

AVENUE

Avenue™ signal integration system

Model 7925 Dual HD Downconverter Data Pack

ENSEMBLE

D E S I G N S

Revision 1.1 SW v2.2.2

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Model 7925 Dual HD Downconverter

MODULE OVERVIEW

The 7925 module is a two-channel, dual downconverter with HD and SD outputs that can be used in the most demanding broadcast applications. With two downconverters on one module, the 7925 provides high efficiency with excellent picture quality. The downconverted outputs are timeable with respect to the reference input and can feed production switchers and routers.

The 7925 accepts 720p, 1080i, 1080sF and 1080p inputs that are synchronous or asynchronous. If an SD SDI input is received, SD is passed to the output.

Motion-adaptive deinterlacing of the video signal enables all internal processing to occur in progressive.

The 7925 performs automatic color space and gamma conversion to accommodate the differences between HD and SD. The Aspect Ratio Conversion process offers resizing and repositioning with choices for: Letterbox, Anamorphic, Crop and Zoom.

Proc amp controls are provided in the form of Video, Chroma and Pedestal. Video outputs can be timed with respect to the reference input.

Audio Handling

The 7925 supports 16 channels of embedded audio (without the need for any sub module). Embedded audio in the input is safely bypassed around the video processing, delayed to preserve lip sync, and reembedded in the SD SDI output. Any two of those audio channels can be selected for conversion to analog form. These balanced outputs can be used with the composite video output to feed analog equipment, or for signal monitoring. All audio processing and conversion is performed at full 24 bit resolution.

Control

The 7925 can be configured locally or controlled and configured remotely with Avenue Touch Screens, Express Panels, or Avenue PC Software. Alarm generation, configurable user levels, module lock-out, and customizable menus are just some of the tools included in the Avenue control system.

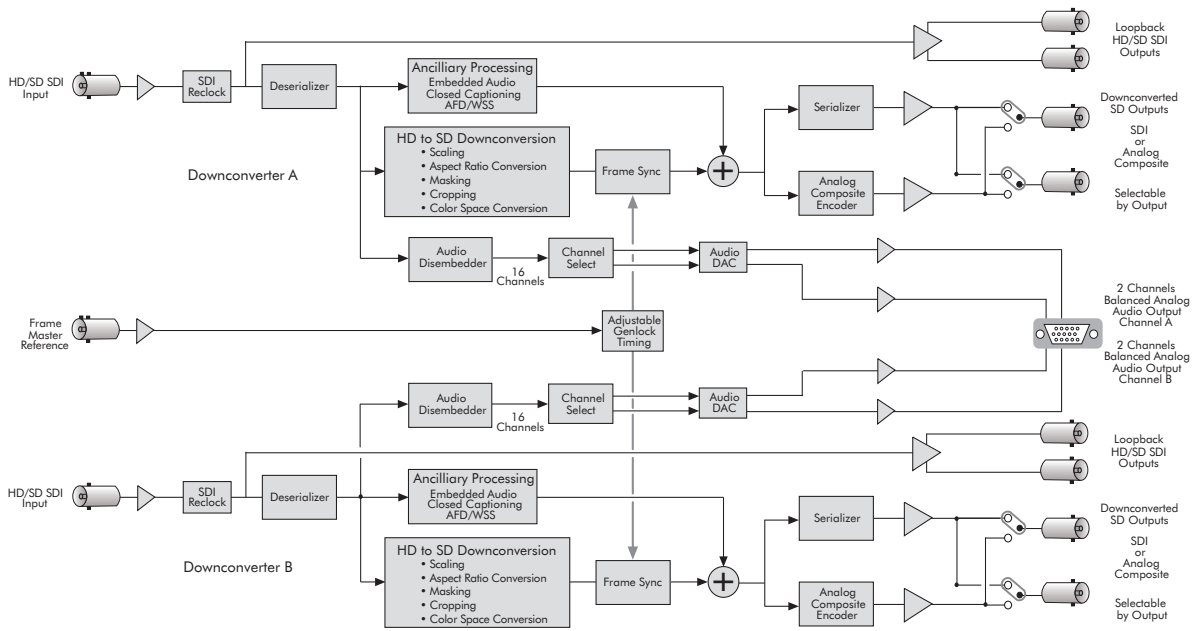
Metadata

HD closed captioning is carried in data packets in the vertical interval ancillary data space. The 7925 properly translates HD caption data to traditional SD captioning (line 21 or 23) so that closed captioning content is converted transparently between video standards and formats.

Automatic Aspect Ratio Conversion

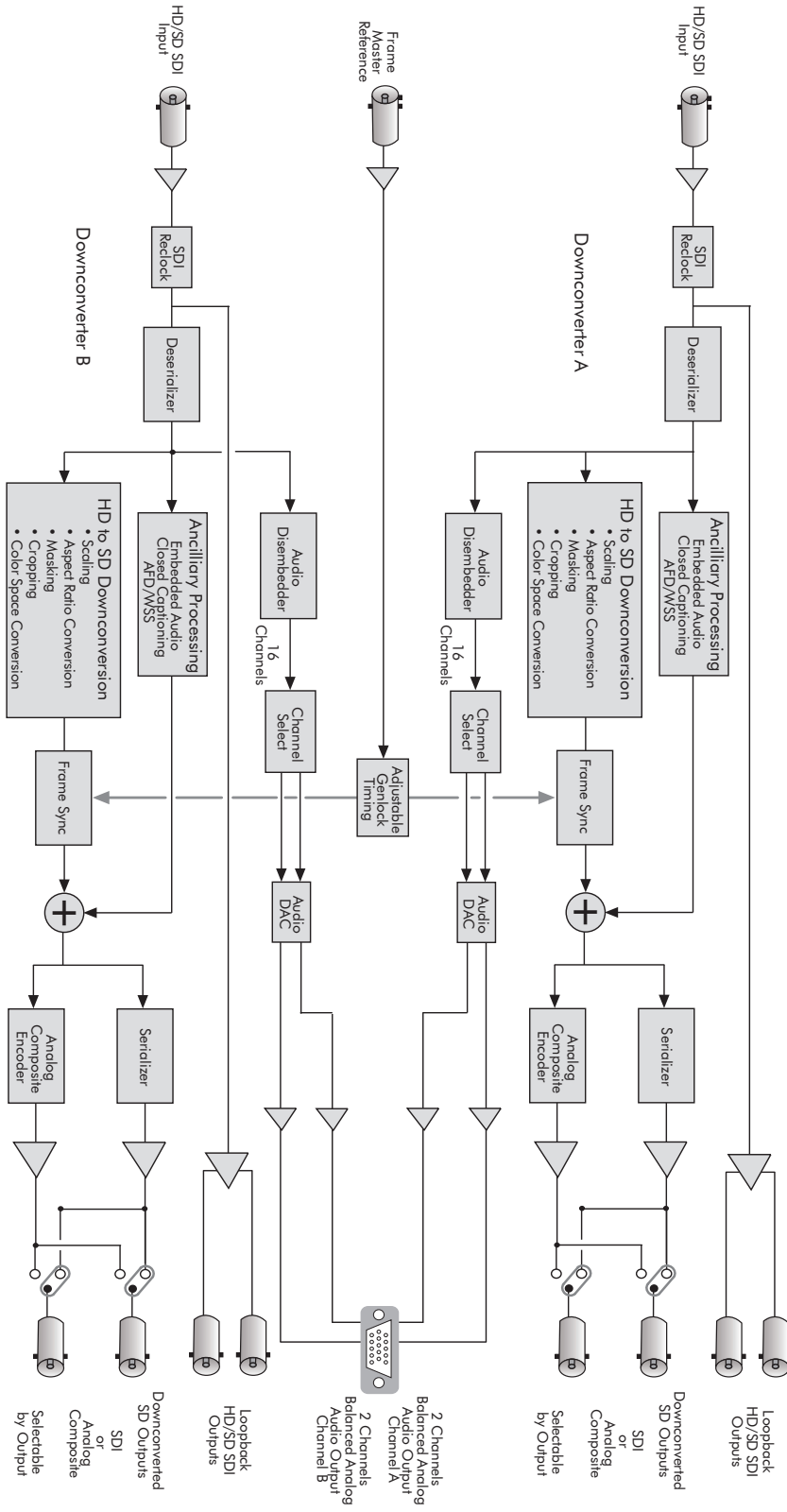
The 7925 uses WSS (Wide Screen Signaling) and AFD (Active Format Description) to mark or identify the aspect ratio of the video content. These tags are read at the input of the module to determine the type of Aspect Ratio Conversion to perform. Subsequently, these tags are properly updated in the output signal to reflect its format and presentation.

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7925 Dual HD Downconverter Functional Block Diagram, Portrait Orientation

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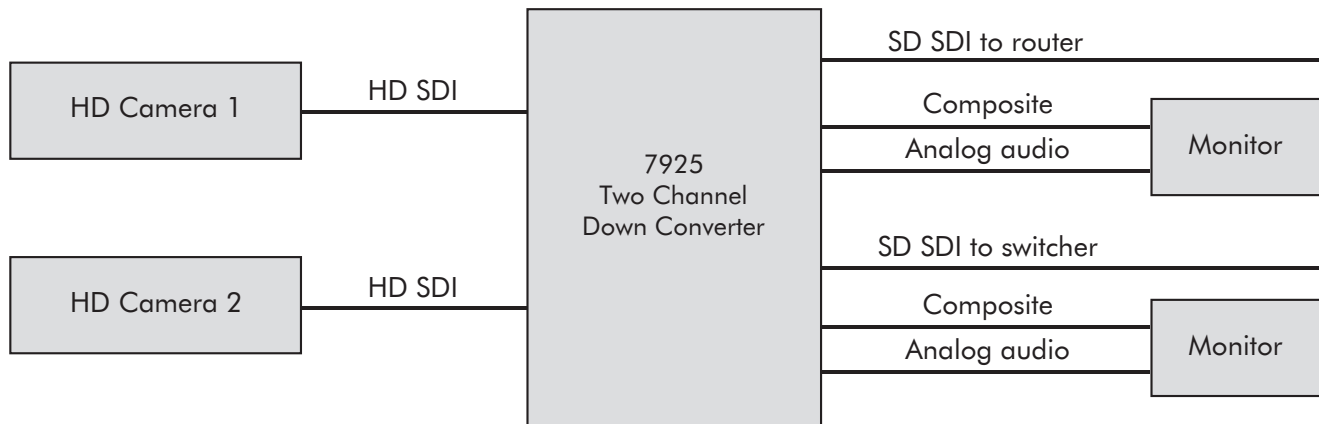
7925 Dual HD Downconverter Functional Block Diagram, Landscape Orientation

Model 7925 Dual HD Downconverter

APPLICATIONS

HD Downconversion

In this example the 7925 is down converting HD signals from two cameras. The 7925 here is configured to output an SD SDI signal and an analog composite signal for each camera. The outputs can be timed to house with respect to the reference. Two channels of analog audio can be monitored as well.



INSTALLATION

Plug the 7925 module into any one of the slots in the 1RU or 3RU 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.

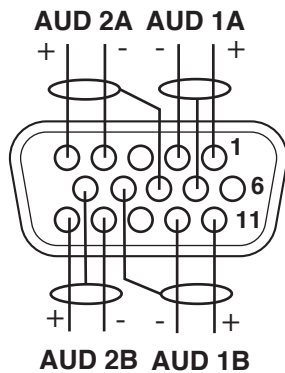
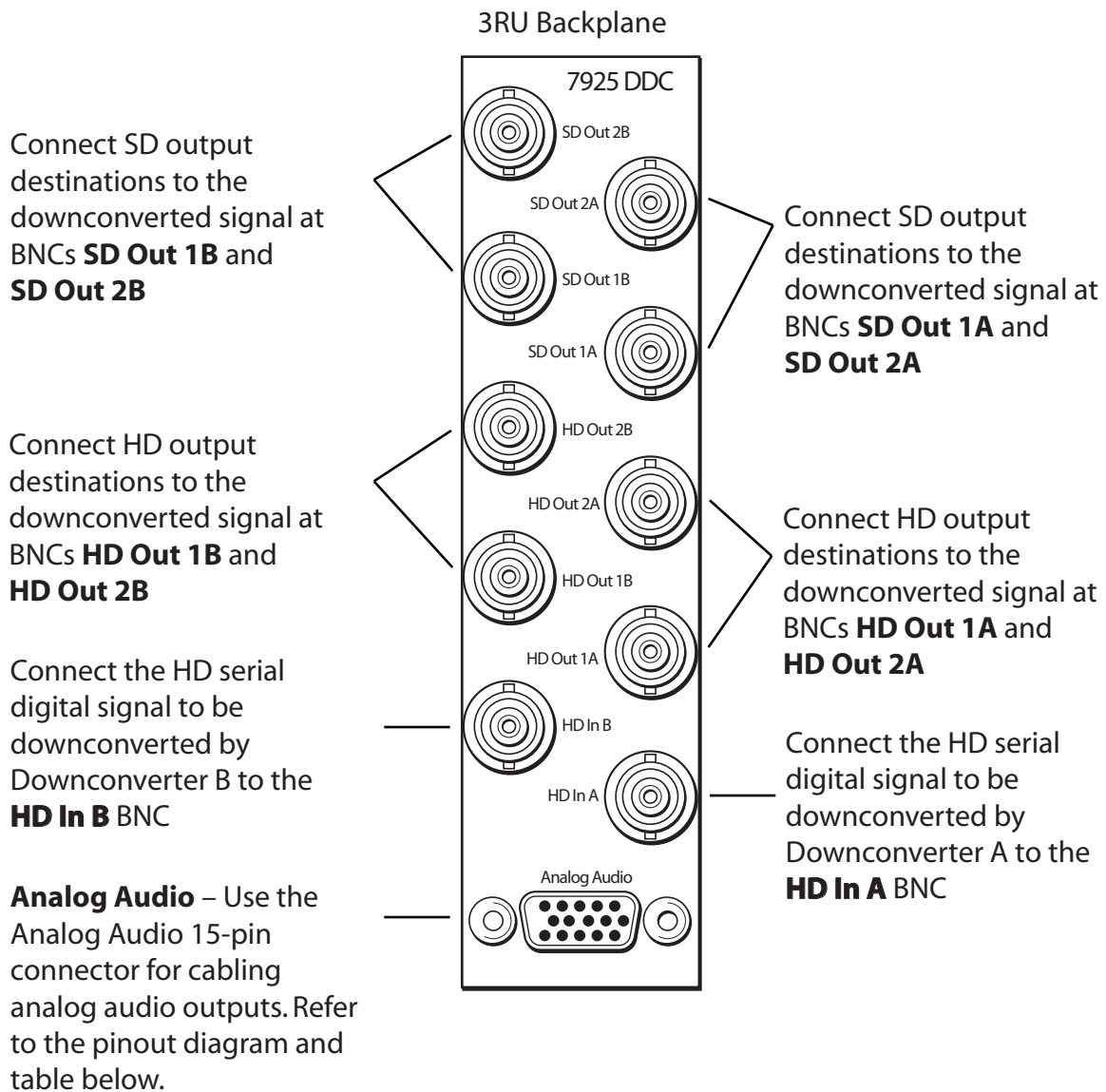
SD SDI or Composite Out BNC Configuration

The four SD Out BNCs (SD Out 1A, 1B, 2A and 2B) can be configured as either SD or composite outputs by setting switches on the 7925 module. Set each switch independently to the up position for SD SDI and down for composite (CPST).

CABLING

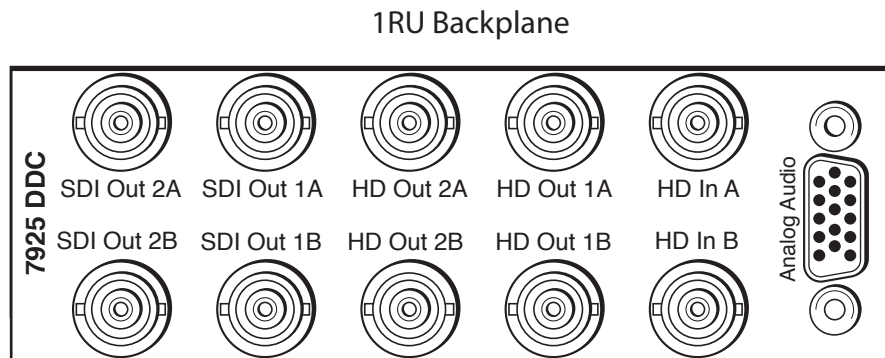
Refer to the 3RU and 1RU backplane diagrams of the module below for cabling instructions. Note that unless stated otherwise, the 1RU cabling explanations are identical to those given in the 3RU diagram.

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Analog Audio Pinouts		
Signal	Pins	Output
Aud 1 +, -, G	1, 2, 7	Output 1A
Aud 2 +, -, G	5, 4, 8	Output 2A
Aud 3 +, -, G	11, 12, 9	Output 1B
Aud 4 +, -, G	15, 14, 10	Output 2B

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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.

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. The Local switches are inactive when the Remote/Local switch is in the Remote position.

In the Remote mode, Avenue module parameters can be configured and controlled from one of the remote control options, the Avenue Touch Screen, Avenue Express Control Panel, 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 slot in the frame at your discretion without losing the stored information.

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.

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Front Panel Controls and Indicators

The front edge indicators and switch settings are shown in the diagram below:

Remote/Local switch:

Set to the mode you will be using.

Ana/Proc switch:

Set the output mode to Ana (Anamorphic) or Proc (Process). When the switch is set to Proc then the Box/Crop switch is enabled and the output will either be Box or Crop for A channel.

Box/Crop switch:

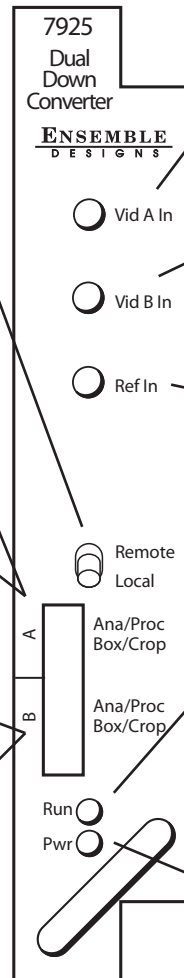
When Proc is selected above, set the output to either Box or Crop for A channel.

Ana/Proc switch:

Set the output mode to Ana (Anamorphic) or Proc (Process). When the switch is set to Proc then the Box/Crop switch is enabled and the output will either be Box or Crop for B channel.

Box/Crop switch:

When Proc is selected above, set the output to either Box or Crop for B channel.



Vid A In green LED:

ON indicates SDI input signal is present and valid.
OFF indicates no input signal is detected or is invalid.

Vid B In green LED:

ON indicates SDI input signal is present and valid.
OFF indicates no input signal is detected or is invalid.

Ref In green LED:

ON indicates external reference signal is present and valid.
OFF indicates no external reference is detected or is invalid.

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.)

Pwr green LED:

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

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Avenue PC Remote Configuration

The Avenue PC remote control menus for this module are illustrated and explained below. 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.

7925 Avenue PC Menus

The **Input A** menu shown below allows you to configure the following:

- **Input** – Reports the HD input format detected by the module.
- **Reference** – Reports the status of the reference input as either Ref Video In Lock or No Reference.
- **Ref Source** – Use this control to set the reference input source. Select between Master Ref or Video In Ref.
- **Embedded Aud** – Reports which of the four groups are present in the embedded audio on the video input.

Timing B	Global	Memory
Input A	Timing A	Input B
Config A	Config B	Config B
Prc Amp A	Prc Amp B	Prc Amp B
Input	Reference	Ref Source
1080i/59.94	Ref 525 Lock	Master Ref
Embedded Aud		
-- NONE --		

Model 7925 Dual HD Downconverter

The **Config A** menu shown below allows you to configure the following:

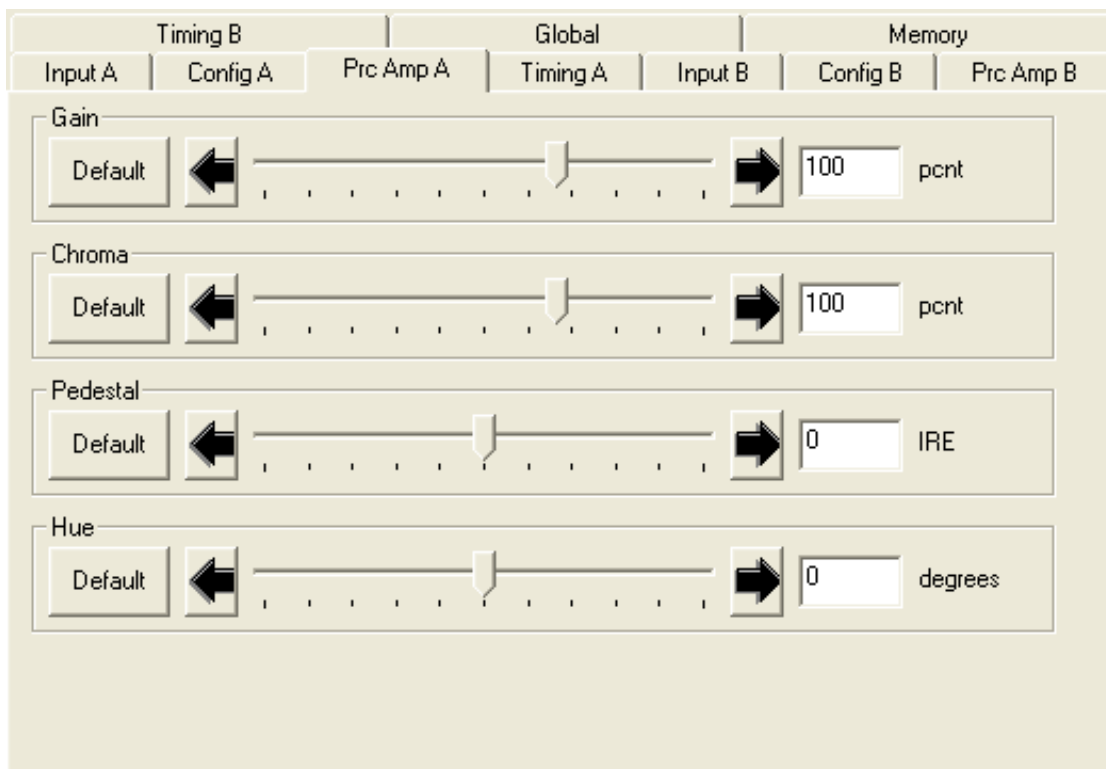
- **Mode** – Use this control to set the aspect ratio for the downconverted SD video output. Choose between Anamorphic, Letterbox 16:9, Letterbox 14:9, Letterbox 13:9, or Center Cut.
- **Detail** – Adjust the amount of picture detail enhancement on the output from Low, Medium, or High.
- **Cpst Out Setup** – Turn setup on the output on or off.
- **Test Pattern** – Select a test pattern to be sent to the video output of the module. Choose Bars, Black or Off.
- **Captions Out** – Use this control to determine if closed captions are passed through to the output. Choose On or Off.
- **Output Embed** – Use this control to determine if audio is embedded into the video output stream. Choose On or Off.
- **Anlg Audio Out** – Use this control to select which channel pair to be routed to the analog output on the module's D connector.

Timing B		Global			Memory	
Input A	Config A	Prc Amp A	Timing A	Input B	Config B	Prc Amp B
Mode Letterbox 16:9		Detail Normal		Cpst Setup On		
Test Pattern Off		Captions Out Off		Output Embed On		
Anlg Audio Out Ch 1/2						

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The **Prc Amp A** 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.



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

- **Fine Phase** – Adjust for proper Sch phase with respect to other sources. If fine phase will not adjust properly, readjust the horizontal phase by up to ± 2 clocks until the fine phase falls into place.
- **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.
- **Delay** – The amount of total delay through the module is reported in lines.

Timing B		Global		Memory		
Input A	Config A	Prc Amp A	Timing A	Input B	Config B	Prc Amp B
Fine Phase						
Default	←				→	0 nsec
Hor Timing						
Default	←				→	0 clocks
Vert Timing						
Default	←				→	0 lines
Delay						
0		Lines				

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The **Input B** menu shown below allows you to configure the following:

- **Input** – Reports the HD input format detected by the module.
- **Reference** – Reports the status of the reference input as either Ref Video In Lock or No Reference.
- **Ref Source** – Use this control to set the reference input source. Select between Master Ref or Video In Ref.
- **Embedded Aud** – Reports which of the four groups are present in the embedded audio on the video input.

Timing B		Global		Memory		
Input A	Config A	Prc Amp A	Timing A	Input B	Config B	Prc Amp B
Input		Reference		Ref Source		
1080i/59.94		Ref 525 Lock		Master Ref		
Embedded Aud						
-- NONE --						

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The **Config B** menu shown below allows you to configure the following:

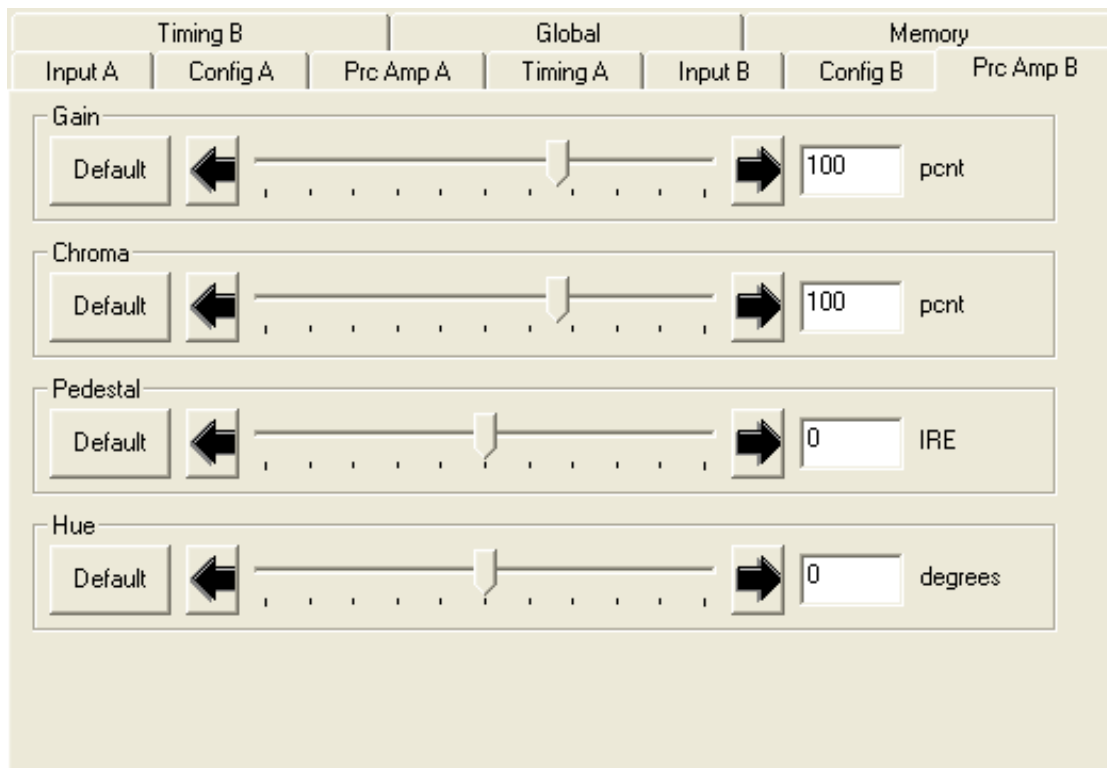
- **Mode** – Use this control to set the aspect ratio for the downconverted SD video output. Choose between Anamorphic, Letterbox 16:9, Letterbox 14:9, Letterbox 13:9, or Center Cut.
- **Detail** – Adjust the amount of picture detail enhancement on the output from Low, Medium, or High.
- **Cpst Setup** – Turn setup on the output on or off.
- **Test Pattern** – Select a test pattern to be sent to the video output of the module. Choose Bars, Black or Off.
- **Captions Out** – Use this control to determine if closed captions are passed through to the output. Choose On or Off.
- **Output Embed** – Use this control to determine if audio is embedded into the video output stream. Choose On or Off.
- **Anlg Audio Out** – Use this control to select which channel pair to be routed to the analog output on the module's D connector.

Timing B		Global			Memory	
Input A	Config A	Prc Amp A	Timing A	Input B	Config B	Prc Amp B
Mode		Detail		Cpst Setup		
Letterbox 16:9		Normal		On		
Test Pattern		Captions Out		Output Embed		
Off		Off		On		
Anlg Audio Out						
Ch 1/2						

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

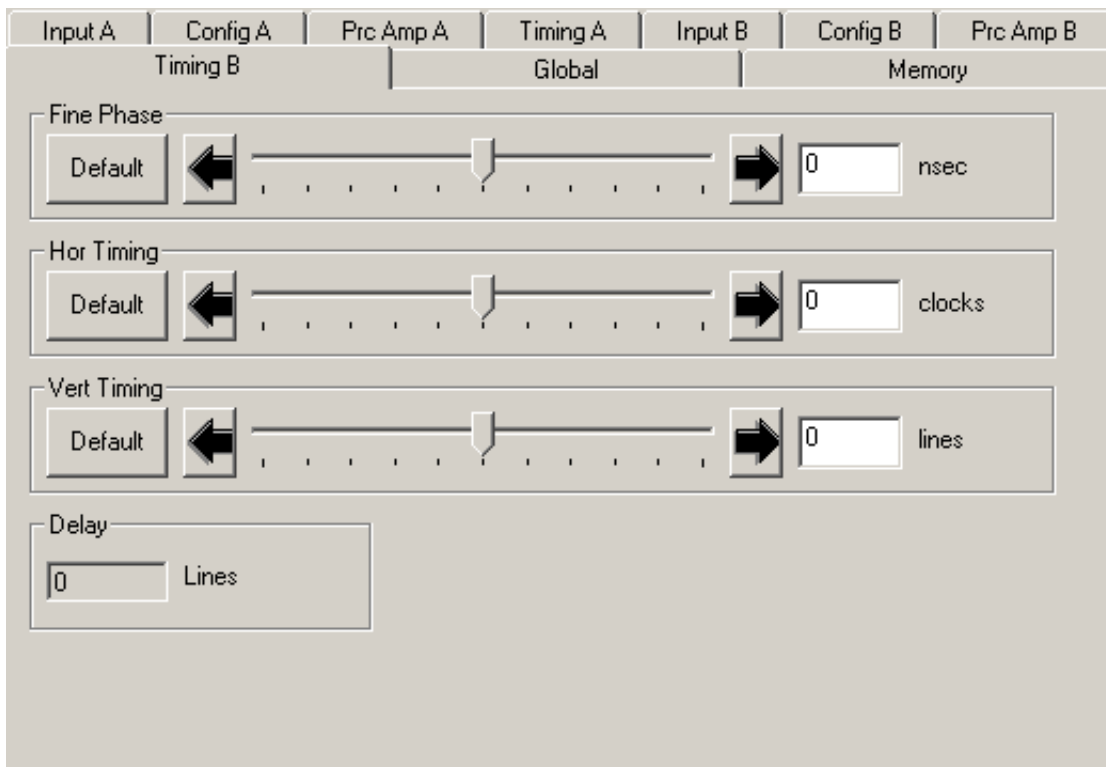
- **Gain** – Adjust the percentage of overall gain (luminance and chrominance).
- **Chroma** – Adjust the percentage of chroma amplitude.
- **Pedestal** – Adjust the pedestal (black) level of the signal in IRE.
- **Hue** – Adjust the hue of the signal ± 180 degrees.



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

- **Fine Phase** – Adjust for proper ScH phase with respect to other sources. If fine phase will not adjust properly, readjust the horizontal phase by up to ± 2 clocks until the fine phase falls into place.
- **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.
- **Delay** – The amount of total delay through the module is reported in lines.



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

- **Audio Dig Ref** – Set the digital reference level for the audio output. Select between -20 or -18 dBFS.
- **Audio Anlg Ref** – Set the analog audio reference level for the audio output. Select between +4, 0, -4, -6, or -10 dB.

Input A	Config A	Prc Amp A	Timing A	Input B	Config B	Prc Amp B
Timing B			Global		Memory	
Audio Dig Ref			Audio Anlg Ref			
-20dBFS			+4 dB			

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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.



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Avenue Touch Screen Remote Configuration

The Avenue Touch Screen remote control menus for this module are illustrated and explained below. 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.

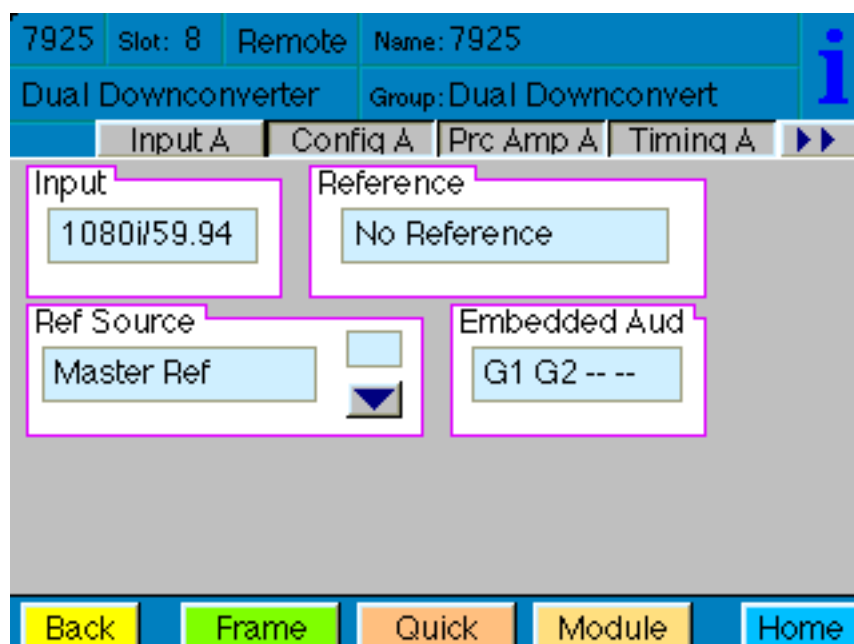
Parameter fields that are grayed out can indicate one of the following conditions:

- 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.

7925 Avenue Touch Screen Menus

The **Input A** menu shown below allows you to configure the following:

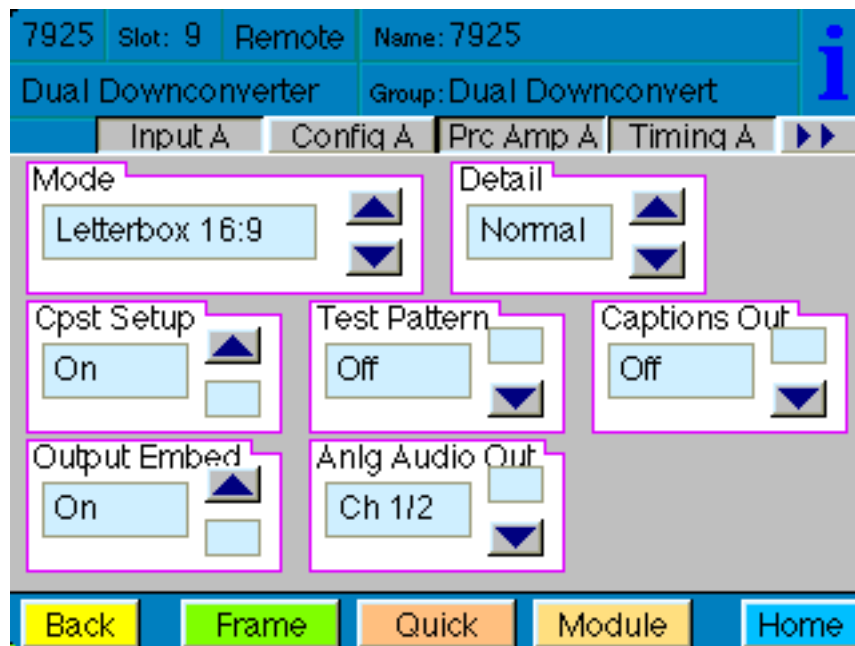
- **Input** – Reports the HD input format detected by the module.
- **Reference** – Reports the status of the reference input as either Ref Video In Lock or No Reference.
- **Ref Source** – Use this control to set the reference input source. Select between Master Ref or Video In Ref.
- **Embedded Aud** – Reports which of the four groups are present in the embedded audio on the video input.



Model 7925 Dual HD Downconverter

The **Config A** menu shown below allows you to configure the following:

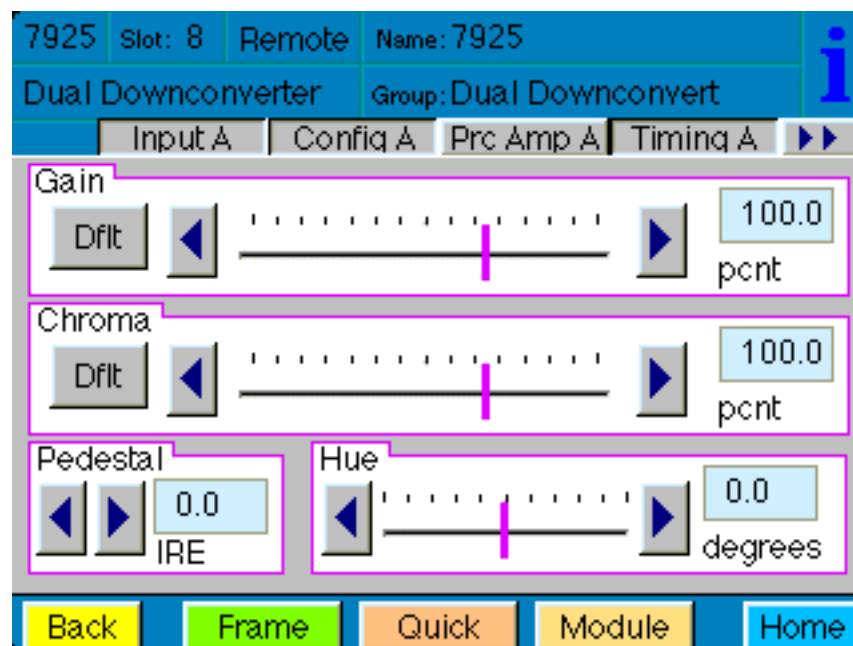
- **Mode** – Use this control to set the aspect ratio for the downconverted SD video output. Choose between Anamorphic, Letterbox 16:9, Letterbox 14:9, Letterbox 13:9, or Center Cut.
- **Detail** – Adjust the amount of picture detail enhancement on the output from Low, Medium, or High.
- **Cpst Out Setup** – Turn setup on the output on or off.
- **Test Pattern** – Select a test pattern to be sent to the video output of the module. Choose Bars, Black or Off.
- **Captions Out** – Use this control to determine if closed captions are passed through to the output. Choose On or Off.
- **Output Embed** – Use this control to determine if audio is embedded into the video output stream. Choose On or Off.
- **Anlg Audio Out** – Use this control to select which channel pair to be routed to the analog output on the module's D connector.



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

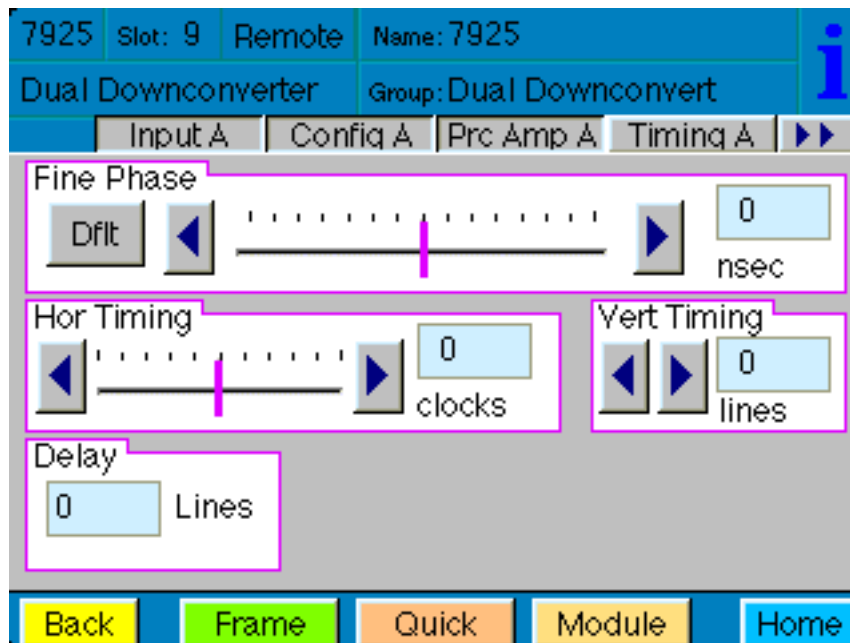
- **Gain** – Adjust the percentage of overall gain (luminance and chrominance).
- **Chroma** – Adjust the percentage of chroma amplitude.
- **Pedestal** – Adjust the pedestal (black) level of the signal in IRE.
- **Hue** – Adjust the hue of the signal ± 180 degrees.



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

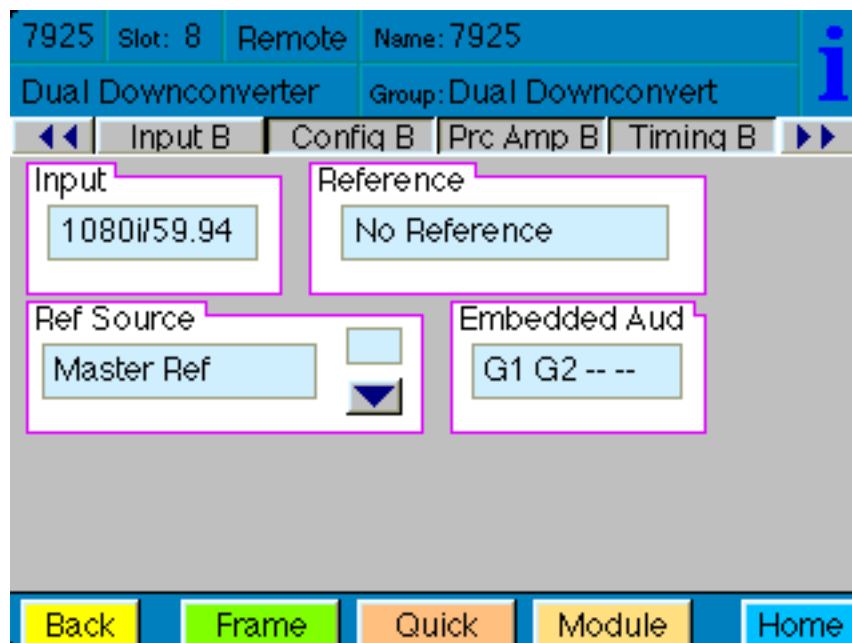
- **Fine Phase** – Adjust for proper ScH phase with respect to other sources. If fine phase will not adjust properly, readjust the horizontal phase by up to ± 2 clocks until the fine phase falls into place.
- **Hor Timing** – Adjust the horizontal timing of the output signal to place the leading edge of sync coincident with other sources.
- **Vertical Timing** – Set the vertical timing to a typical setting of 0 lines.
- **Delay** – The amount of total delay through the module is reported in lines.



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The **Input B** menu shown below allows you to configure the following:

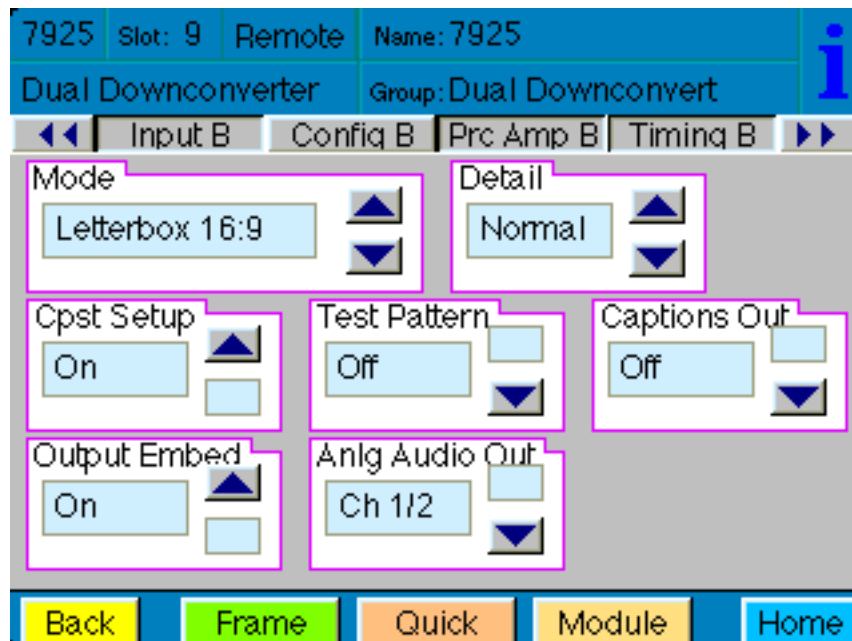
- **Input** – Reports the HD input format detected by the module.
- **Reference** – Reports the status of the reference input as either Ref Video In Lock or No Reference.
- **Ref Source** – Use this control to set the reference input source. Select between Master Ref or Video In Ref.
- **Embedded Aud** – Reports which of the four groups are present in the embedded audio on the video input.



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The **Config B** menu shown below allows you to configure the following:

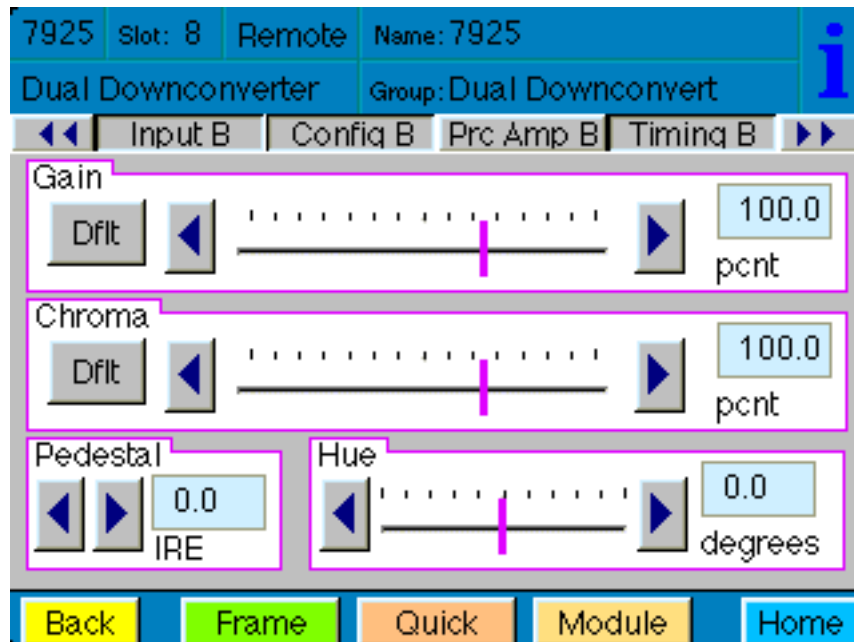
- **Mode** – Use this control to set the aspect ratio for the downconverted SD video output. Choose between Anamorphic, Letterbox 16:9, Letterbox 14:9, Letterbox 13:9, or Center Cut.
- **Detail** – Adjust the amount of picture detail enhancement on the output from Low, Medium, or High.
- **Cpst Setup** – Turn setup on the output on or off.
- **Test Pattern** – Select a test pattern to be sent to the video output of the module. Choose Bars, Black or Off.
- **Captions Out** – Use this control to determine if closed captions are passed through to the output. Choose On or Off.
- **Output Embed** – Use this control to determine if audio is embedded into the video output stream. Choose On or Off.
- **Anlg Audio Out** – Use this control to select which channel pair to be routed to the analog output on the module's D connector.



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

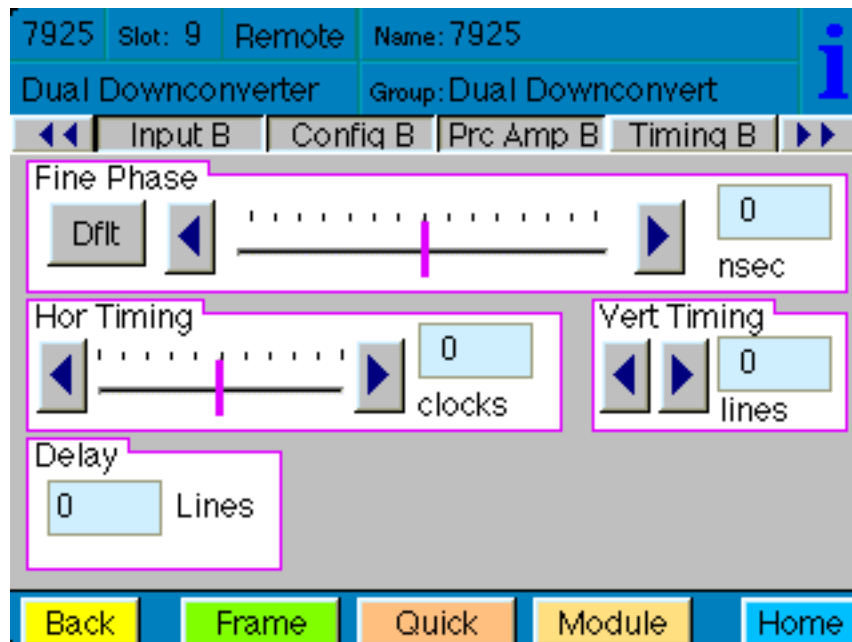
- **Gain** – Adjust the percentage of overall gain (luminance and chrominance).
- **Chroma** – Adjust the percentage of chroma amplitude.
- **Pedestal** – Adjust the pedestal (black) level of the signal in IRE.
- **Hue** – Adjust the hue of the signal ± 180 degrees.



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

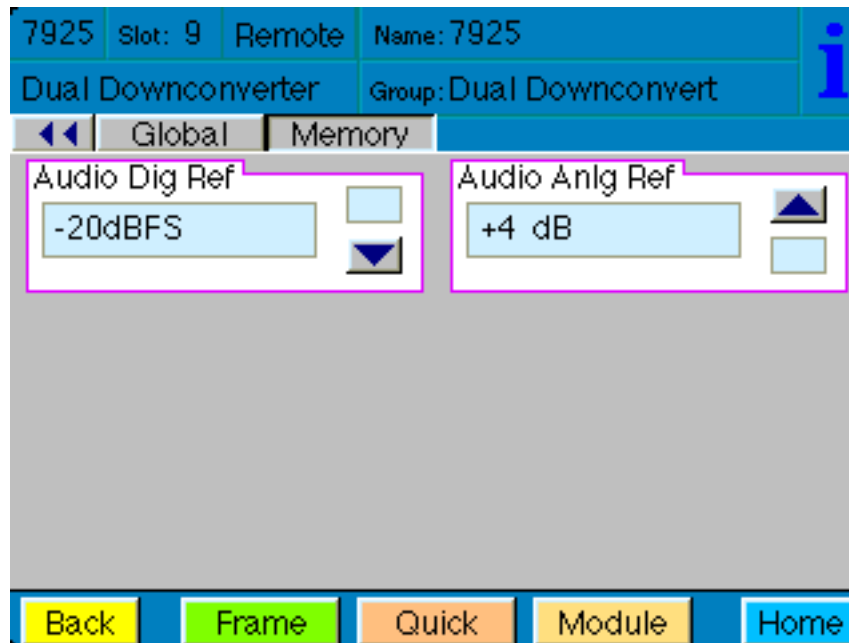
- **Fine Phase** – Adjust for proper ScH phase with respect to other sources. If fine phase will not adjust properly, readjust the horizontal phase by up to ± 2 clocks until the fine phase falls into place.
- **Hor Timing** – Adjust the horizontal timing of the output signal to place the leading edge of sync coincident with other sources.
- **Vertical Timing** – Set the vertical timing to a typical setting of 0 lines.
- **Delay** – The amount of total delay through the module is reported in lines.



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

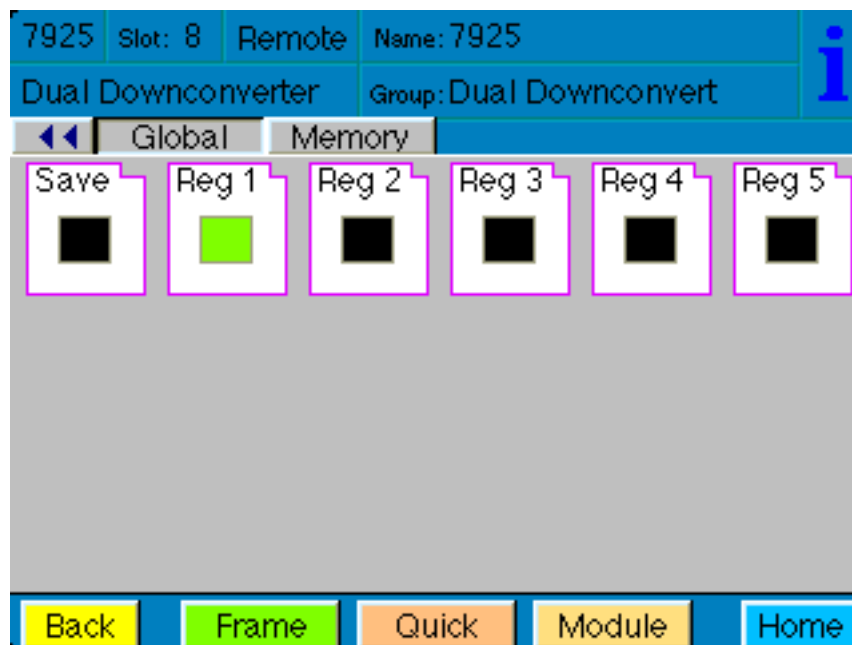
- **Audio Dig Ref** – Set the digital reference level for the audio output. Select between -20 or -18 dBFS.
- **Audio Anlg Ref** – Set the analog audio reference level for the audio output. Select between +4, 0, -4, -6, or -10 dB.



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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.



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TROUBLESHOOTING

As a troubleshooting aid, the signal presence, power and CPU status can be easily monitored from the front panel of this module using the indicators explained in the Front Panel Switches and Indicators section.

The following status items can be monitored using the Avenue Touch Screen Control Panel, Express Panel, or PC Application:

- Input Status
- Slot ID, Software Version and Board Revision

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

No status lights are lit on front panel:

- Check that frame power is present (green LED{s} on frame power supplies).
- Check that module is firmly seated in frame. Try removing it and plugging it in again.

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.
- System module may not be working properly if installed.

No video or audio signal out of module:

- Check status of In green LEDs. If not lit, check the input signal for presence and quality.
- Check cabling to input of module.

You may also refer to the technical support section of the Ensemble 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

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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.

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SPECIFICATIONS

Serial Digital Input

Number	Two (one per channel)
Signal Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M
Impedance	75 Ohm, BNC
Return Loss	>15 dB
Max Cable Length	100 meter Belden 1694A

Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz
525i 59.94, 625i 50

Conversion Directions

Downconversion from
1080i/59.94, 720p/59.94, 1080p/23.98, 1080sF/23.98 to
525 (NTSC), or
1080i/50, 720p/50, 1080p/25, 1080sF/25 to
625 (PAL)

Reference Input

Number	One internal (frame master ref BNC)
Signal Type	PAL or NTSC composite video or HD Tri-Level Sync

HD Serial Digital Output

Number	Four (two per channel)
Signal Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M, SD Serial Digital 270 Mb/s SMPTE 259M, (Both 525 and 625 SD standards)
Impedance	75 Ohms
Return Loss	>15 dB
Output DC	None (AC coupled)
Delay	0 for HD outputs

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SD Serial Digital Output

Number	Four max Jumper selectable, BNCs shared with composite outputs Each channel has two SD outputs, selectable as two SD SDI, or two composite, or one SD SDI and one composite
Signal Type	SD Serial Digital 270 Mb/s SMPTE 259M (Both 525 and 625 SD standards)
Impedance	75 Ohms
Return Loss	>15 dB
Output DC	None (AC coupled)
Delay	16.6 msec in 59.94 Hz systems 20 msec in 50 Hz systems

Analog Video Output

Number	Four max Jumper selectable, BNCs shared with composite outputs Each channel has two SD outputs, selectable as two SD SDI, or two composite, or one SD SDI and one composite
Signal Type	PAL or NTSC composite
Impedance	75 Ohms
Return Loss	>40 dB
Output DC	<50 mV
Resolution	16 bit processing
Signal to Noise	>65 dB
Frequency Response	± 0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase error	< ± 2 degrees
Differential Phase	<1 degree
Differential Gain	<1%
Delay	16.6 msec in 59.94 Hz systems 20 msec in 50 Hz systems

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Analog Audio Output

Number	Two (selectable from sixteen)
Signal Type	Balanced, transformerless
Impedance	30 Ohms
Maximum Output Level	24 dBu
Resolution	24 bits, 128x Oversampled
Reference Level	-10 dBu to +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 kHz
Crosstalk	<102 dB
Dynamic Range	>106 dB
Delay	Automatic to match video processing

Embedded Output

Support for all four groups (16 channels) from input to output. Audio in SD output is delayed appropriately to compensate for conversion.

General Specifications

Power Consumption	10 watts
Temperature Range	0 to 40°C ambient (all specs met)
Relative Humidity	0 to 95%, noncondensing
Altitude	0 to 10,000 ft