error
SLOW BLINK:
System OK. (If SPI control is active from the main frame System Control Module, all **Run** indicators will be synchronized.)

Legalizer switch:
Turn **On** to enable legalizer or **OFF** to disable.

Anlg/AES switch:
Select **Anlg** or **AES** to identify what audio format is being input to the module (6330 submodule installed).

Embed switch:
Select **Embed** to embed AES audio in serial digital output stream.

Pwr green LED:
Indicates the presence (**ON**) or absence (**OFF**) of power (+5V).

Avenue PC Remote Configuration

The Avenue PC remote control menus for this module are illustrated and explained below. Refer to the **5330/6330 Parameter Table** for a summary of available parameters that can be set remotely through the menus illustrated. The **Configuration Summary** gives tips and general background information on setting the parameters. For more information on using Avenue PC, refer to the Avenue PC Control Application Software data pack.

Parameter fields that are grayed out can indicate one of the following conditions:

- An option is not installed.
- The function is not active.
- The module is locked.
- The User Level set with Avenue PC is not accessible from the current User Level.

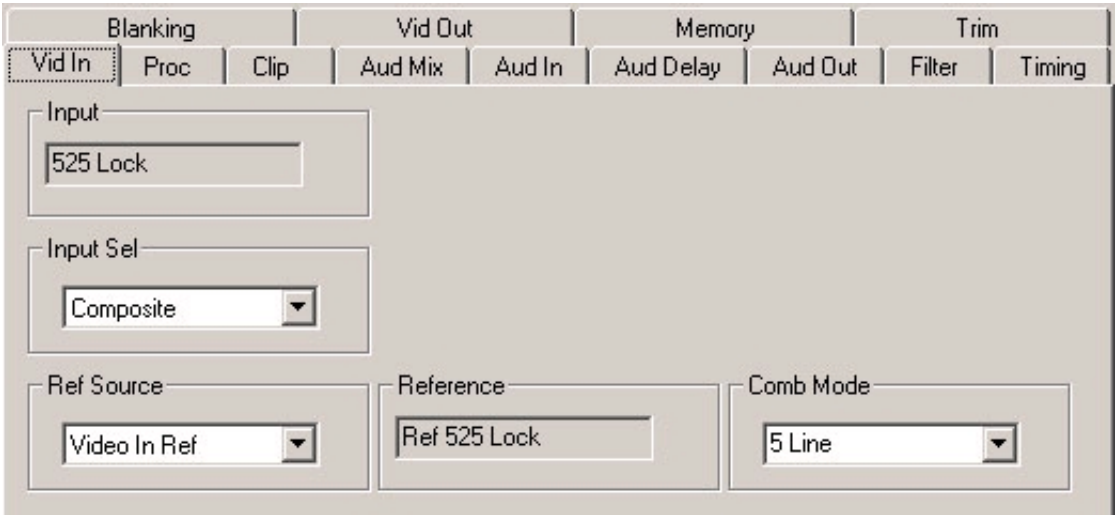
5330 Avenue PC Menus

The **Vid In** menu shown below allows you to configure the following input sources:

- **Input Sel** – use this control to set the analog video input mode connected to the module.
- **Ref Source** – use this control to set the reference input source.
- **Comb Mode** – set the type of comb filter (3- or 5-line) for the video input.

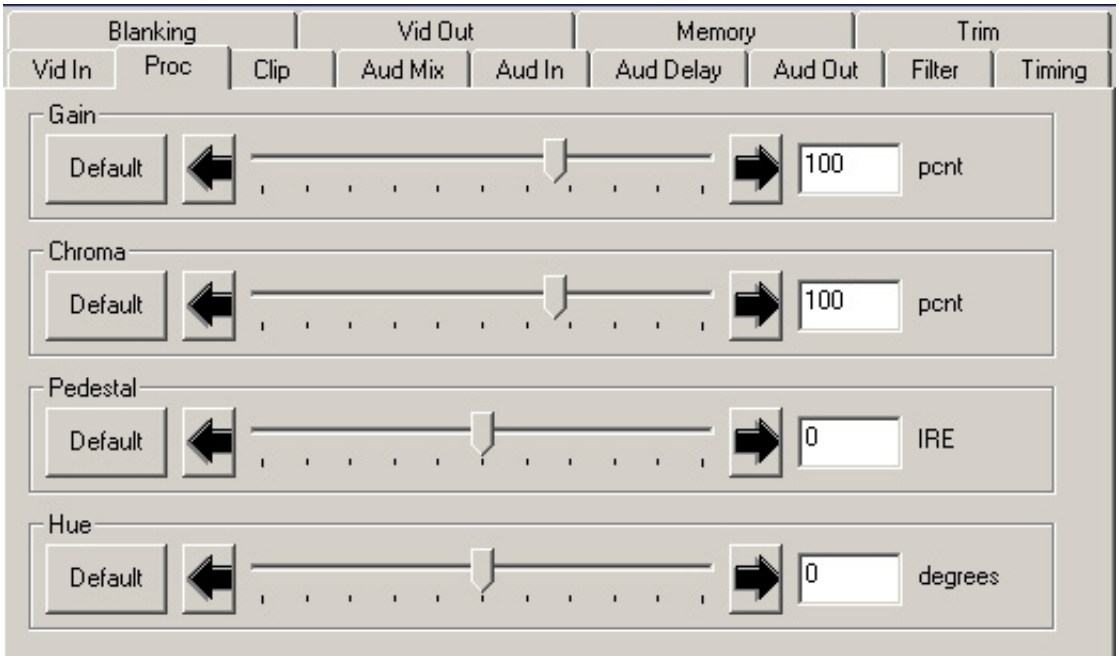
Status reporting is provided for the following conditions:

- **Input** – reports the input status as **No Input**, **525 Lock**, or **625 Lock**.
- **Reference** – reports the status of the reference input as either **No Reference**, **Ref Mismatch**, **Ref Unlocked**, **Ref 525 Lock**, or **Ref 625 Lock**.



The **Proc** menu shown below allows you to adjust the following video processing parameters for the signal:

- **Gain** – adjust the percentage of overall gain (luminance and chrominance).
- **Chroma** – adjust the percentage of chroma amplitude.
- **Pedestal** – adjust the pedestal (black) level of the signal in IRE.
- **Hue** – adjust the hue of the signal ± 180 degrees.



Use the **Clip** menu shown on the next page to adjust the following parameters:

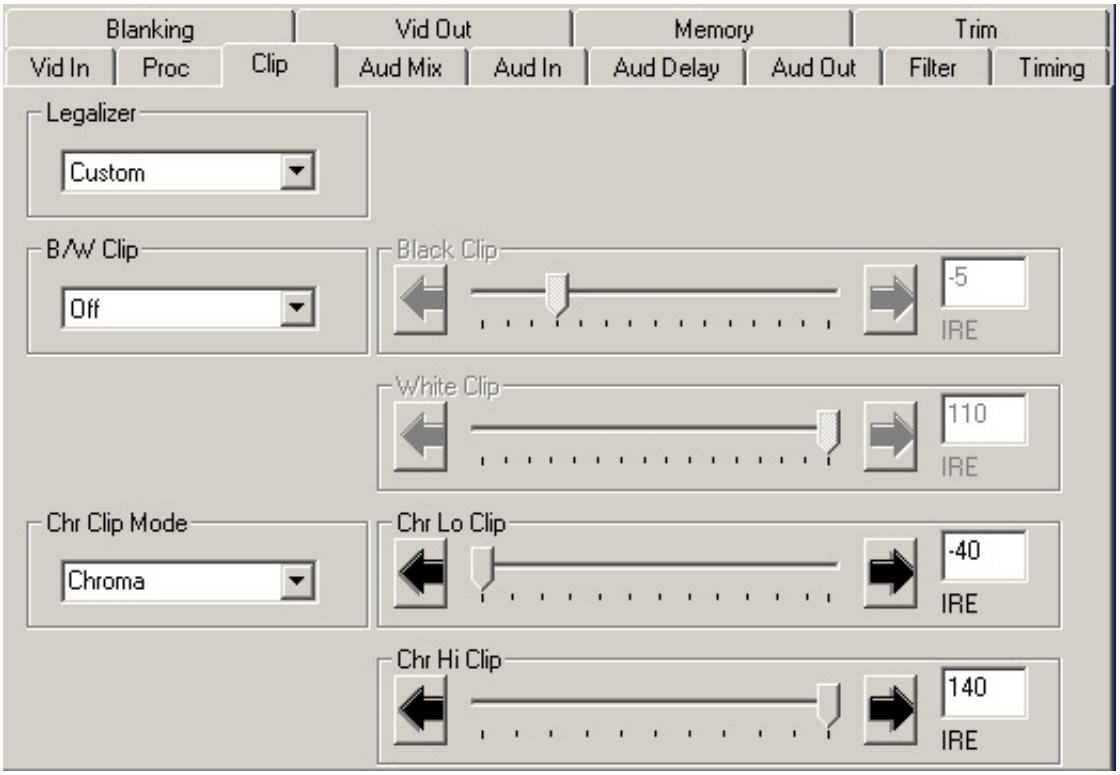
- **Legalizer** – set the legalizer function to one of the following:

  Off – to disable it.

  Legal – to apply the following factory default values:
  - **B/W Clip** is on.
  - **Black Clip** is set to 2.5 IRE.
  - **White Clip** is set to +105 IRE.
  - **Chr Clip Mode** is predictive composite.
  - **Chr Lo Clip** is set to –20 IRE.
  - **Chr Hi Clip** is set to +120 IRE.

Custom – to enable the **B/W Clip** and **Chr Clip Modes** controls to set custom parameters with the following controls:

- **B/W Clip** – select **On** to enable black and white clip functions or **Off** to disable them.
  - **Black Clip** – set the threshold for the black clip level. (No content will be allowed below the level set.)
  - **White Clip** – set the threshold for the white clip. (No content will be allowed above the level set.)
- **Chr Clip Mode** – select one of the following modes:
  - **Off** for no chroma clip functions.
  - **Chroma** to use the chroma clip controls **Chr Lo Clip/Chr Hi Clip** to set to clip the chroma content (irrespective of the luminance).
  - **Cpst** to enable the Predictive Composite Clipper. This mode allows you to ensure that when the signal is encoded to PAL or NTSC, the minimum and maximum chroma excursions do not exceed preset levels. Because in composite video, the chroma rides on the luminance, this clip mode is based on chroma and luminance values.



The next group of audio menus are used when the 6330 Audio submodule is installed.

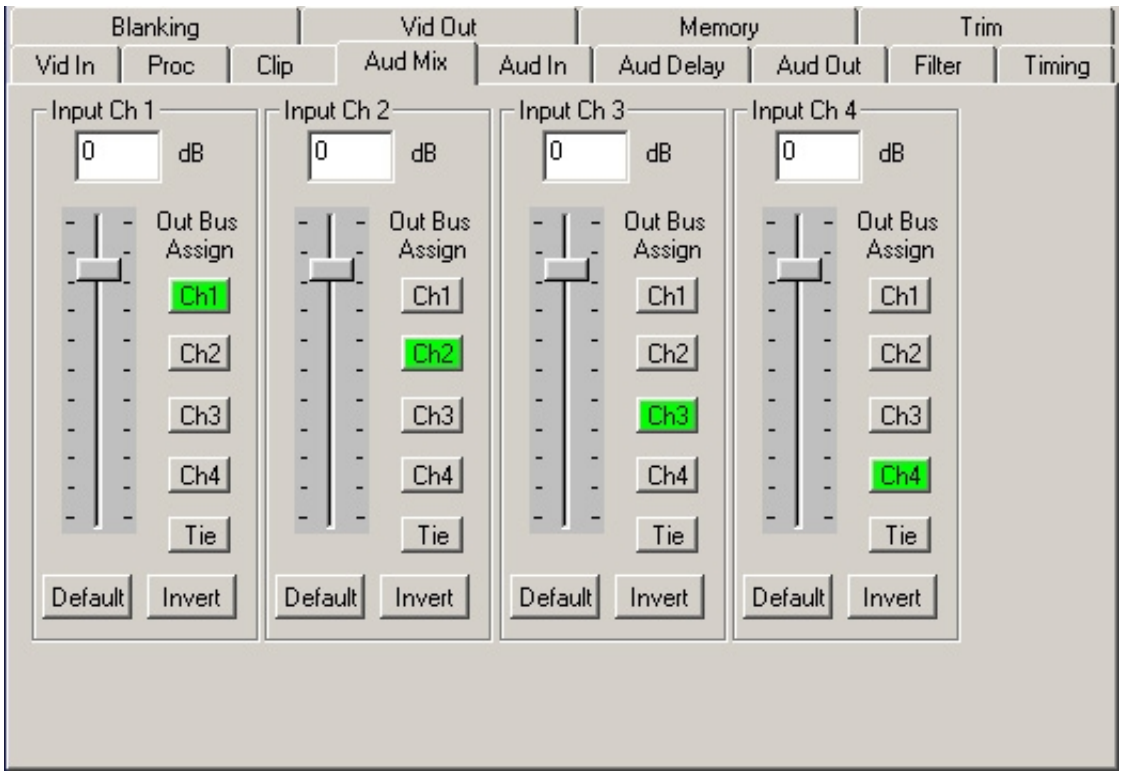
Use the **Aud Mix** menu shown below to control the audio mixing and shuffling of the module. Each output bus assignment will be indicated by a green box.

- **Input Ch 1** – assign Input Channel 1 to the desired output bus or tie to Channel 2. Set the input level using the slider control or by entering a number in the window and pressing the **Enter** key on your PC.
- **Input Ch 2** – assign Input Channel 2 to the desired output bus or tie to Channel 1. Set the input level using the slider control or by entering a number in the window and pressing the **Enter** key on your PC.
- **Input Ch 3** – assign Input Channel 3 to the desired output bus or tie to Channel 4. Set the input level using the slider control or by entering a number in the window and pressing the **Enter** key on your PC.
- **Input Ch 4** – assign Input Channel 4 to the desired output bus or tie to Channel 3. Set the input level using the slider control or by entering a number in the window and pressing the **Enter** key on your PC.

Selecting the **Tie** button in Input Ch 1 or Input Ch 2 will tie the two controls together. Selecting the **Tie** button in Input Ch 3 or Input Ch 4 will tie the controls for these channels together.

Select the **Default** button to return to the default value.

Select the **Invert** button to invert the phase of the audio content.



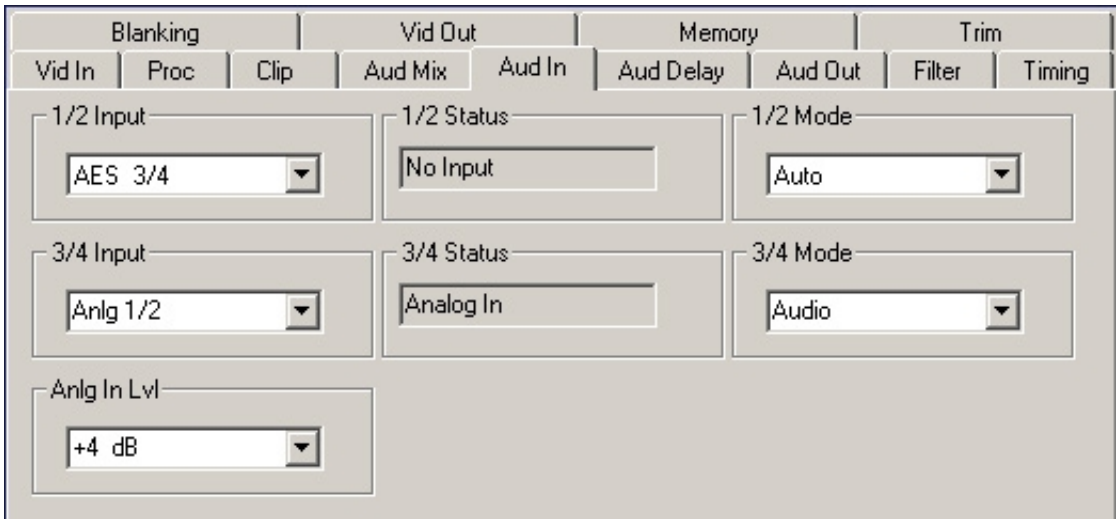
Use the **Aud In** menu shown below to adjust the following parameters:

- **1/2 Input** – select the input audio source for Input 1/2.
- **3/4 Input** – select the input audio source for Input 3/4.
- **1/2 Mode** – for an AES audio input, select the type of audio:
  - **Audio** – the embedded stream is standard audio.
  - **Data** – the embedded stream is a non-audio signal.
  - **Auto** – the module will detect the type of audio embedded in the stream.
- **3/4 Mode** – select the type of AES audio as described above.
- **Anlg In Lvl** – set the nominal level of the analog audio input.

Setting analog levels: For example, if the nominal level of your incoming analog audio is +4 dB, set the **Anlg In Lvl** to **+4 dB**.

The status of the corresponding audio inputs are shown next to the control. Status is reported as one of the following:

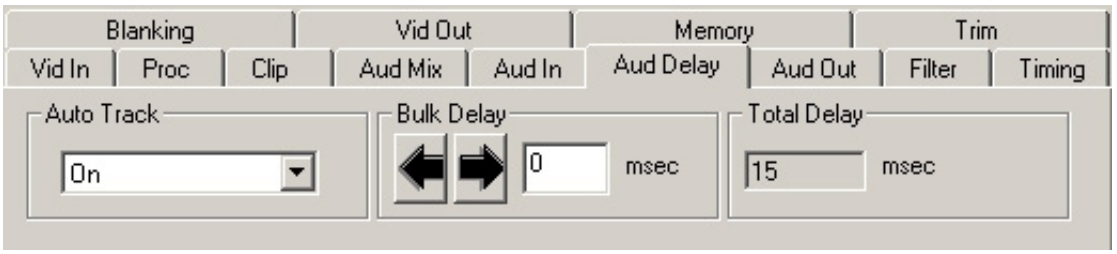
- **Analog In** – analog video is present on the input.
- **No Input** – no serial digital embedded audio is detected.
- **Audio Sync** – the AES audio is synchronous with the timing reference.
- **Data Sync** – the input data is synchronous with the timing reference.
- **Audio ASync** – the AES audio is non-synchronous with the timing reference.
- **Data ASync** – the input data is non-synchronous with the timing reference.



Use the **Aud Delay** menu shown below to adjust the amount of audio delay on the output:

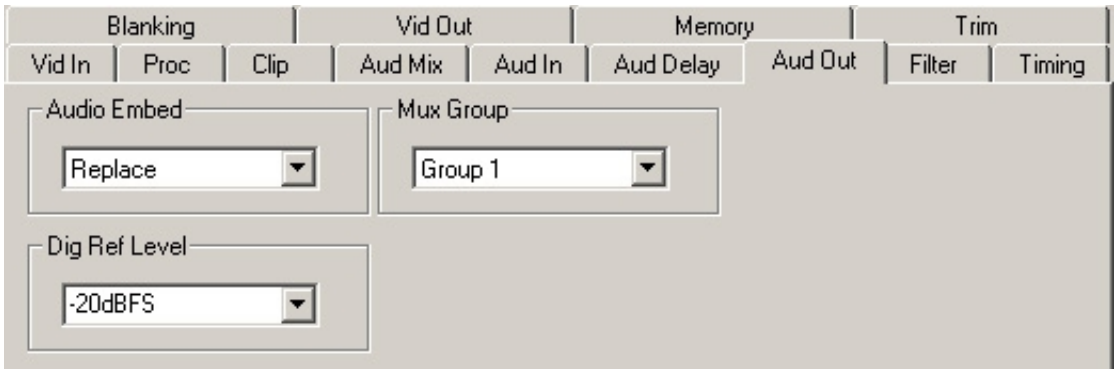
- **Auto Track** – enable auto tracking by selecting **On** or **Off.**
- **Bulk Delay** – set the amount of bulk delay using the left and right arrows.

The amount of total delay will be reported in nsec in the **Total Delay** window.



Use the **Aud Out** menu shown below to adjust the following audio output parameters:

- **Audio Embed** – turn embedding **Off** for no embedding in the output signal. To embed an audio group, select the position to embed from either **Cascade** (next available audio group) or **Replace** (replace all groups).
- **Mux Group** – select the multiplexed audio group to be embedded in the output.
- **Dig Ref Level** – set the digital reference level for the audio output.



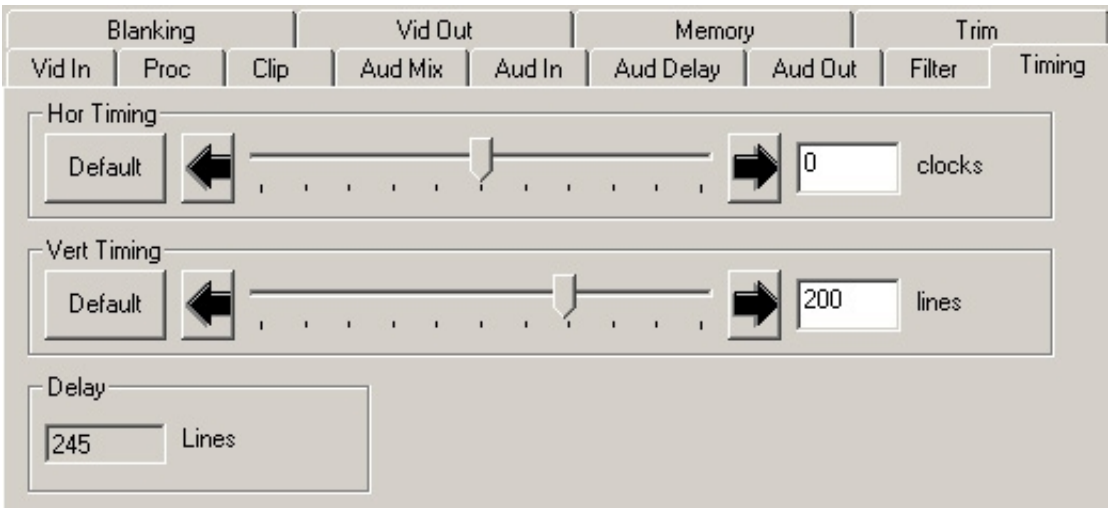
The **Filter** menu shown below allows setting of the luminance and chroma sharpness with the following detail enhancing controls:

- **Lum Sharp** – set to **Off** to bypass detail enhancing filters. Set to **1/4**, **1/2**, or **Max** to set the sharpness of the luminance portion of the signal.
- **Chr Sharp** – set to **Off** to bypass detail enhancing filters. Set to **1/2, 1/4**, or **Max** to set the sharpness of the chrominance portion of the signal.

Use the **Timing** menu shown below to adjust the following parameters:

- **Hor Timing** – adjust the horizontal timing of the output signal to place the leading edge of sync coincident with other sources.
- **Vertical Timing** – set the vertical timing to a typical setting of 0 lines.

This menu provides a **Delay** window at the bottom of the screen that will report the total delay in lines of the module.

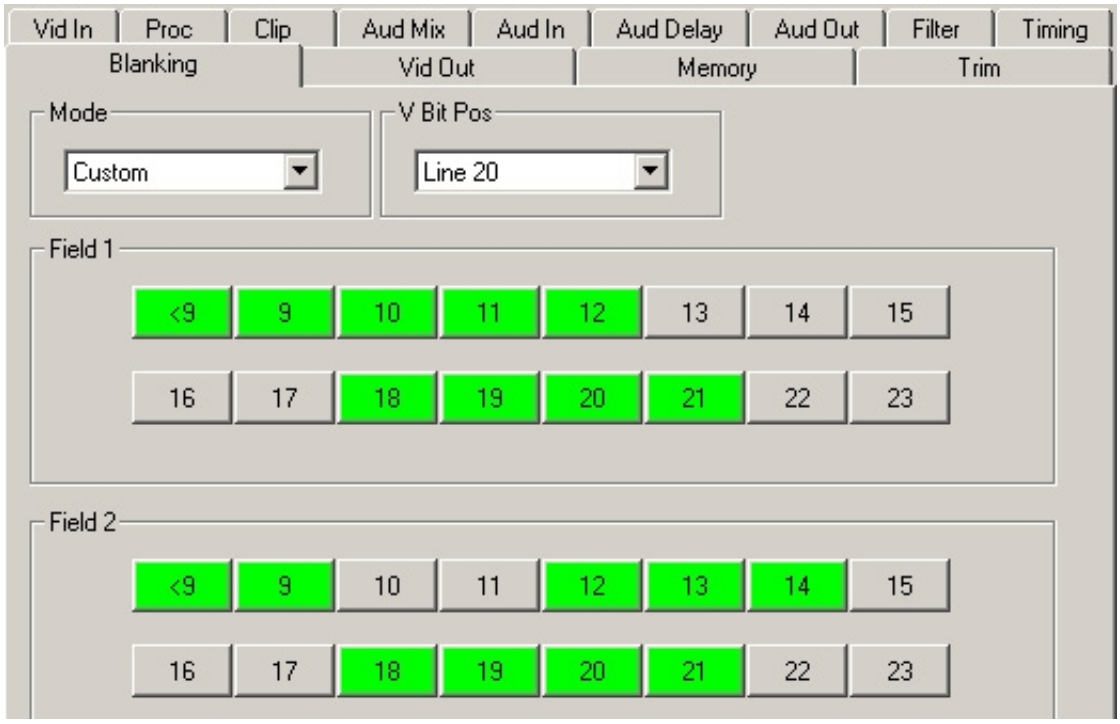


The **Blanking** menu shown below allows you to adjust the output blanking of the module with the following controls:

- **Mode** – set the blanking mode to **Narrow** (lines 1-9 are blanked in NTSC, lines 1-6 in PAL), **Wide** (lines 1-20 in NTSC, lines 1-22 in PAL), or **Custom**.

  In **Custom** mode you may select which lines are blanked on a line by line basis in Field 1 and Field 2. A green box indicates the line is blanked. In NTSC, there are individual blanking controls for each line starting with 10 ending with 21. In PAL, there are blanking controls for lines 7 and 8 as one group (both passed or both blank) and individual blanking controls for each line starting with 9 ending with 23.

- **V Bit Pos** – in 525 mode only. Set the position of the vertical bit in the SDI output to **Line 10**, **Line 20**, or **Line 23**.



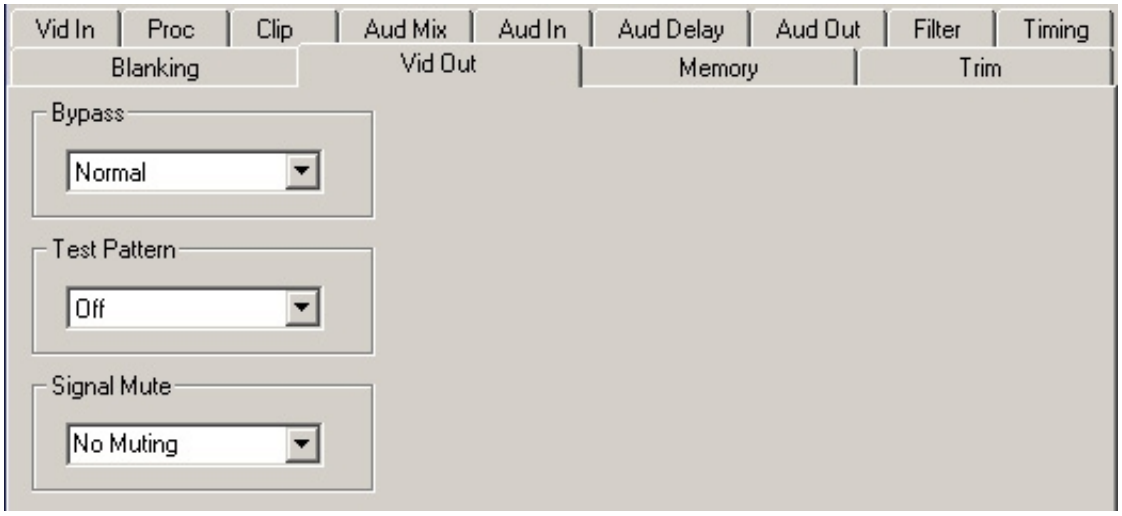
Use the **Vid Out** menu shown below to adjust the following parameters:

- **Bypass** – set to **Normal** for no split screen, **Bypass** to completely bypass any digital processing or **Split** to enable a split screen comparison between the original input signal (left) and the processed output (right).
- **Test Pattern** – select a test pattern to be sent to the video output of the module.
- **Signal Mute** – set to one of the following three choices:

  1) No Muting – allows the video to pass through regardless of video quality.

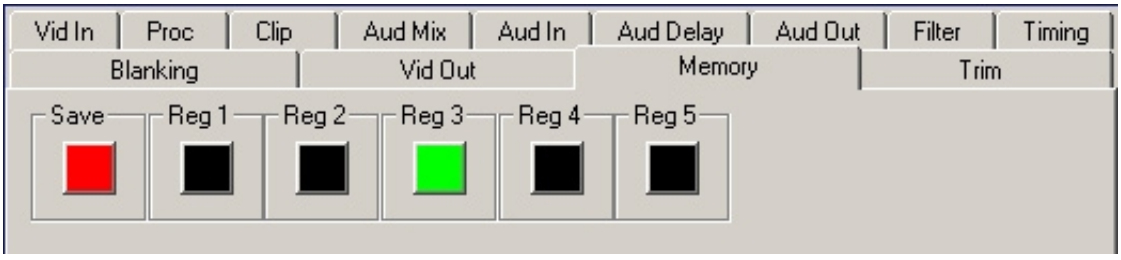
  2) Mutes on Noise – when the module detects the video quality to be unacceptable, the 5330 will output a black signal.

  3) Freezes on Noise – when the module detects the video quality to be unacceptable, the 5330 will freeze and output the last good field of video.



The **Memory** menu shown below allows you to save overall module setups to five memory registers as follows:

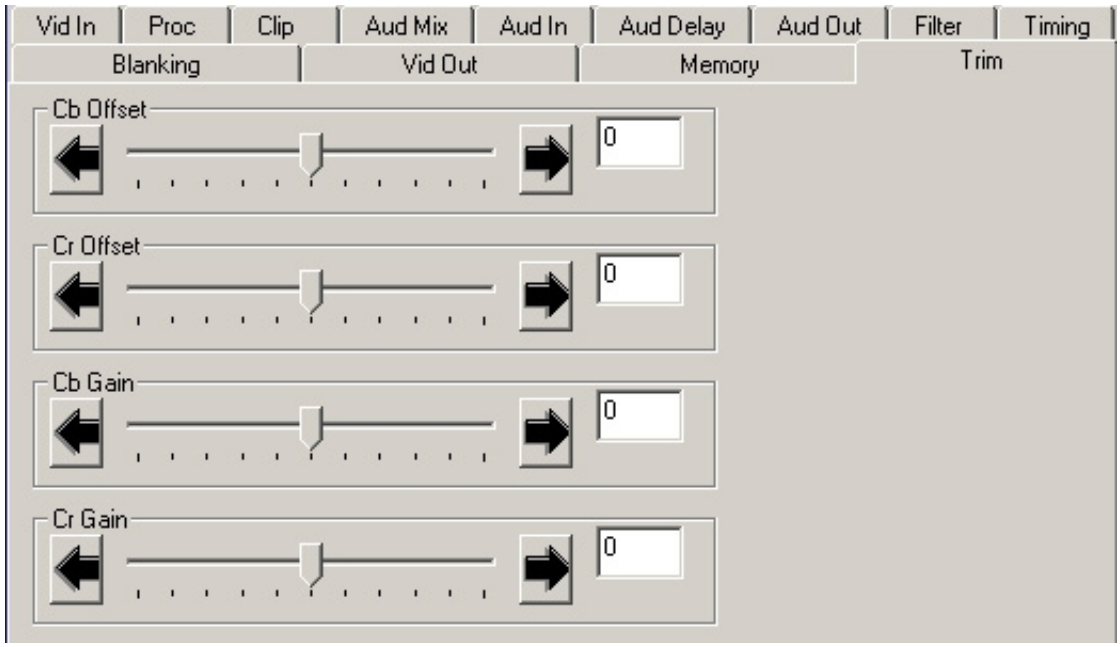
- Select **Save**, then one of the five memory registers **Reg 1 – 5**. The box will turn green. The entire module setup is now saved in the selected register.
- To recall a register, select the register box. If there is information saved, the box will turn green. The saved setup will now be loaded to the module. Up to five different module setups can be saved and recalled using the individual registers.



The **Trim** menu allows you to correct subtle issues in the individual color difference channels with offset and gain controls. The offset controls adjust the DC offsets above or below the nominal points. This can be used to correct black balance errors. The gain controls adjust the amplitude of each channel. It is helpful to set the output of the module to **Split** (in the **Vid Out** menu, enabling a split screen) to allow viewing a comparison of the processed signal to the input while adjusting the controls below.

Use the controls described below to make the offset and gain corrections:

- **Cb Offset** – adjust the DC offset of the Cb channel to between ± 300.
- **Cr Offset** – adjust the DC offset of the Cr channel to between ± 300.
- **Cb Gain** – adjust the amplitude of the Cb channel to between ± 20.
- **Cr Offset** – adjust the amplitude of the Cr channel to between ± 20.



Avenue Touch Screen Remote Configuration

The Avenue Touch Screen remote control status menu for this module is illustrated and explained below. Refer to the **5330/6330 Parameter Table** for a summary of available parameters that can be set remotely through the menus illustrated. The **Configuration Summary** gives tips and general background information on setting the parameters. For more information on using Avenue Touch Screen, refer to the Avenue System Overview.

Parameter fields that are grayed out can indicate one of the following conditions:

- An option is not installed.
- The function is not active.
- The module is locked.
- The User Level set with Avenue PC is not accessible from the current User Level.

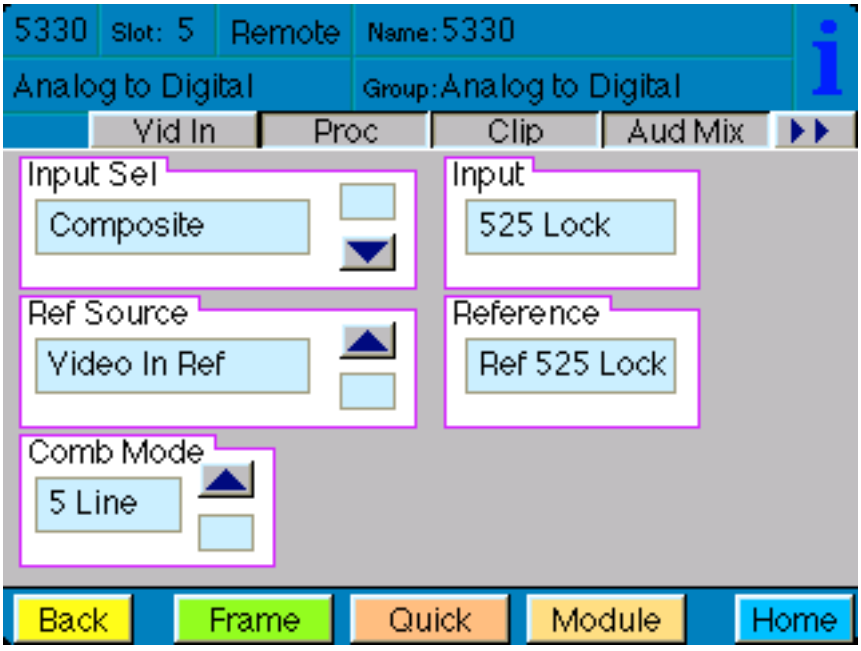
5330 Touch Screen Menus

The **Vid In** menu shown below allows you to configure the following input sources:

- **Input Sel** – use this control to set the analog video input mode connected to the module.
- **Ref Source** – use this control to set the reference input source.
- **Comb Mode** – set the type of comb filter (3- or 5-line) for the video input.

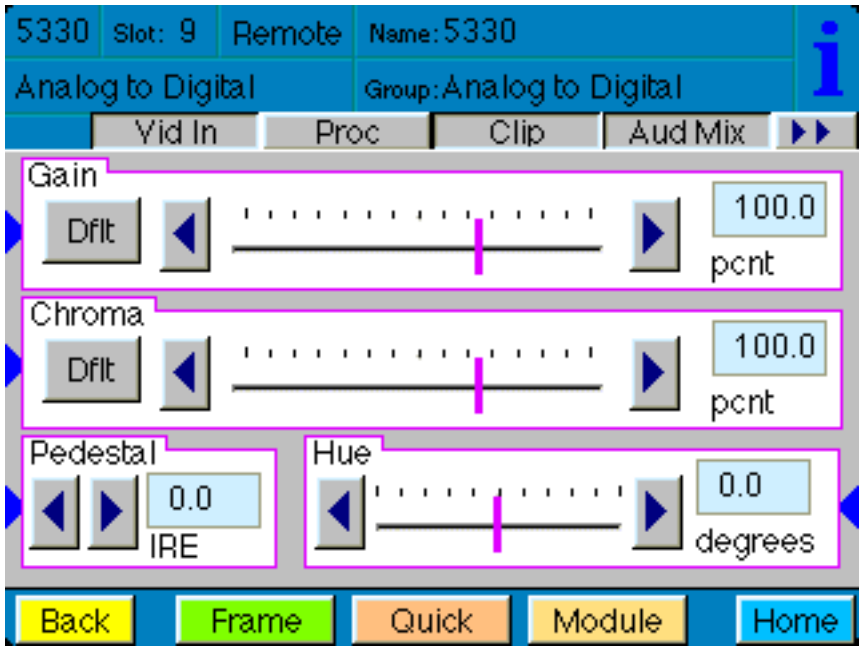
Status reporting is provided for the following conditions:

- **Input** – reports the input status as **No Input**, **525 Lock**, or **625 Lock**.
- **Reference** – reports the status of the reference input as either **No Reference**, **Ref Mismatch**, **Ref Unlocked**, **Ref 525 Lock**, or **Ref 625 Lock**.



The **Proc** menu shown below allows you to adjust the following video processing parameters for the signal:

- **Gain** – adjust the percentage of overall gain (luminance and chrominance).
- **Chroma** – adjust the percentage of chroma amplitude.
- **Pedestal** – adjust the pedestal (black) level of the signal in IRE.
- **Hue** – adjust the hue of the signal ± 180 degrees.



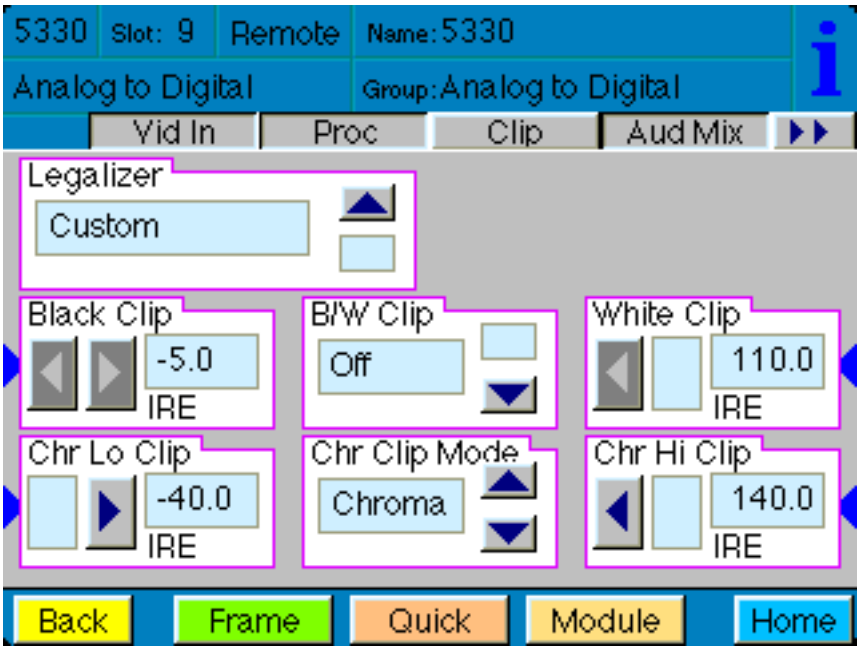
Use the **Clip** menu shown below to adjust the following parameters:

- **Legalizer** – set the legalizer function to one of the following:

  Off – to disable it.

  Legal – to apply the following factory default values:
  - **B/W Clip** is on.
  - **Black Clip** is set to 2.5 IRE.
  - **White Clip** is set to +105 IRE.
  - **Chr Clip Mode** is predictive composite.
  - **Chr Lo Clip** is set to –20 IRE.
  - **Chr Hi Clip** is set to +120 IRE.

  Custom – to enable the **B/W Clip** and **Chr Clip Modes** controls to set custom parameters with the following controls:
  - **B/W Clip** – select On to enable black and white clip functions or Off to disable them.
    - **Black Clip** – set the threshold for the black clip level. (No content will be allowed below the level set.)
    - **White Clip** – set the threshold for the white clip. (No content will be allowed above the level set.)
  - **Chr Clip Mode** – select one of the following modes:
    - **Off** for no chroma clip functions.
    - **Chroma** to use the chroma clip controls **Chr Lo Clip/Chr Hi Clip** to set to clip the chroma content (irrespective of the luminance).
    - **Cpst** to enable the Predictive Composite Clipper. This mode allows you to ensure that when the signal is encoded to PAL or NTSC, the minimum and maximum chroma excursions do not exceed preset levels. Because in composite video, the chroma rides on the luminance, this clip mode is based on chroma and luminance values.



The next group of audio menus are used when the 6330 Audio submodule is installed.

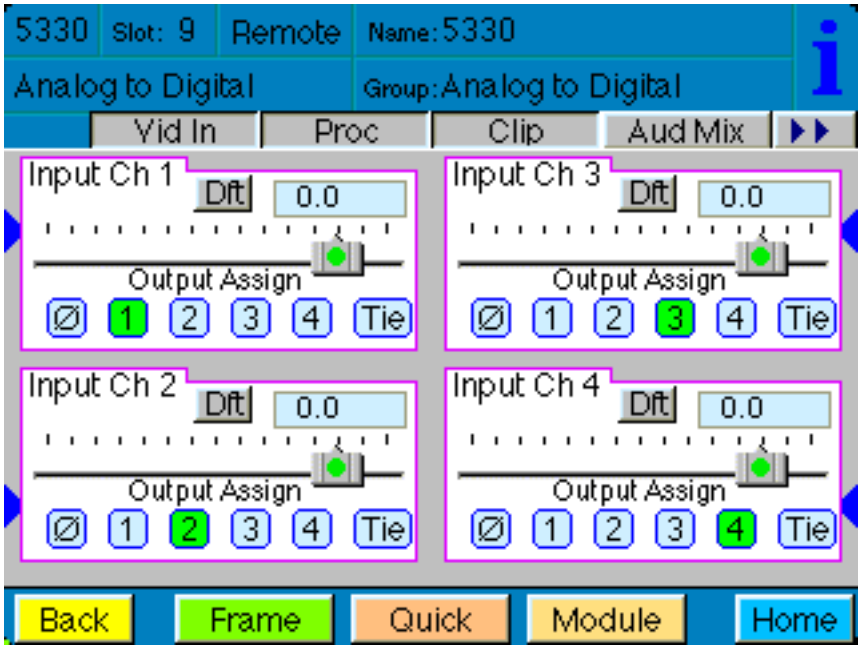
Use the **Aud Mix** menu shown below to control the audio mixing and shuffling of the module. Each output bus assignment will be indicated by a green box.

- **Input Ch 1** – assign Input Channel 1 to the desired output bus or tie to Channel 2. Set the input level using the slider control or by entering a number in the pop-up keypad and pressing the **Enter** key.
- **Input Ch 2** – assign Input Channel 2 to the desired output bus or tie to Channel 1. Set the input level using the slider control or by entering a number in the window.
- **Input Ch 3** – assign Input Channel 3 to the desired output bus or tie to Channel 4. Set the input level using the slider control or by entering a number in the pop-up keypad and pressing the **Enter** key.
- **Input Ch 4** – assign Input Channel 4 to the desired output bus or tie to Channel 3. Set the input level using the slider control or by entering a number in the pop-up keypad and pressing the **Enter** key.

Selecting the **Tie** button in Input Ch 1 or Input Ch 2 will tie the two controls together. Selecting the **Tie** button in Input Ch 3 or Input Ch 4 will tie the controls for these channels together.

Select the **Default** button to return to the default value.

Select the **Invert** button to invert the phase of the audio content.



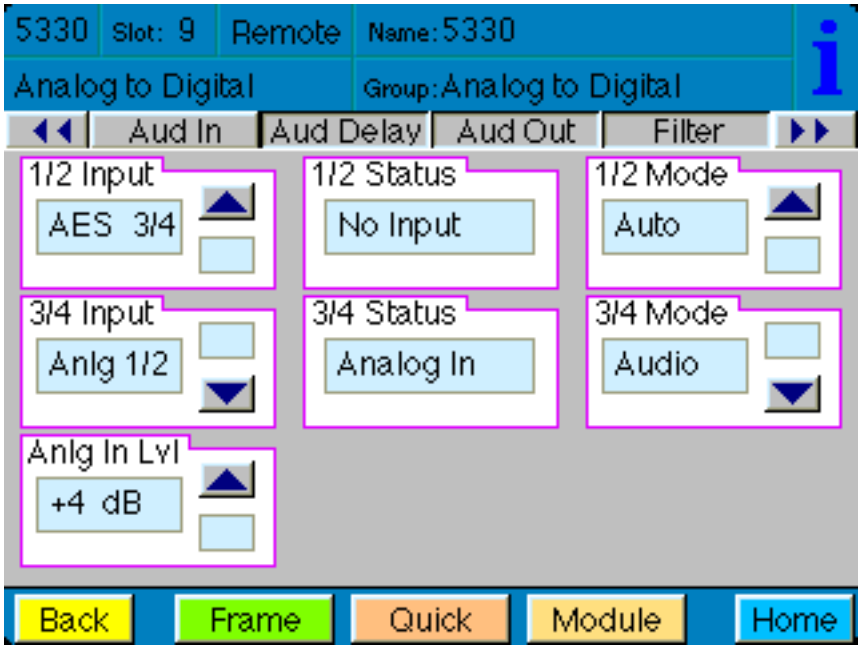
Use the **Aud In** menu shown below to adjust the following parameters:

- **1/2 Input** – select the input audio source for Input 1/2.
- **3/4 Input** – select the input audio source for Input 3/4.
- **1/2 Mode** – for a Serial input with embedded audio, select the type of audio in the stream:
  - **Audio** – the embedded stream is standard audio.
  - **Data** – the embedded stream is a non-audio signal.
  - **Auto** – the module will detect the type of audio embedded in the stream.
- **3/4 Mode** – select the type of audio in the serial stream as described above.
- **Anlg In Lvl** – set the level of the analog audio input.

Setting analog levels: For example, if the nominal level of your incoming analog audio is +4 dB, set the **Anlg In Lvl** to **+4 dB**.

The status of the corresponding audio inputs are shown next to the control. Status is reported as one of the following:

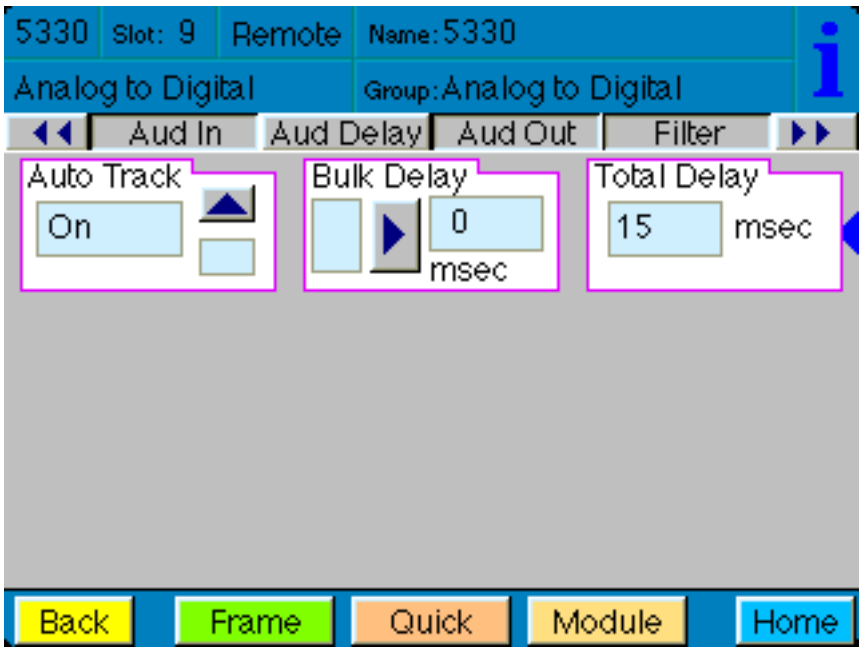
- **Analog In** – analog video is present on the input.
- **No Input** – no serial digital embedded audio is detected.
- **Audio Sync** – the AES audio is synchronous with the timing reference.
- **Data Sync** – the data is synchronous with the timing reference.
- **Audio Async** – the AES audio is non-synchronous with the timing reference.
- **Data Async** – the input data is non-synchronous with the timing reference.



Use the **Aud Delay** menu shown below to adjust the amount of audio delay on the output:

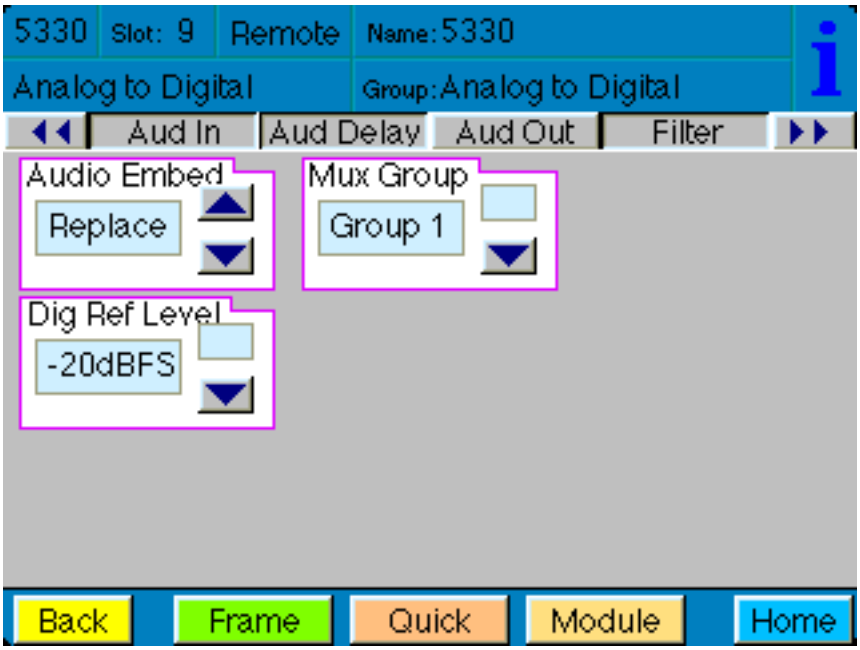
- **Auto Track** – enable auto tracking by selecting **On** or **Off.**
- **Bulk Delay** – set the amount of bulk delay using the left and right arrows.

The amount of total delay will be reported in nsec in the **Total Delay** window.



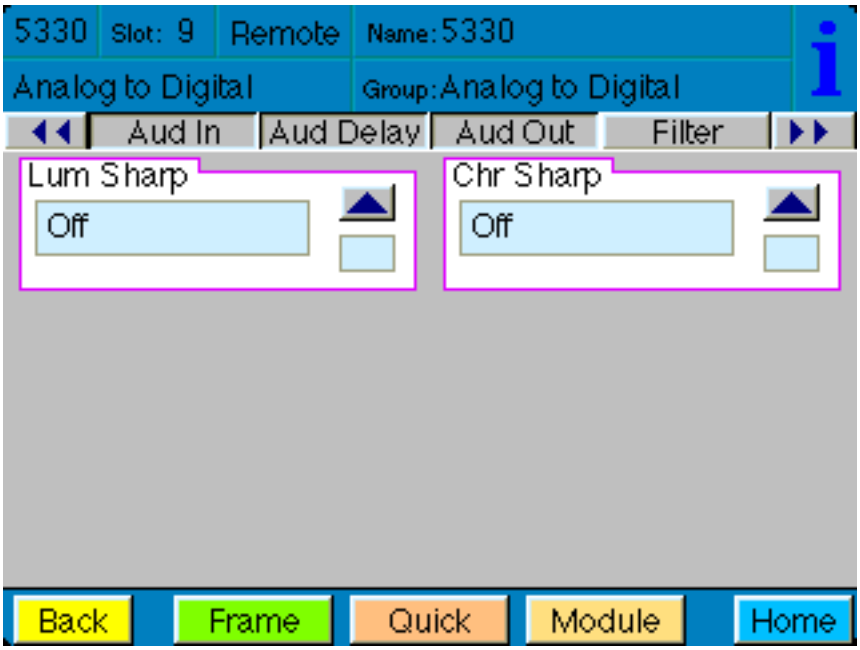
Use the **Aud Out** menu shown below to adjust the following audio output parameters:

- **Audio Embed** – turn embedding **Off** for no embedding in the output signal. To embed an audio group, select the position to embed from either **Cascade** (next available audio group) or **Replace** (replace all groups).
- **Mux Group** – select the multiplexed audio group to be embedded in the output.
- **Anlg Lvl Out** – set the output level of the analog audio.
- **Dig Ref Level** – set the digital reference level for the audio output.



The **Filter** menu shown below allows setting of the luminance and chroma sharpness with the following detail enhancing controls:

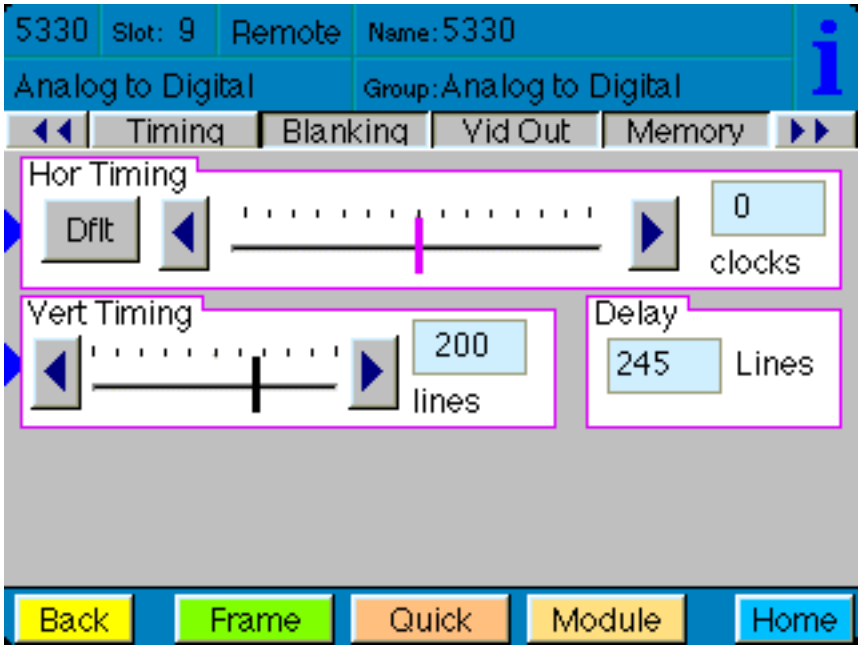
- **Lum Sharp** – set to **Off** to bypass detail enhancing filters. Set to **1/4**, **1/2**, or **Max** to set the sharpness of the luminance portion of the signal.
- **Chr Sharp** – set to **Off** to bypass detail enhancing filters. Set to **1/2, 1/4**, or **Max** to set the sharpness of the chrominance portion of the signal.



Use the **Timing** menu shown below to adjust the following parameters:

- **Hor Timing** – adjust the horizontal timing of the output signal to place the leading edge of sync coincident with other sources.
- **Vertical Timing** – set the vertical timing to a typical setting of 0 lines.

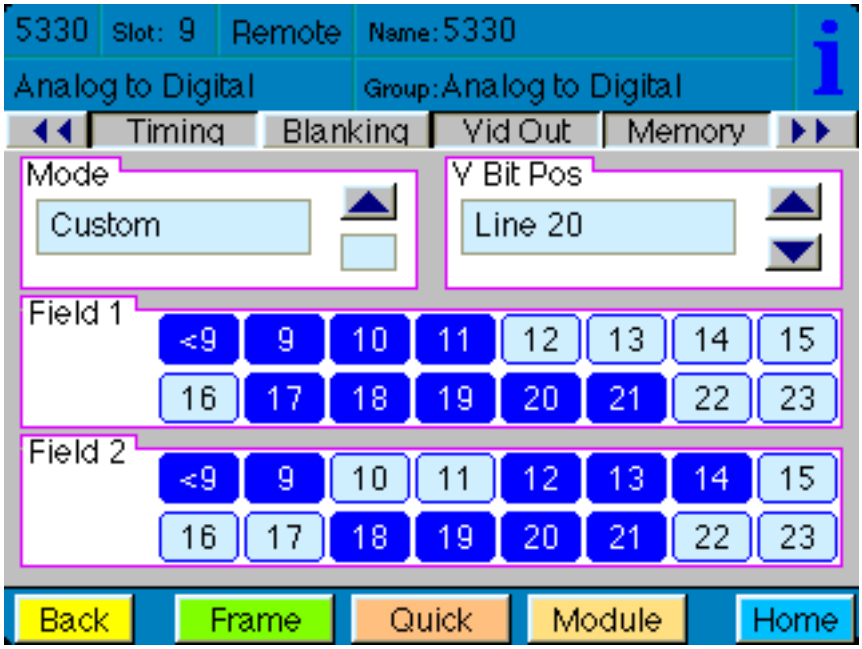
This menu provides a **Delay** window at the bottom of the screen that will report the total delay in lines of the module.



The **Blanking** menu shown below allows you to adjust the output blanking of the module with the following controls:

- **Mode** – set the blanking mode to **Narrow** (lines 1-9 are blanked in NTSC, lines 1-6 in PAL), **Wide** (lines 1-20 in NTSC, lines 1-22 in PAL), or **Custom**.

  In **Custom** mode you may select which lines are blanked on a line by line basis in Field 1 and Field 2. A colored box indicates the line is blanked. In NTSC, there are individual blanking controls for each line starting with 10 ending with 21. In PAL, there are blanking controls for lines 7 and 8 as one group (both passed or both blank) and individual blanking controls for each line starting with 9 ending with 23.
- **V Bit Pos** – in 525 mode only. Set the position of the vertical bit in the SDI output to **Line 10**, **Line 20**, or **Line 23**.



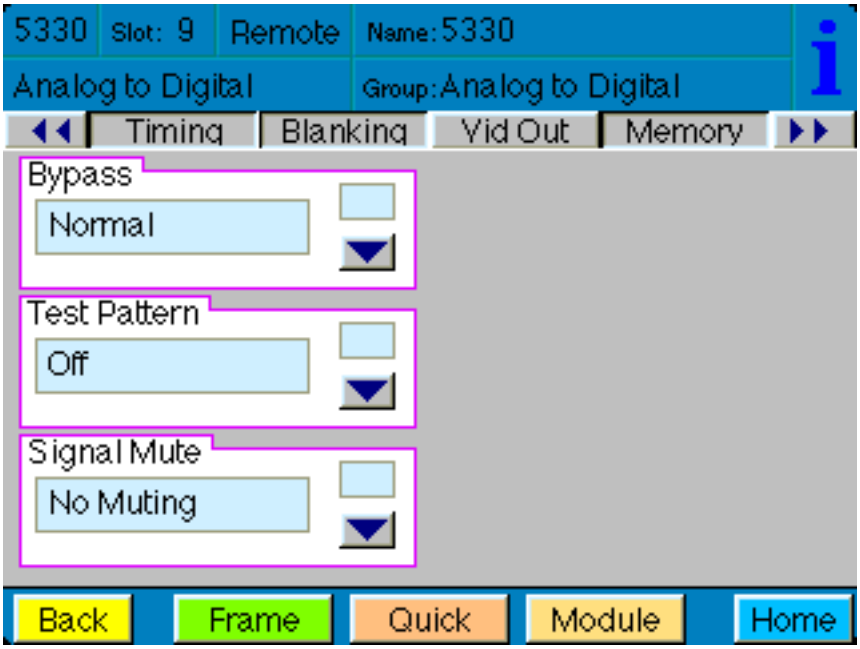
Use the **Vid Out** menu shown below to adjust the following parameters:

- **Bypass** – set to **Normal** for no split screen, **Bypass** to completely bypass any digital processing, or **Split** to enable a split screen comparison between the original input signal (left) and the processed output (right).
- **Test Pattern** – select a test pattern to be sent to the video output of the module.
- **Signal Mute** – set to one of the following three choices:

  1) No Muting – allows the video to pass through regardless of video quality.

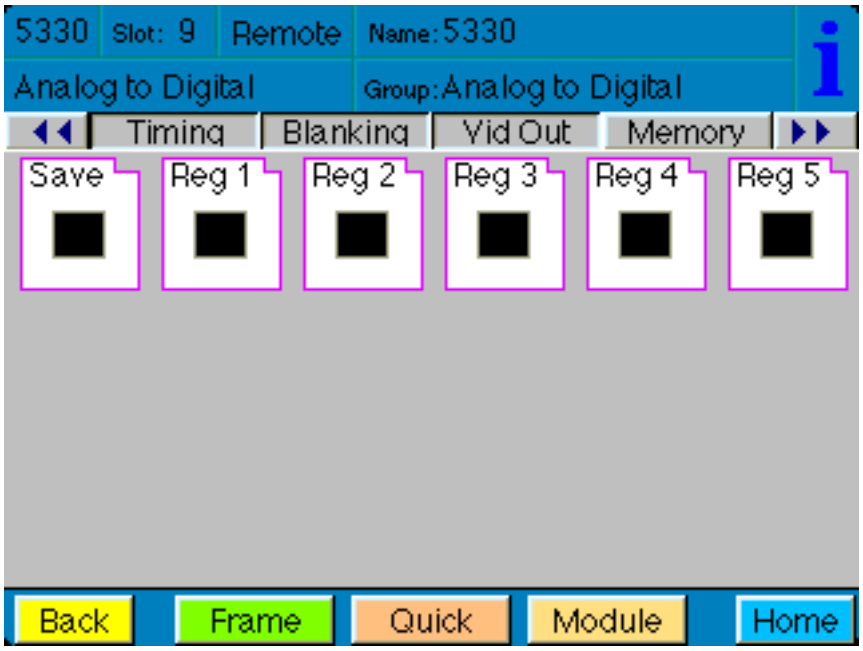
  2) Mutes on Noise – when the module detects the video quality to be unacceptable, the 5330 will output a black signal.

  3) Freeze on Noise – when the module detects the video quality to be unacceptable, the 5330 will freeze and output the last good field of video.



The **Memory** menu shown below allows you to save overall module setups into up to five memory registers as follows:

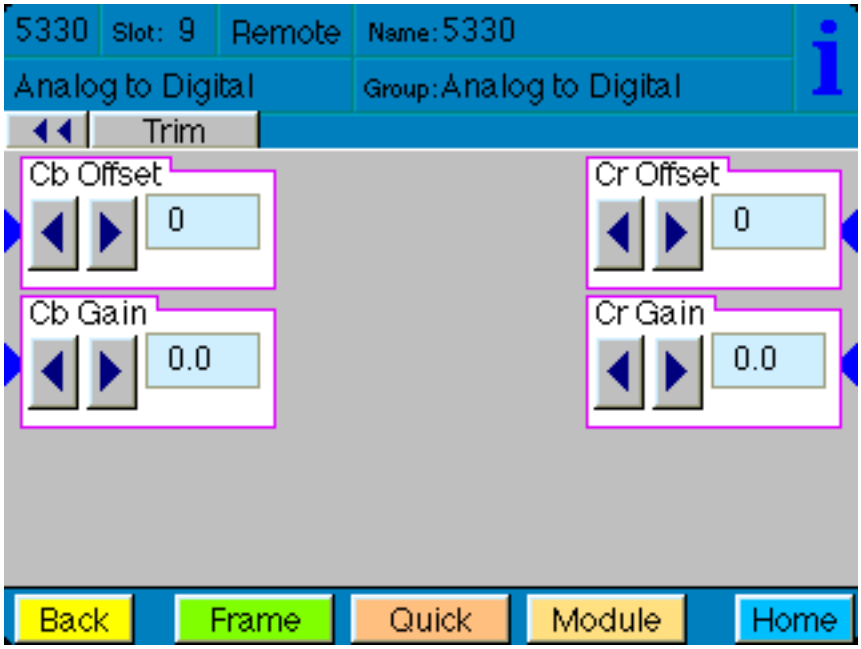
- Select **Save**, then one of the five memory registers **Reg 1 – 5**. The box will turn green. The entire module setup is now saved in the selected register.
- To recall a register, select the register box. If there is information saved, the box will turn green. The saved setup will now be loaded to the module. Up to five different module setups can be saved and recalled using the individual registers.



The **Trim** menu allows you to correct subtle issues in the individual color difference channels with offset and gain controls. The offset controls adjust the DC offsets above or below the nominal points. This can be used to correct black balance errors. The gain controls adjust the amplitude of each channel. It is helpful to set the output of the module to **Split Screen** (in the **Vid Out** menu) to allow viewing a comparison of the processed signal to the input while adjusting the controls below.

Use the controls described below to make the offset and gain corrections:

- **Cb Offset** – adjust the DC offset of the Cb channel to between ± 300.
- **Cr Offset** – adjust the DC offset of the Cr channel to between ± 300.
- **Cb Gain** – adjust the amplitude of the Cb channel to between ± 20.
- **Cr Offset** – adjust the amplitude of the Cr channel to between ± 20.



TROUBLESHOOTING

As a troubleshooting aid, the reference signal status and presence, power and CPU status can be easily monitored from the front panel of this module using the front panel indicators.

Refer to the overall troubleshooting tips given below for the module:

Can't control module:

- Check status of CPU **Run** green LED. Should be blinking slowly and in unison with other modules if System module is present. If not, try removing it and plugging it in again to be sure it is seated properly.
- System module may not be working properly if installed.

Module controls are grayed out:

- Module is locked or access to module controls is restricted by User Level.
- Local/Remote switch on module is in the **Local** position.

No signals out of module:

- Check status of **Active** LEDs. Primary or Secondary should be lit. If not, check all inputs for presence and quality.
- Check cabling to inputs of module.
- Check inputs to destinations are terminated properly.

You may also refer to the technical support section of the Ensemble Designs web site for the latest information on your equipment at the URL below:

http://www.ensembledesigns.com/support

SOFTWARE UPDATING

Software upgrades for each module can be downloaded remotely if the optional System Control module is installed. These can be downloaded onto your PC and then Avenue PC will distribute the update to the individual module. (Refer to the Avenue PC documentation for more information). Periodically updates will be posted on our web site. If you do not have the required System Control Module and Avenue PC, modules can be sent back to the factory for software upgrades.

WARRANTY AND FACTORY SERVICE

Warranty

This module is covered by a five year limited warranty, as stated in the main Preface of this manual. If you require service (under warranty or not), please contact Ensemble Designs and ask for customer service before you return the unit. This will allow the service technician to provide any other suggestions for identifying the problem and recommend possible solutions.

Factory Service

If you return equipment for repair, please get a Return Material Authorization Number (RMA) from the factory first.

Ship the product and a written description of the problem to:

Ensemble Designs, Inc.

Attention: Customer Service RMA #####

870 Gold Flat Rd.

Nevada City, CA. 95959 USA

(530) 478-1830

Fax: (530) 478-1832

service@ensembledesigns.com

http://www.ensembledesigns.com

Be sure to put your RMA number on the outside of the box.

SPECIFICATIONS

5330 Video ADC

Analog Inputs

Type:	SMPTE Y, Cr, Cb
	Beta Y, Cr, Cb
	NTSC, PAL Composite
	NTSC, PAL S-Video (Y/C)
Impedance:	75 Ω, BNC
Return Loss:	> 40 dB
Input DC:	± 1 volt DC
Input Hum:	< 100 mV

Reference Input

Number:	One external
	One internal Master Timing Ref
Type:	1V p-p Composite Video
	PAL or NTSC
Impedance:	75 Ω, BNC
Return Loss:	> 40 dB

Analog to SDI Performance

Bit Resolution:	12 bit input quantization
	4x Oversampling
Signal to Noise	> 62 dB, weighted
Frequency Response:	
Composite & Y:	± 0.1dB, 0 to 5.5 MHz
Cr, Cb:	± 0.1dB, 0 to 2.75 MHz
Minimum Delay:	90 µSec

Serial Digital Outputs

Number:	Two or Four (set onboard switch S?? to ??)
Type:	ITU-R601, SMPTE 259M-C
Impedance:	75 Ω, BNC
Return Loss:	> 15 dB
Output DC:	None (AC coupled)

Analog Audio Inputs (6330 Submodule)

Number:	4, Balanced Pair
Processing:	24 bits
CMRR:	> 60dB, 20Hz to 10KHz
Analog Input Z:	15k Ω, balanced, transformerless

AES Audio Inputs (6330 Submodule)

Number:	2 (Total of four channels)
Type:	AES3id
Connector Type:	Coaxial, 75 Ω BNC

AES Digital Outputs

Number:	2 (Total of four channels)
Type:	AES3id
Connector Type:	Coaxial, 75 Ω BNC
Bit Depth:	20 and 24 Bit
Sample Rate:	48 KHz Synchronous to Video output
Reference Level:	-18 or -20 dBFS (Selectable)

General

Power Consumption:	10 W (with both options installed)
Temperature:	0 to 40° C ambient (all specifications met)
Relative Humidity:	0 to 95%, noncondensing
Size:	Standard Avenue Module Occupies one slot in 3 RU or 1 RU Frame (including 6330)

Due to ongoing product development, all specifications subject to change.