

AVENUE

Avenue™ signal integration system

Model 7420 HD/SD Logo Inserter Data Pack

ENSEMBLE

D E S I G N S

Revision 1.1 SW v2.2.5

This data pack provides detailed installation, configuration and operation information for the **7420 HD/SD Logo Inserter** module as part of the Avenue Signal Integration System. You may also want to refer to the **Avenue Logo HD Application Data Pack**.

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

- Module Overview
- Product Applications
- Installation
- Cabling
- Module Configuration and Control
 - Front Panel Controls and Indicators
 - Avenue PC Remote Control
 - Avenue Touch Screen Remote Control
- Keying Tutorial
- Troubleshooting
- Software Updating
- Warranty and Factory Service
- Specifications

MODULE OVERVIEW

HD and SD Logo Insertion and Branding

The 7420 is a dual rate logo inserter that can accept either an SD or HD video input and key still logos and animations over program material. The logo insertion capability can be used to add letterbox framing. It can also be used to key sports or event logos, or to source a virtual set background. The on-board memory can play back almost a minute of uncompressed video. Alternately, the 7420 can supply separate fill and key outputs to a production switcher for keying there.

Handy Flash Memory

The 7420 is fitted with a Secure Digital flash memory card in order to provide an extremely fast and easy way to transfer material. This is a particularly convenient method for pre-building material off-line. Simply transfer logos and animations to a Secure Digital flash memory card using a standard card reader, then insert into the 7420.

The 7420's flash memory card can be removed and reinstalled without interrupting logo playback. The flash memory card is used for transfer while the actual logo and animation playback comes from the 7420's DDR2 memory.

Linear Keying

7420 provides two cascaded, full linear keyers with transparency and programmable transition rate. Each keyer is independently controllable and each has independent access to up to 2 GB of stored video and sound files.

Standard configuration is Keyer 1 and 2 each populated with 512 MB of DDR2 (SODIMM) memory. Users can upgrade to 2 GB of DDR2.

Audio Support (Not yet implemented)

Sounds and voice-overs can be associated with logos and clips. Each keying channel can play back a stereo sound file simultaneously with video. Audio is mixed into the user-selected output channel. Faders and unders (audio ducking) are programmable and can be sequenced.

The 7420 supports all sixteen channels of embedded audio. Compensation delay is provided in the audio path when one of the 7490 series options is being used.

Avenue Logo Authoring Environment

The Avenue Logo authoring environment provides a means to import graphics, animations and sound files. Video files are converted to the appropriate SD or HD color space, adjusted for proper aspect ratio, and organized in a form suitable to download into the 7420. Lossless compression ensures logos, animations and clips look as good in the program output as when they were created. The authoring system allows importing sound files which can be associated with one or more still or animated logos. Video and audio files are associated through the Avenue Logo Playback Sequence interface. Avenue Logo software can be provided to your clients so they can build sports or event logos off-line.

Upconversion and Logo Insertion with One Module

You can bring in SD background material, upconvert to HD, key logos, and output HD – all with one module. The 7490 series sub module options for the 7420 provide HD upconversion, downconversion, cross conversion and aspect ratio conversion. When the 7490 is installed, simply set the 7420 to output the facility’s preferred HD or SD standard. The 7420 will accommodate whatever input provided – any type of SD SDI or HD SDI signal. After setting the output standard, the input will be converted to the correct standard, logos and animations will be keyed, and the program out will be in the correct standard for the facility.

Control

Playback of sequences can be issued through a variety of methods. All Avenue modules can be accessed via ethernet with Avenue Logo software, Avenue PC software, or through third party support using TCP/IP or SNMP protocols. Automation interfaces can be made through the ethernet port or through a simple ASCII protocol via the RS-232 port specific to the module. Single GPI contact closures can be used to initiate program sequences.

Sub Module Options for the 7420

7490 Up/Down/Cross Converter

This option offers total flexibility. Simply set the HD or SD output standard desired. Then feed any SD SDI or HD SDI signal to the input. Up, down, cross, or aspect ratio conversion is automatic. Use logo insertion capability to add letterbox framing.

7491 Upconverter

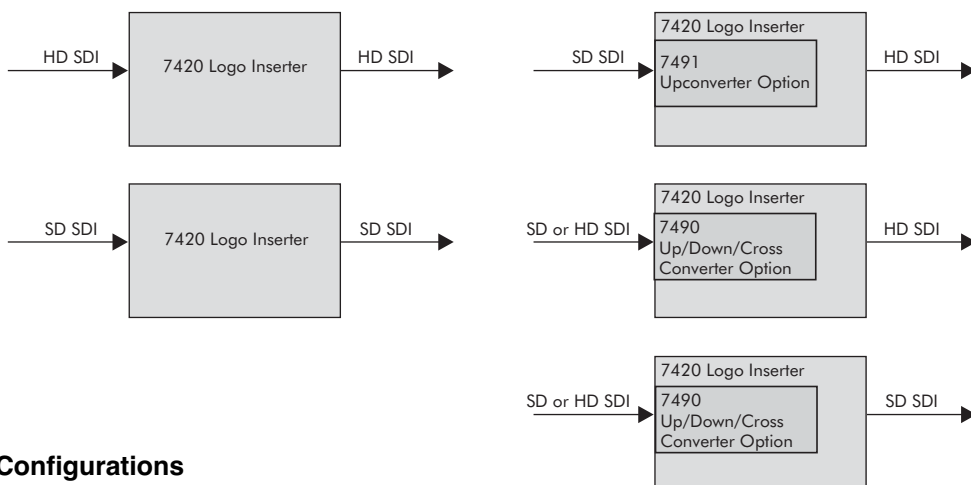
This option provides a very cost-effective, convenient way to handle both branding and upconverting to HD. Feed an SD SDI or HD SDI input to the module and output HD SDI in your selected standard.

7492 Downconverter

Feed an HD SDI input to the module and get an SD SDI output.

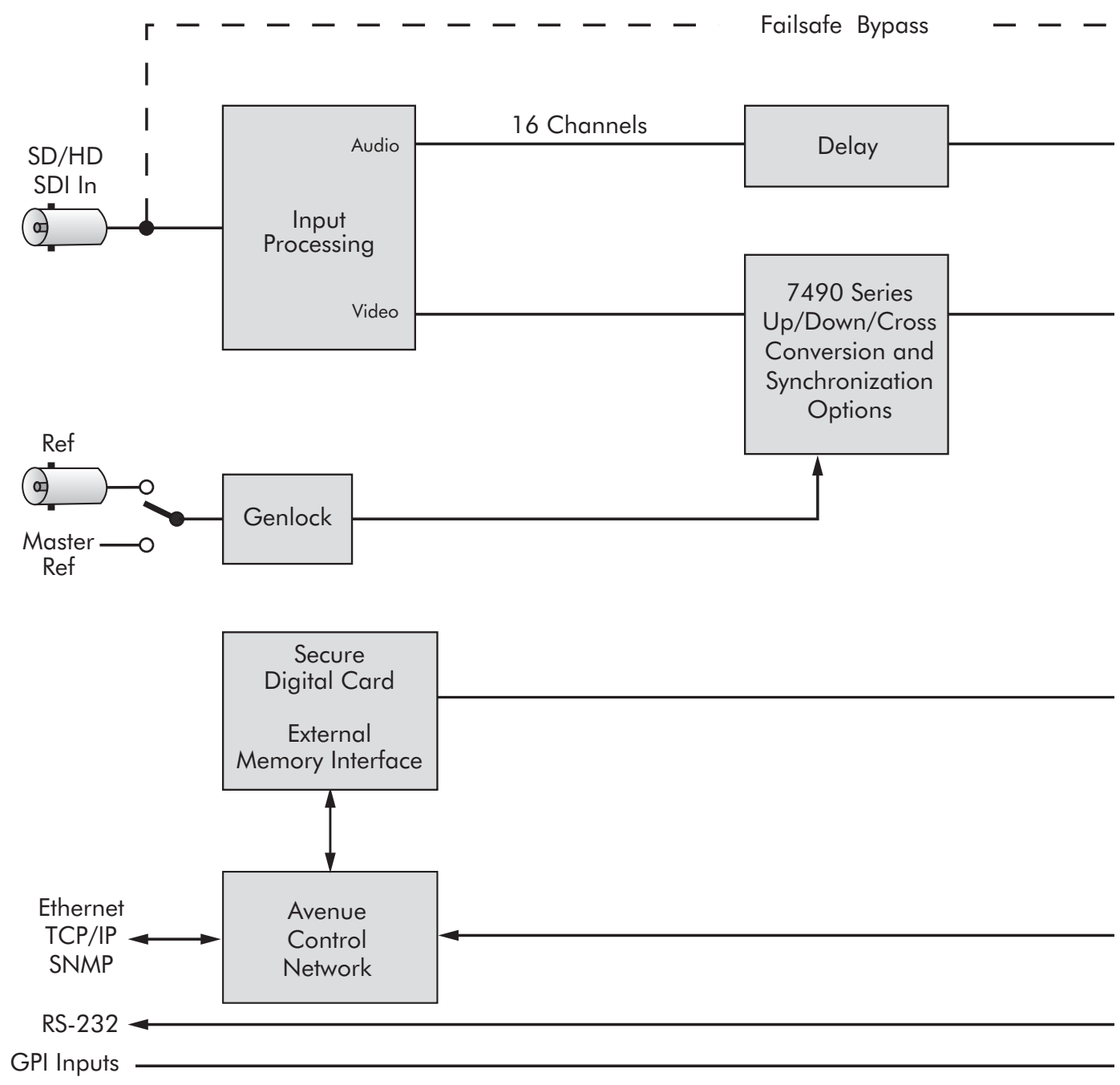
7494 Aspect Ratio Converter

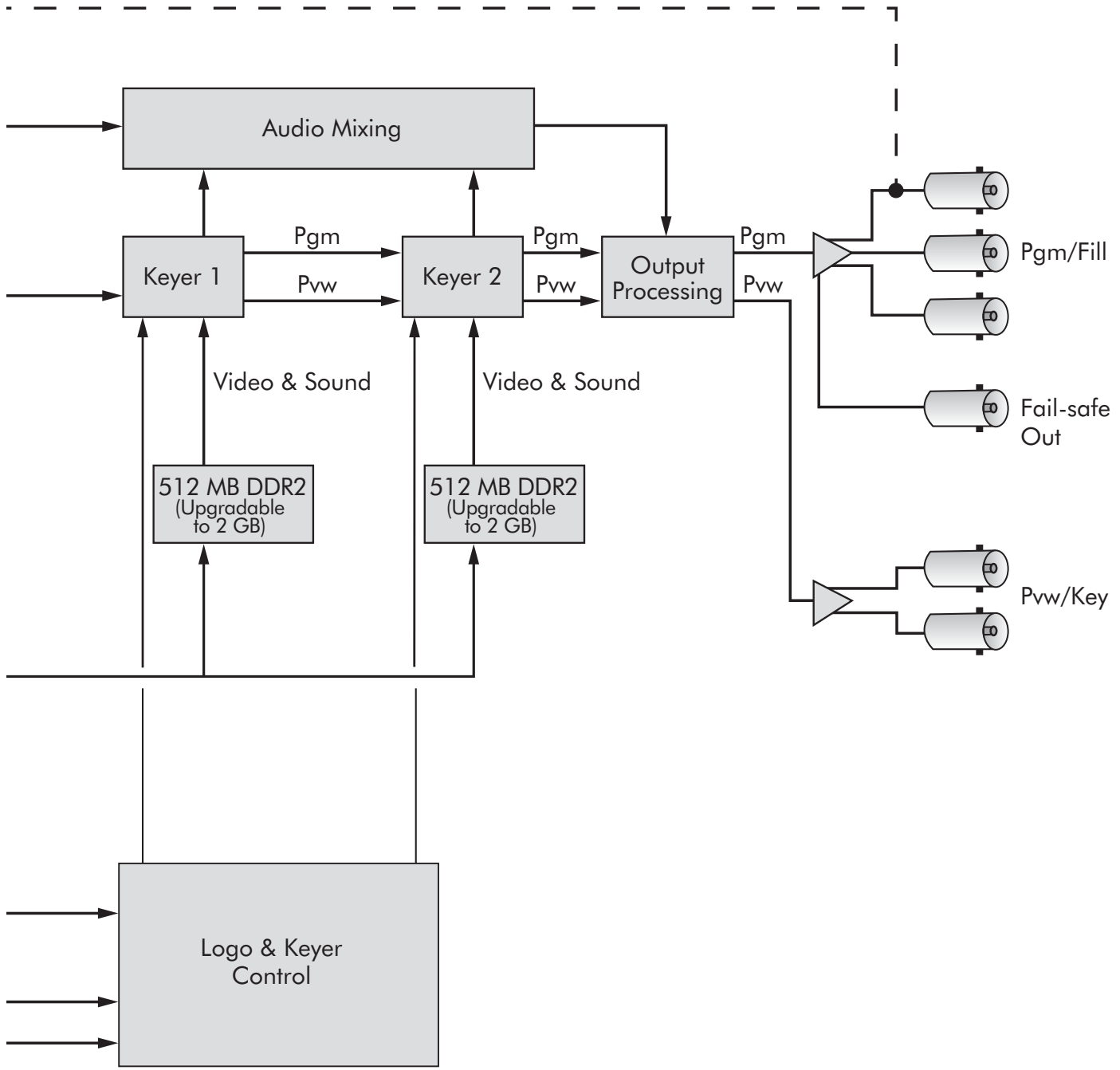
Feed a 4:3 SD SDI signal to the input and get a 16:9 SD SDI output.
Or the reverse, 16:9 to 4:3.



7420 Configurations

7420 HD/SD Logo Inserter Block Diagram





APPLICATIONS

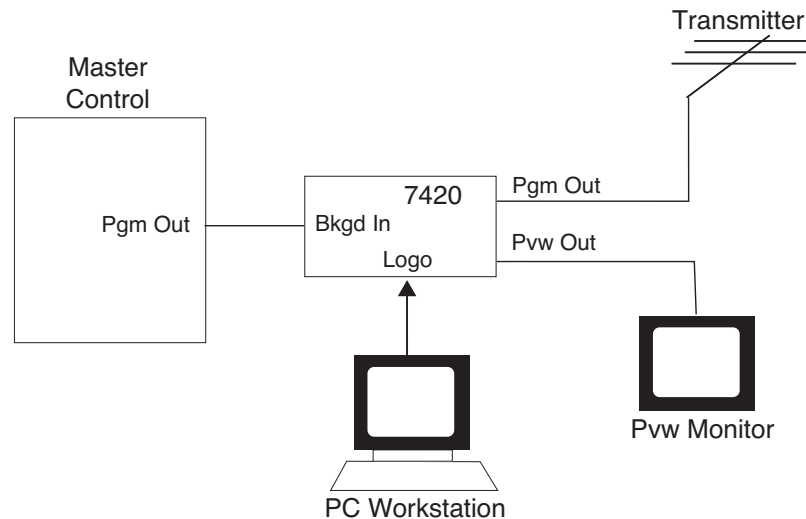
The 7420 module can be used in many ways to take advantage of its versatility:

- Key still or animated station and channel ID
- Key sports or event logos and animations with associated audio clips
- Add letterbox framing for HD
- Source a virtual set background
- Custom full-field test patterns/zone plates
- One 7420 can be a source for two simultaneous Trouble “Slides”

The 7420 module can operate in Program/Preview mode, Fill/Key mode, or Dual Channel mode. Examples of typical applications are given here.

Program/Preview Mode

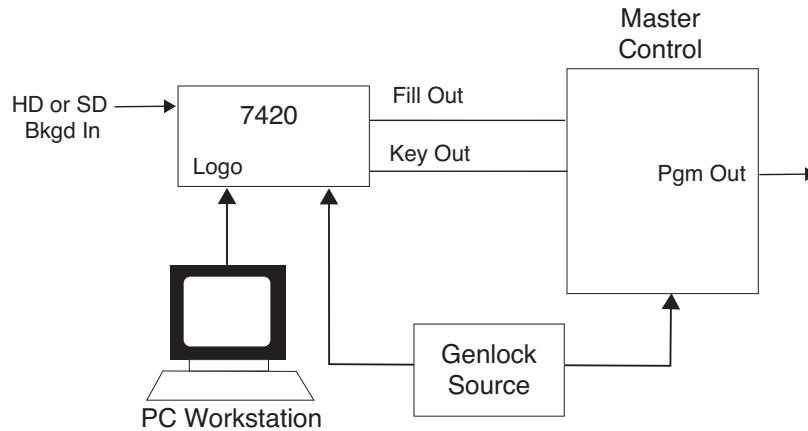
When the module is configured for Program/Preview mode (the most common use), a serial digital signal from a device such as a Master Control switcher can be connected to the input and a graphic or logo from a PC workstation can be inserted over the background to provide the final video as shown in the example below. The PGM outputs can be fed to the transmitter and other destinations. The PVW outputs show what the next transition will be.



Using the 7420 in Program/Preview Mode

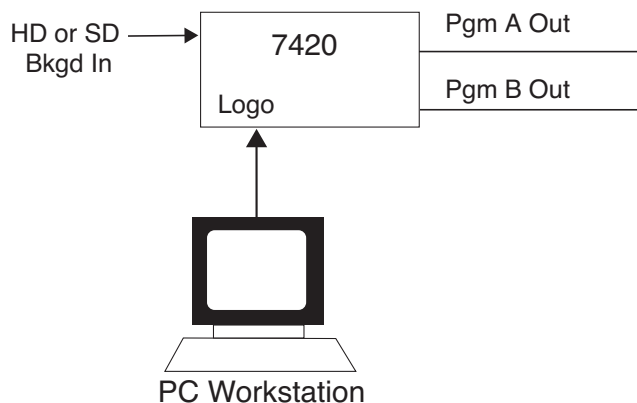
Fill/Key Mode

When the module is configured for Fill/Key mode separate Fill and Key signals are provided to feed a Master Control switcher as an input source, in a similar manner as a character generator. The 7420 can be genlocked to an external reference to match the timing of the Master Control device as shown below.



Dual Channel Mode

When the module is configured for Dual Channel Mode the module has two independent keyers, each with an independent output. As shown in the diagram below, the background input feeds both keyers. Alternately, the internal matte generator could be selected as the background for either or both of the keyers. Each keyer has unique key and fill material for keying. Output 1 provides the program out for Keyer 1. Output 2 provides the program out for Keyer 2.



Using the 7420 in Dual Channel Mode

INSTALLATION

Plug the 7420 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.

CABLING

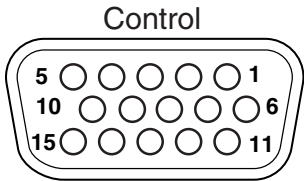
Refer to the 3RU and 1RU backplane diagrams of the module on the following page for cabling instructions. Note that unless stated otherwise, the 1RU cabling explanations are identical to those given in the 3RU diagram.

Control Devices

In addition to GPI access through the control system, the module provides eight GPI input contact closures and control from a dedicated serial port both accessible through the 15-pin D **Control** connector on the corresponding rear slot of the frame.

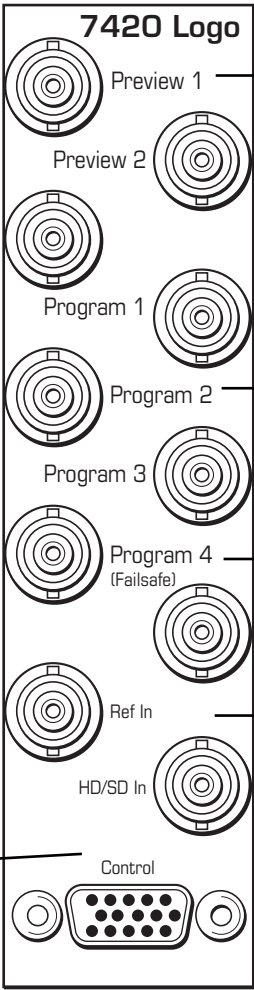
Three types of devices can control the eight GPI inputs to the **7420** module; the Avenue 5815 GPI Control Panel, a customer-supplied GPI device and an external device (such as a PC) using a Serial port connection. Connection of the 5815 GPI Control Panel and the GPI device to the 7420 module and the cable pinouts for each application are given in the next sections. Refer to Appendix A for the details for connecting an external device such as a PC, including the serial protocol.

3RU Backplane



Pin	Function
1	RX +
2	RX -
3	Gnd
4	TX -
5	TX +
6	Gnd
7	GPI 8
8	GPI 7
9	GPI 6
10	GPI 5
11	GPI 4
12	GPI 3
13	Gnd
14	GPI 2
15	GPI 1

Pinouts for the 15-pin **Control** connector for serial control and GPI inputs are given above.



Connect the **Preview 1 and 2** output BNCs to serial destinations.

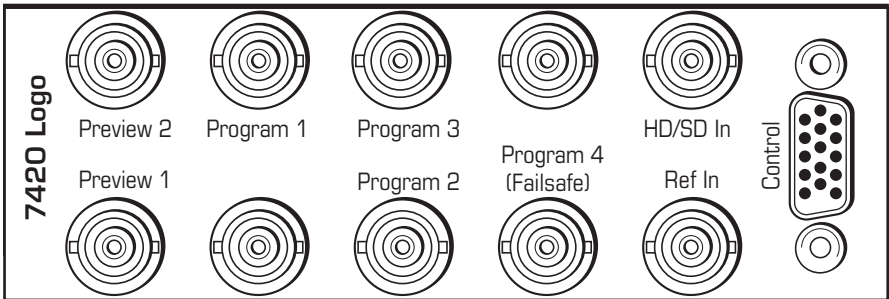
Connect the **Program 1 - 4** output BNCs to serial destinations.

The **Program 4** output BNC provides a failsafe output in the case of a power failure.

Connect an external genlock reference signal to the **Ref In** BNC if required.

Connect the Background video signal to the **HD/SD In** BNC.

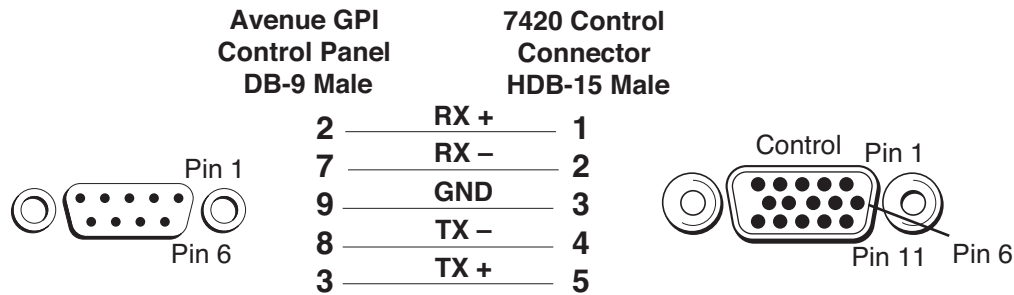
1RU Backplane



Avenue GPI Remote Control Panel

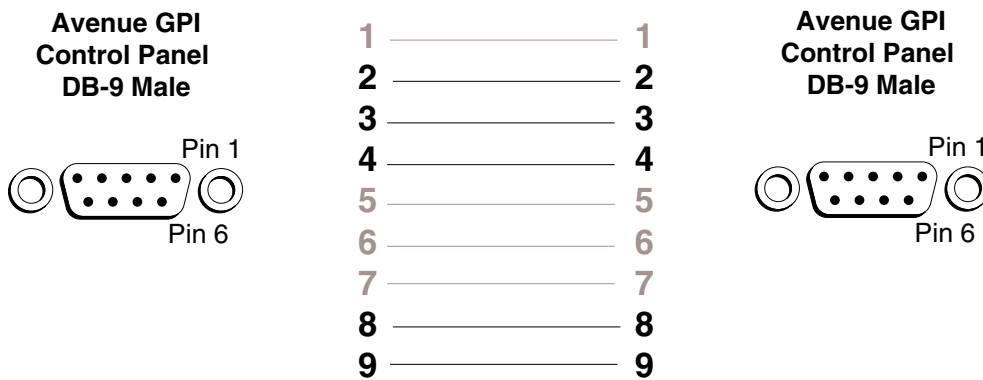
Connect an Avenue 5815 GPI Control Panel from the rear of the control panel (either DB 9-pin male) to the **Control** connector on the rear of the 7420 module (HDB 15-pin male). The pinout for this connecting cable is given below.

The 5815 GPI Control Panel can be rack-mounted in a standard 19 inch equipment rack. Connect the universal in-line power supply provided to the connector at the left rear of the GPI panel. The power supply is auto-sensing and requires no adjustments.



Avenue GPI Remote Control Panel to Avenue Frame Pinout

Up to eight Avenue 5815 GPI Control Panels can be connected in parallel for GPI control. Panels are connected together via the DB 9-pin loop-through connectors on each panel. The cable to connect each panel is a DB 9-pin male to DB 9-pin male with straight pin-to-pin connections as shown in the illustration below. This cable may be purchased at any electronics supply store or constructed from the diagram. Note not all pins are necessary for control panel connection but all pins can be connected.



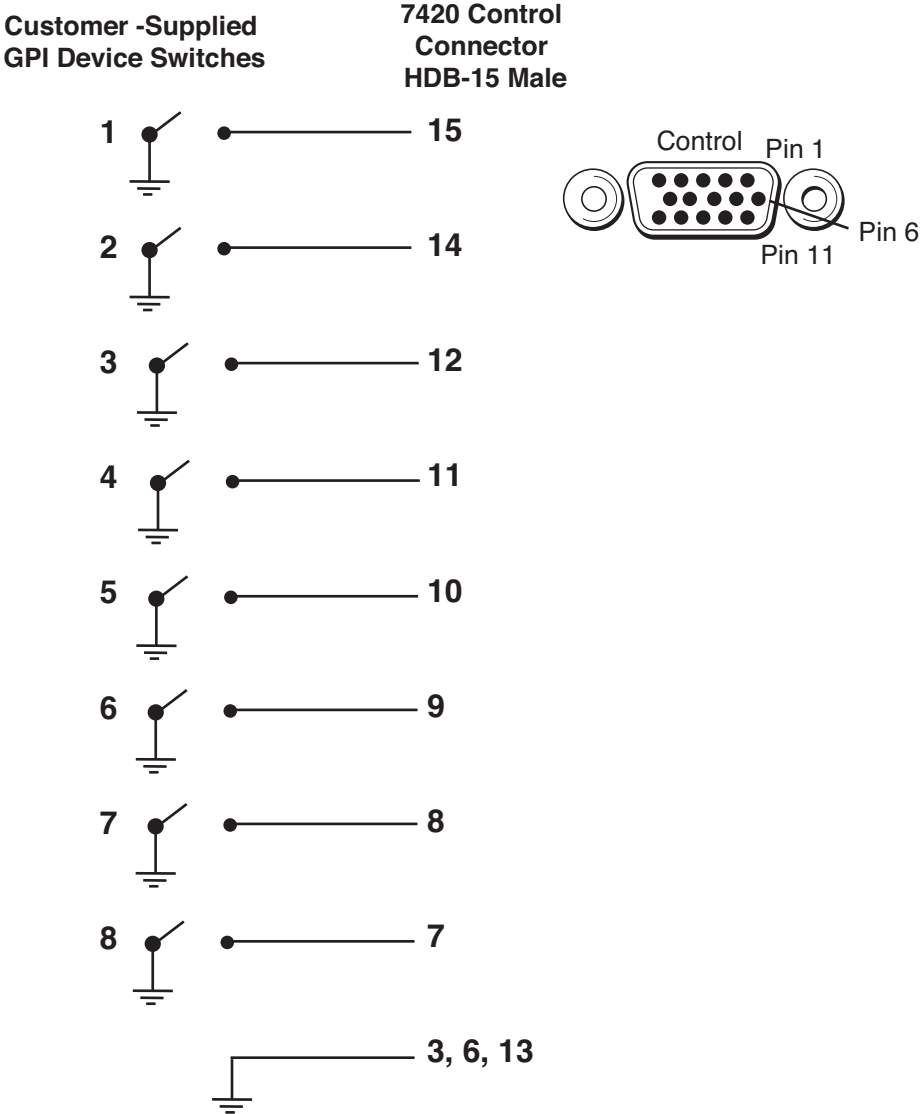
Only bolded pins are necessary for control panel communication, however, all pins may be connected.

Avenue GPI Remote Control Loop-through Pinout

GPI Control

An external customer-supplied GPI device can be connected to the rear of the 7420 module to control any of the eight GPI inputs.

Connect the GPI control device to the 7420 **Control** connector pins as shown below. Each GPI pushbutton should be wired with closure to ground to trigger a crosspoint.



Customer-supplied GPI Device to Avenue Frame Pinout

5815 GPI Control Panel Operation

The GPI inputs to the 7420 module can control up to eight logos or animation sequences defined as events using the remote control menus. The configured inputs can then be triggered with the Avenue 5815 GPI Control Panel shown below. Up to eight control panels can be installed in parallel as explained earlier in this data pack.

Assign logos or animation sequences to each of the eight GPI inputs using Avenue PC or the Touch Screen control menus as explained in the next sections. When one of the eight pushbuttons is selected, the event assigned to that input will be placed on air according to



5815 GPI Control Panel

the parameters (in and out transition time, density, horizontal and vertical position) configured with the remote control menus or with the Avenue Logo application.

Serial Control

The 7420 HD/SD Logo Inserter module has a serial interface port which supports a command protocol for remote control of the eight GPI selections. This serial port is used by the optional Avenue 5815 GPI Control Panel or an external GPI control device. The port can also be used by external devices such as a PC to control the GPI inputs.

Refer to the pinout information shown previously for the cable needed to connect a PC or other device to the serial port of the module. The port can be cabled to support either RS-422 or RS-232 signaling levels.

The details for the serial protocol are outlined below.

The communication standard for this port is as follows:

Data Rate: 38.4 Kbaud

Start Bits: 1

Stop Bits: 1

Parity: None

The command and status messages for this port are in plain ASCII form, with each command or message terminated with a carriage return (shown as <cr> below).

Commands to the module are as follows:

Fire GPI Command

Syntax: G1 <cr>

This will fire GPI 1.

The module will respond with a single status message:

Syntax: S1 <cr>

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. This module has no local front panel configuration controls.

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

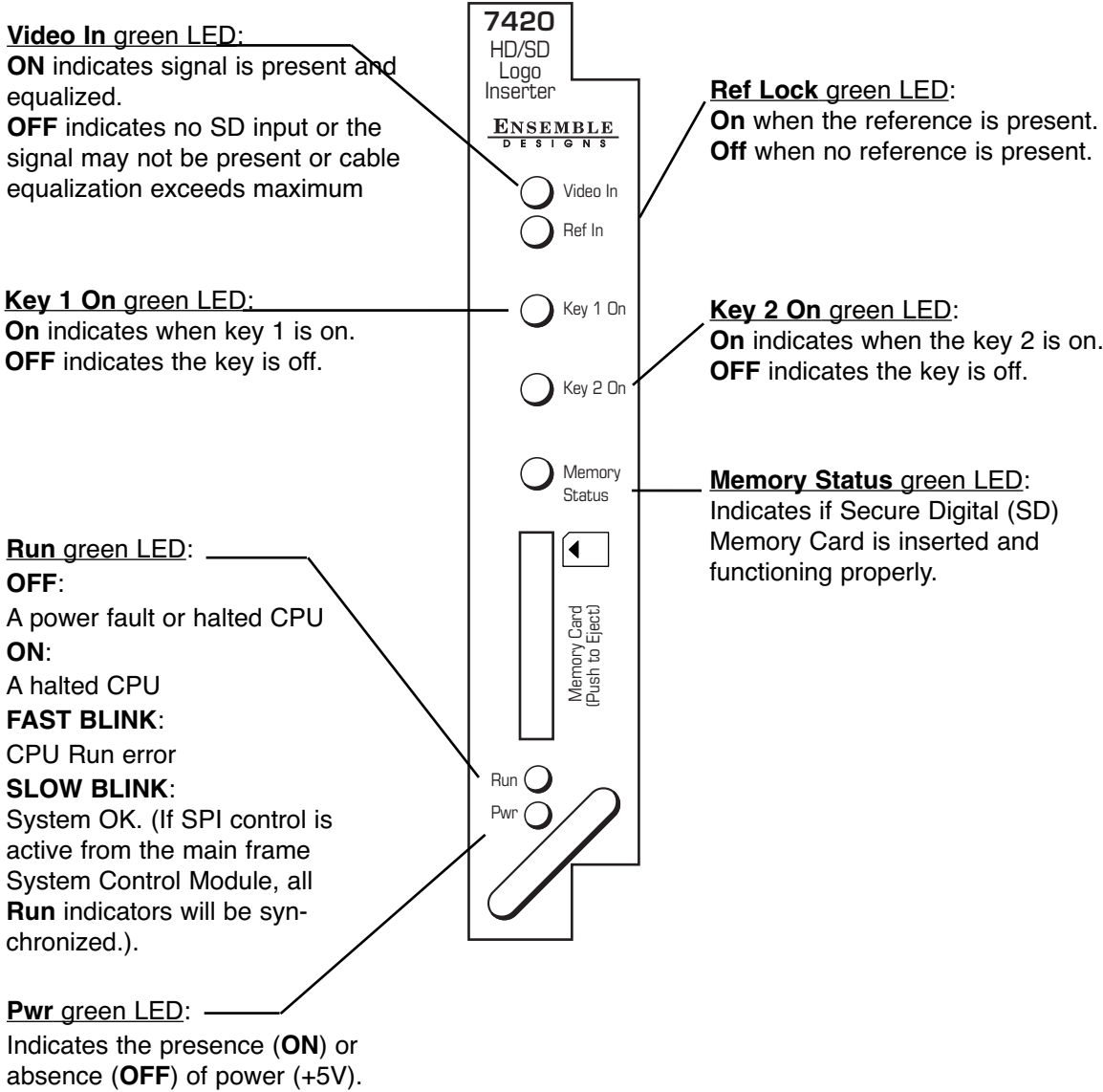
For setting the parameters using the Avenue Touch Screen option, refer to the **Avenue Touch Screen** operating section in the Avenue System Overview section.

For setting the parameters using Avenue Logo HD Application Software, refer to the **Avenue Logo HD Application Data Pack**. It includes information on the following topics:

- Creating A New Project
- Adding Assets (logos, animations and audio clips)
- Adjusting Crop Settings and Key Settings
- Creating Events
- Outputting Projects to the 7420 module

Front Panel Controls and Indicators

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



Avenue PC Remote Configuration

The Avenue PC remote control status menus for this module are illustrated and explained below. For more information on using Avenue PC, refer to the Avenue PC Control Application Software data pack that came with the option.

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.

For information on installing and using the Avenue Logo HD application for loading logos, animations and audio clips to the module, refer to the Avenue Logo HD data pack and CD that accompanies the 7420 module.

7420 Avenue PC Menus

The **Program A** menu screen shown below allows you to control the two keyers, select Cut or Mix, and set the transition Rate (or duration). **Program A** is output on the BNCs labeled Program 1, Program 2, Program 3, and Program 4.

When the module is in Pgm/Pvw Mode or Key/Fill Mode, then the **Program A** menu is similar in functionality to the Cut and Mix buttons on a production switcher.

The following are examples of how to use the Program A menu:

If Key 1 is on and you want to cut it off, press Cut 1. If Key 1 is off and you want to cut it on, press Cut 1.

If Key 1 and Key 2 are both off and you want to cut them on together, press Cut All.

If Key 1 is on and Key 2 is off and you want to swap so that Key 1 is off and Key 2 is on, press Cut All.

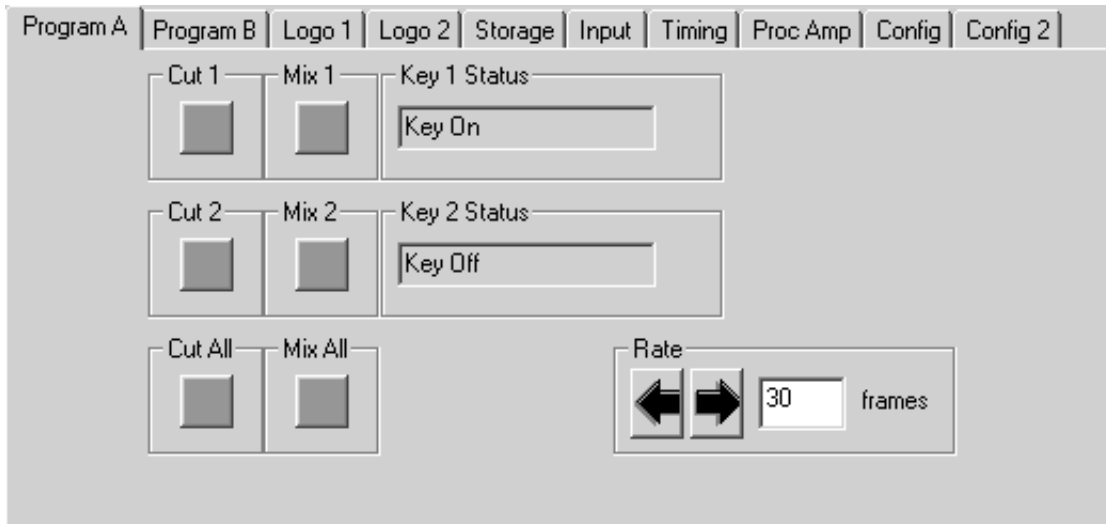
If Key 1 is off and Key 2 is on and you want to transition so that Key 1 is on and Key 2 is off, press Mix All.

- **Cut 1** – Push the Cut 1 button to cut Key 1 on or off.
- **Mix 1** – Push the Mix 1 button to mix Key 1 on or off.
- **Key 1 Status** – indicates the status of Key 1. Possible values are: Key On, Key Off, Mix On, and Mix Off. Mix On or Mix Off appears while the transition is occurring.
- **Cut 2** – Push the Cut 2 button to cut Key 2 on or off.
- **Mix 2** – Push the Mix 2 button to mix Key 2 on or off.
- **Key 2 Status** – indicates the status of Key 2. Possible values are: Key On, Key Off, Mix On, and Mix Off. Mix On or Mix Off appears while the transition is occurring.
- **Cut All** – Push the Cut All button to cut both Key 1 and Key 2. If Key 1 and Key 2 are off, pushing Cut All will cut them both on. If Key 1 and Key 2 are on, pushing Cut All will cut them both off. If Key 1 is on and Key 2 is off, pushing Cut All will

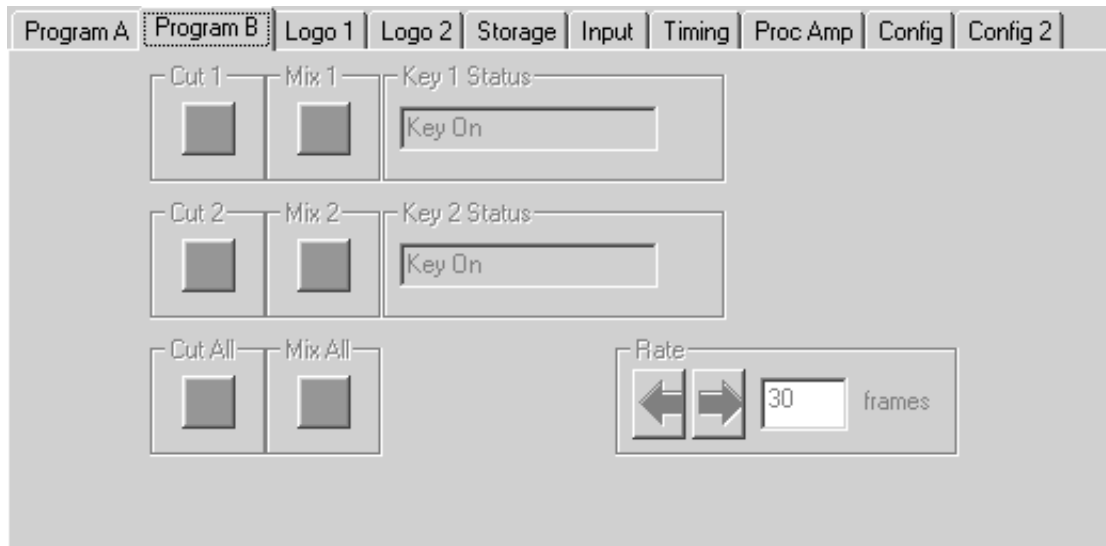
cut Key 1 off and cut Key 2 on.

- **Mix All** – Push the Mix All button to transition both Key 1 and Key 2. If Key 1 and Key 2 are off, pushing Mix All will transition them both on. If Key 1 and Key 2 are on, pushing Mix All will transition them both off. If Key 1 is on and Key 2 is off, pushing Mix All will transition Key 1 off and transition Key 2 on.
- **Rate** – Use the arrows to adjust the transition rate, or enter numbers directly in the Rate field.

The **Program B** menu is only used when Dual Channel Mode is selected in the Config



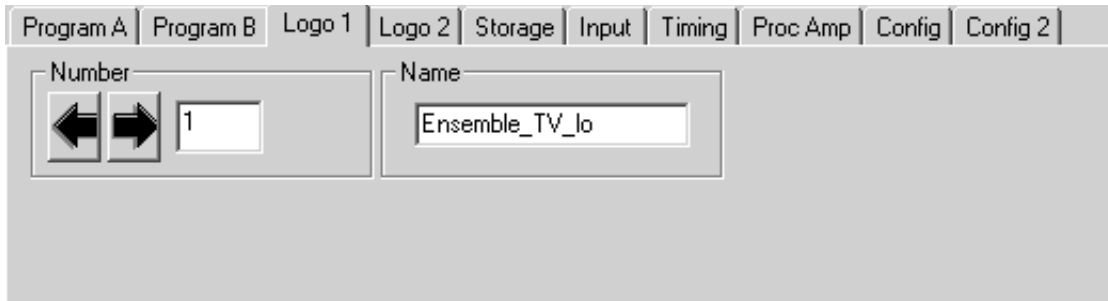
menu. Dual Channel Mode provides two independent outputs from the 7420. Either or both of the keys can be used in either the Program A or Program B outputs.



When Dual Channel Mode is selected, the **Program B** menu operates in the same way as the above **Program A** menu. It allows you to control the two keys, select Cut or Mix, and set the transition Rate (or duration). **Program B** is output on the BNCs labeled Preview 1 and Preview 2.

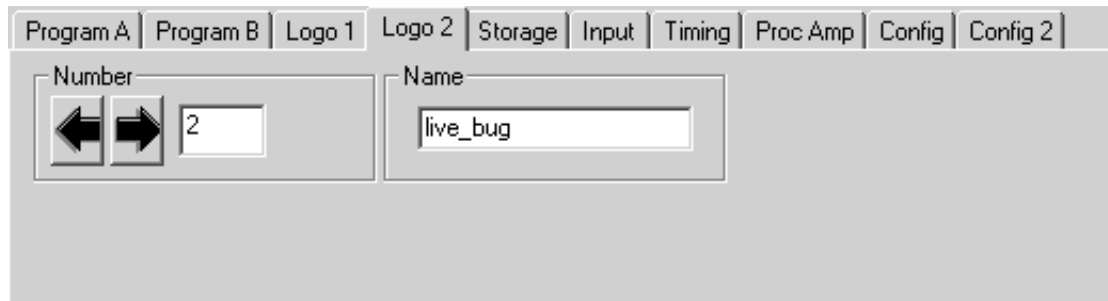
The **Logo 1** menu controls the assets in Keyer 1. The **Logo 1** menu shown below allows you to scroll through each of the assets (logo, animation or audio clip) by number and view the name of the asset associated with the number.

- **Number** – allows you to select the desired asset number stored in memory.
- **Name** – displays the name of the selected asset.



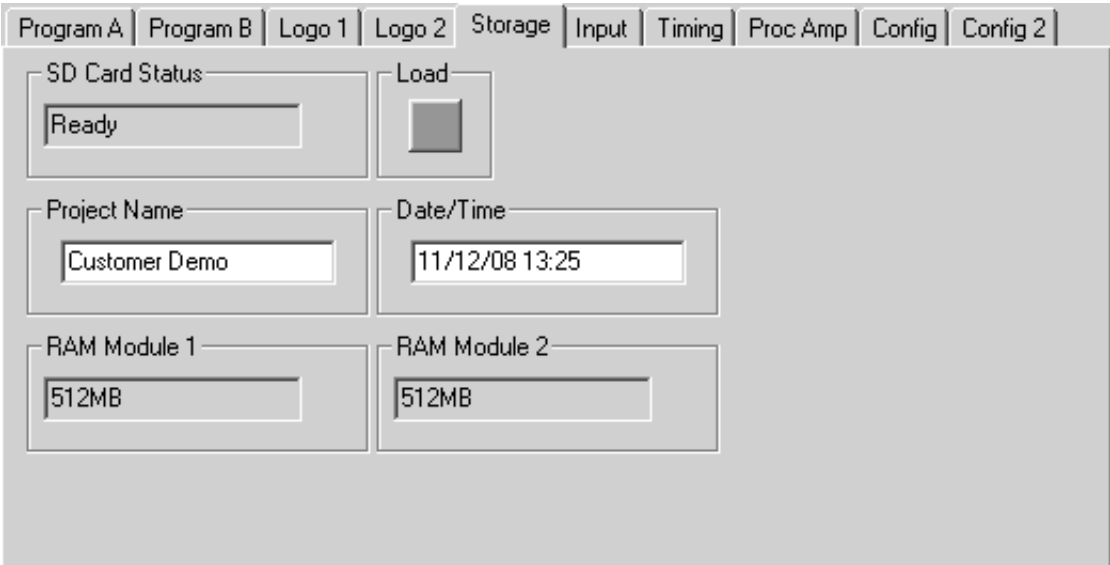
The **Logo 2** menu controls the assets in Keyer 2. The **Logo 2** menu shown below allows you to scroll through each of the assets (logo, animation or audio clip) by number and view the name of the asset associated with the number.

- **Number** – allows you to select the desired asset number stored in memory.
- **Name** – displays the name of the selected asset.



The **Storage** menu shown below provides the status for the Secure Digital (SD) card and provides a button for loading assets from the SD card into the 7420s RAM memory:

- **SD Card Status** – reports if the SD card is Ready. If an incompatible SD card is inserted into the 7420 or if no SD card is present that status will be reported. The SD card must have a storage capacity of between 256 MB and 2 GB in FAT32 format.
- **Load** – press the Load button to transfer the Project (group of assets) from the SD card onto the 7420’s RAM memory.
- **Project Name** – the name of the Project that is on the SD card. One Project can be stored on an SD card.
- **Date/Time** – displays the current Date and Time.
- **RAM Module 1** – displays the size of RAM installed in Keyer 1.
- **RAM Module 2** – displays the size of RAM installed in Keyer 2.



The **Input** menu shown below provides the status and controls for the background video input:

- **Input** – reports the standard of the background video input.
- **Reference** – reports the standard of the reference that the module is locked to.
- **Output Standard** – the output standard follows the background video input standard unless one of the scaler submodule options is installed.

Sub Module Options for the 7420

7490 Up/Down/Cross Converter

When this option is installed an SD or HD SDI input is accepted and an SD or HD SDI output can be selected. Select the desired output standard and up, down, cross, or aspect ratio conversion is automatic.

7491 Upconverter

When this option is installed an SD SDI input is accepted. Select the desired HD SDI output standard.

7492 Downconverter

When this option is installed an SD SDI input is accepted. Select the desired HD SDI output standard.

7494 Aspect Ratio Converter

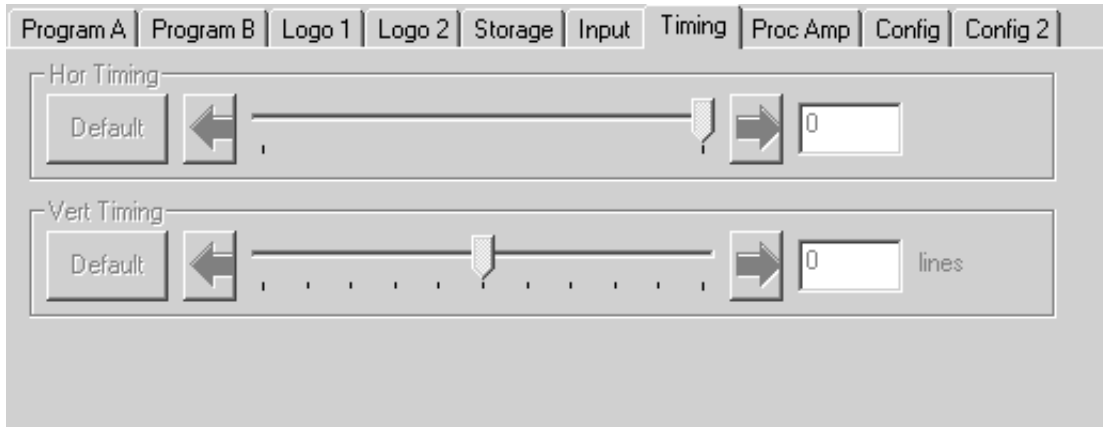
Feed a 4:3 SD SDI signal to the input and get a 16:9 SD SDI output. Or the reverse, 16:9 to 4:3. Select the desired output from the menu.

- **Ref Source** – select Video In Ref to have the module lock to the background video input, select Ext Ref to have the module lock to the signal on the Ext Ref BNC, select Master Ref to have the module lock to the frame's master reference signal.

The screenshot shows the 'Input' menu of the Model 7420 HD/SD Logo Inserter. The menu is divided into several sections: 'Input', 'Reference', 'Output Standard', and 'Ref Source'. The 'Input' section has a text box containing 'SD 525'. The 'Reference' section has a text box containing 'Ref 525 Lock'. The 'Output Standard' section has a dropdown menu with 'SD 525' selected. The 'Ref Source' section has a dropdown menu with 'Video In Ref' selected. The menu is part of a larger interface with tabs for 'Program A', 'Program B', 'Logo 1', 'Logo 2', 'Storage', 'Input', 'Timing', 'Proc Amp', 'Config', and 'Config 2'.

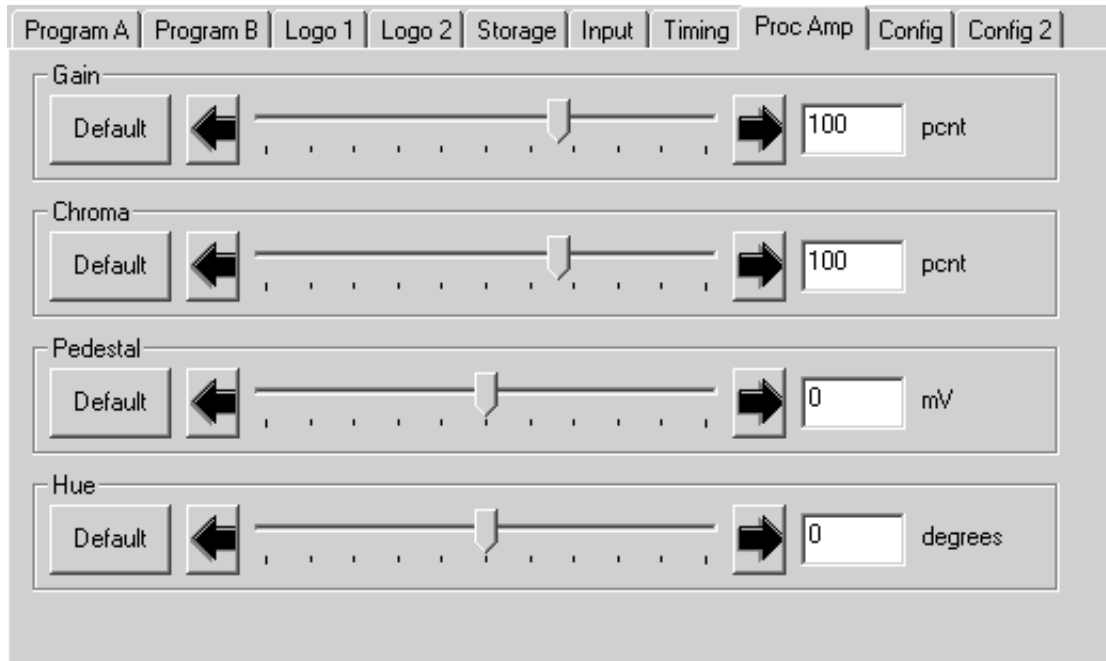
The **Timing** menu shown below provides controls for timing the output signals:

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



The **Proc Amp** menu shown below provides the following video processing parameters for the output signals:

- **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.



The **Config** menu shown below provides controls for the output mode:

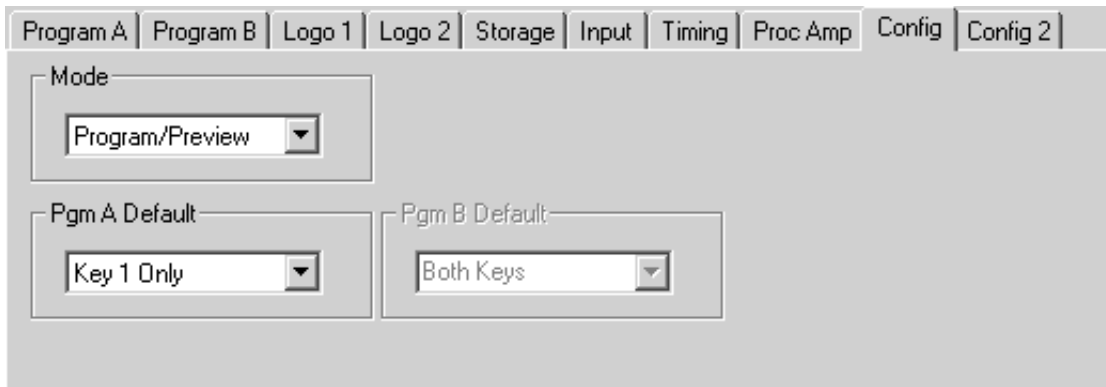
- **Mode** – select between Program/Preview, Key/Fill and Dual Channel modes.

Program/Preview mode provides separate Program and Preview outputs. In Program/Preview Mode the Pgm output appears on the BNCs labeled Program 1, Program 2, Program 3, and Program 4. The Pvw signal appears on the BNCs labeled Preview 1 and Preview 2. The Pvw output will show what the Next Tran will be.

Key/Fill mode provides separate Fill and Key signal outputs. In Fill/Key Mode the Fill signal appears on the BNCs labeled Program 1, Program 2, Program 3, and Program 4. The Key signal appears on the BNCs labeled Preview 1 and Preview 2.

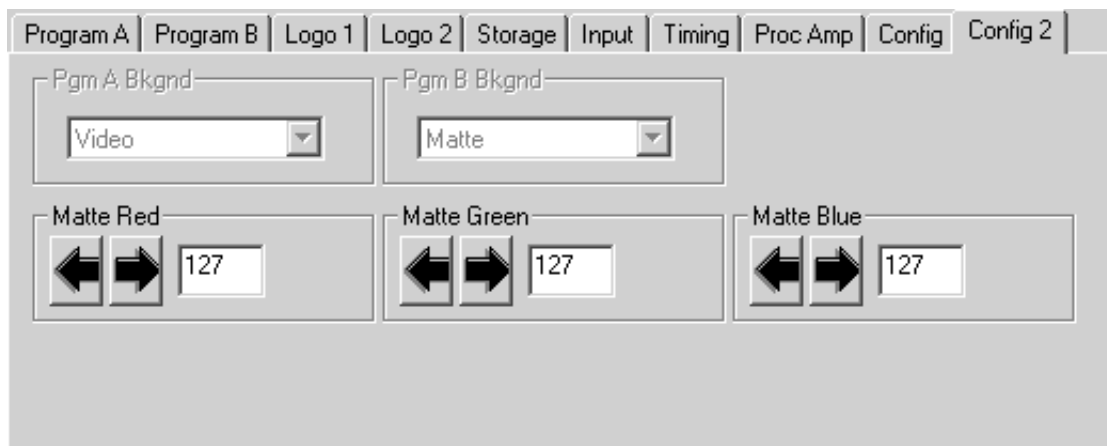
Dual Channel mode provides two independent program outputs from the 7420. Either or both of the keyers can be used in either the Program A or Program B outputs. In Dual Channel Mode the Program A signal appears on the BNCs labeled Program 1, Program 2, Program 3, and Program 4. The Program B signal appears on the BNCs labeled Preview 1 and Preview 2.

- **Pgm A Default** – select the default mode for Program A: Key 1 Only, Key 2 Only or Both Keys.
- **Pgm B Default** – select the default mode for Program B: Key 1 Only, Key 2 Only or Both Keys.



The **Config 2** menu shown below provides additional configuration controls for the module's outputs:

- **Pgm A Bkgnd** – Select Video to use the background video input as the background source for Program A or select Matte to use the internal matte generator as the background source.
- **Pgm B Bkgnd** – Select Video to use the background video input as the background source for Program B or select Matte to use the internal matte generator as the background source.
- **Matte Red** – use the arrows or type in the red value for the internal matte generator.
- **Matte Green** – use the arrows or type in the green value for the internal matte generator.
- **Matte Blue** – use the arrows or type in the blue value for the internal matte generator.



Avenue Touch Screen Remote Configuration

The Avenue Touch Screen remote control status menus for this module are illustrated and explained below. Refer to the **7420 Parameter Table** for a summary of available parameters that can be set remotely through the menus illustrated. For more information on using Avenue Touch Screen, refer to the Avenue System Overview operating section.

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.

For information on installing and using the Avenue Logo application for downloading logos and animations to the module, refer to the Avenue Logo data pack and CD that accompanies the 7420 module.

7420 Avenue Touch Screen Menus

The **Program A** menu screen shown below allows you to control the two keyers, select Cut or Mix, and set the transition Rate (or duration). **Program A** is output on the BNCs labeled Program 1, Program 2, Program 3, and Program 4.

When the module is in Pgm/Pvw Mode or Key/Fill Mode, then the **Program A** menu is similar in functionality to the Cut and Mix buttons on a production switcher.

The following are examples of how to use the Program A menu:

If Key 1 is on and you want to cut it off, press Cut 1. If Key 1 is off and you want to cut it on, press Cut 1.

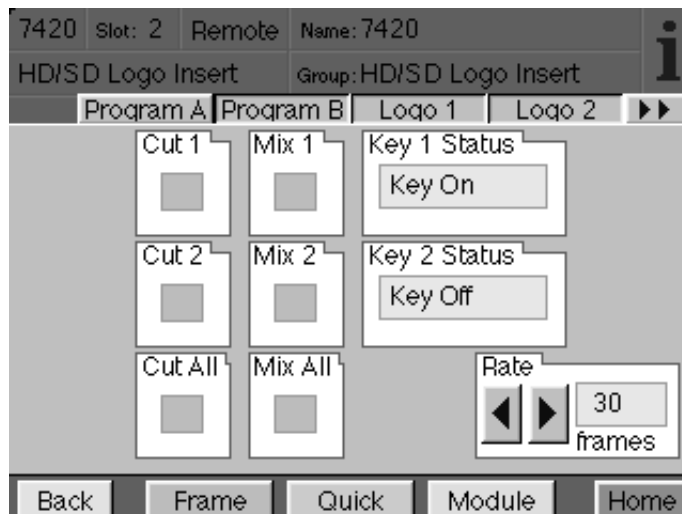
If Key 1 and Key 2 are both off and you want to cut them on together, press Cut All.

If Key 1 is on and Key 2 is off and you want to swap so that Key 1 is off and Key 2 is on, press Cut All.

If Key 1 is off and Key 2 is on and you want to transition so that Key 1 is on and Key 2 is off, press Mix All.

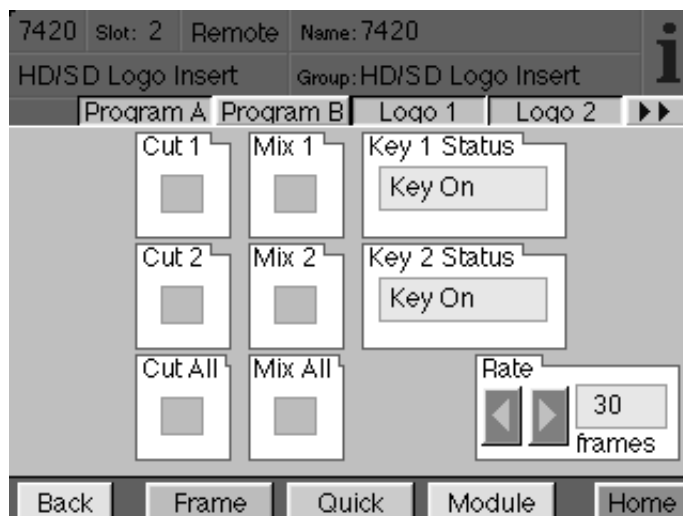
- **Cut 1** – Push the Cut 1 button to cut Key 1 on or off.
- **Mix 1** – Push the Mix 1 button to mix Key 1 on or off.
- **Key 1 Status** – indicates the status of Key 1. Possible values are: Key On, Key Off, Mix On, and Mix Off. Mix On or Mix Off appears while the transition is occurring.
- **Cut 2** – Push the Cut 2 button to cut Key 2 on or off.
- **Mix 2** – Push the Mix 2 button to mix Key 2 on or off.
- **Key 2 Status** – indicates the status of Key 2. Possible values are: Key On, Key Off, Mix On, and Mix Off. Mix On or Mix Off appears while the transition is occurring.
- **Cut All** – Push the Cut All button to cut both Key 1 and Key 2. If Key 1 and Key 2 are off, pushing Cut All will cut them both on. If Key 1 and Key 2 are on, pushing Cut All will cut them both off. If Key 1 is on and Key 2 is off, pushing Cut All will cut Key 1 off and cut Key 2 on.

- **Mix All** – Push the Mix All button to transition both Key 1 and Key 2. If Key 1 and Key 2 are off, pushing Mix All will transition them both on. If Key 1 and Key 2 are on, pushing Mix All will transition them both off. If Key 1 is on and Key 2 is off, pushing Mix All will transition Key 1 off and transition Key 2 on.
- **Rate** – Use the arrows to adjust the transition rate, or enter numbers directly in the Rate field.



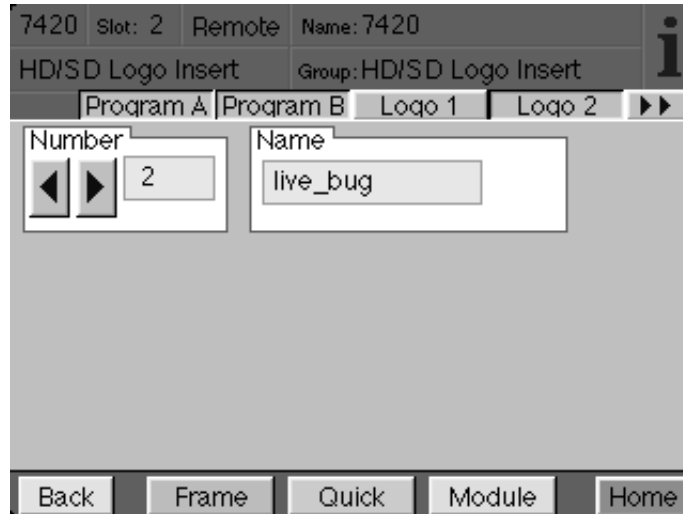
The **Program B** menu is only used when Dual Channel Mode is selected in the Config menu. Dual Channel Mode provides two independent outputs from the 7420. Either or both of the keyers can be used in either the Program A or Program B outputs.

When Dual Channel Mode is selected, the **Program B** menu operates in the same way as the above **Program A** menu. It allows you to control the two keyers, select Cut or Mix, and set the transition Rate (or duration). **Program B** is output on the BNCs labeled Preview 1 and Preview 2.



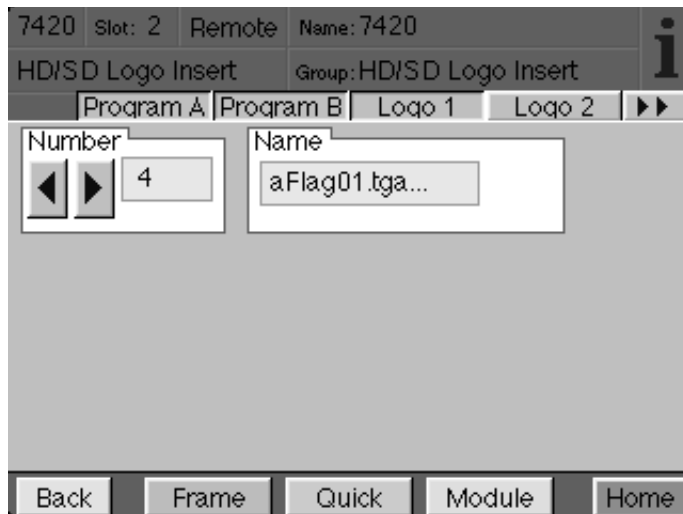
The **Logo 1** menu controls the assets in Keyer 1. The **Logo 1** menu shown below allows you to scroll through each of the assets (logo, animation or audio clip) by number and view the name of the asset associated with the number.

- **Number** – allows you to select the desired asset number stored in memory.
- **Name** – displays the name of the selected asset.



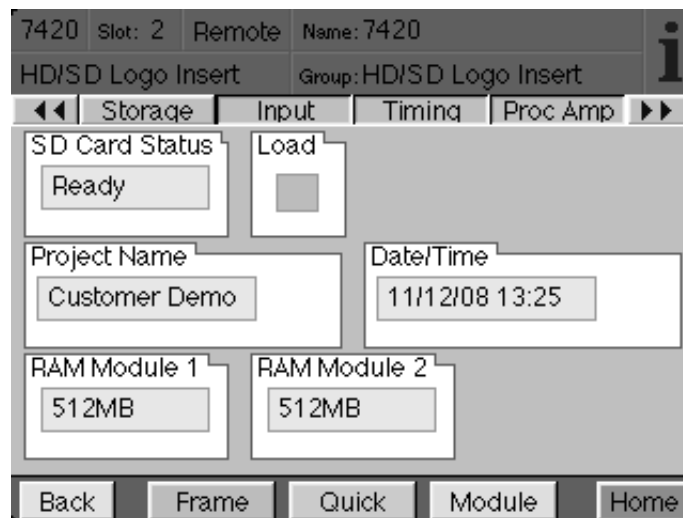
The **Logo 2** menu controls the assets in Keyer 2. The **Logo 2** menu shown below allows you to scroll through each of the assets (logo, animation or audio clip) by number and view the name of the asset associated with the number.

- **Number** – allows you to select the desired asset number stored in memory.
- **Name** – displays the name of the selected asset.



The **Storage** menu shown below provides the status for the Secure Digital (SD) card and provides a button for loading assets from the SD card into the 7420s RAM memory:

- **SD Card Status** – reports if the SD card is Ready. If an incompatible SD card is inserted into the 7420 or if no SD card is present that status will be reported. The SD card must have a storage capacity of between 256 MB to 2 GB in FAT32 format.
- **Load** – press the Load button to transfer the Project (group of assets) from the SD Card onto the 7420's RAM memory.
- **Project Name** – the name of the Project that is on the SD Card. One Project can be stored on an SD Card.
- **Date/Time** – displays the current Date and Time.
- **RAM Module 1** – displays the size of RAM installed in Keyer 1.
- **RAM Module 2** – displays the size of RAM installed in Keyer 2.



The **Input** menu shown below provides the status and controls for the background video input:

- **Input** – reports the standard of the background video input.
- **Reference** – reports the standard of the reference that the module is locked to.
- **Output Standard** – the output standard follows the background video input standard unless one of the scaler submodule options is installed.

Sub Module Options for the 7420

7490 – Up/Down/Cross Converter

When this option is installed an SD or HD SDI input is accepted and an SD or HD SDI output can be selected. Select the desired output standard and up, down, cross, or aspect ratio conversion is automatic.

7491 – Upconverter

When this option is installed an SD SDI input is accepted. Select the desired HD SDI output standard.

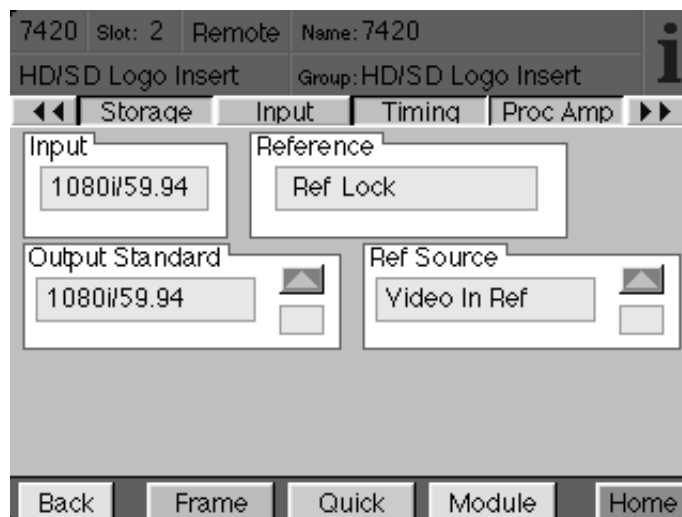
7492 – Downconverter

When this option is installed an SD SDI input is accepted. Select the desired HD SDI output standard.

7494 – Aspect Ratio Converter

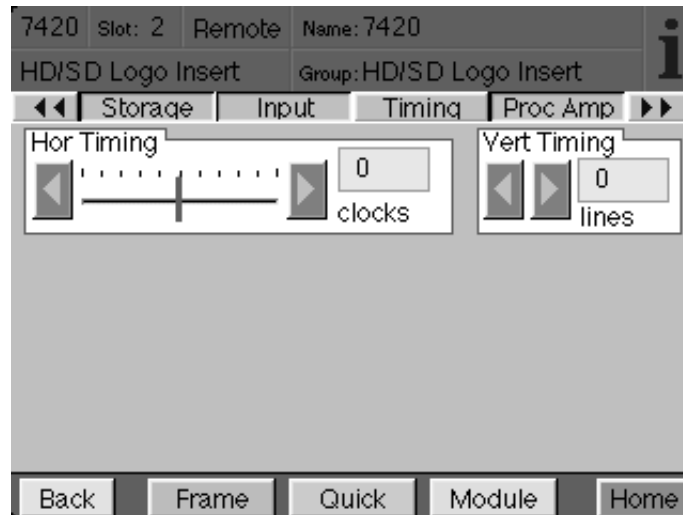
Feed a 4:3 SD SDI signal to the input and get a 16:9 SD SDI output. Or the reverse, 16:9 to 4:3. Select the desired output from the menu.

- **Ref Source** – select Video In Ref to have the module lock to the background video input, select Ext Ref to have the module lock to the signal on the Ext Ref BNC, or select Master Ref to have the module lock to the frame's master reference signal.



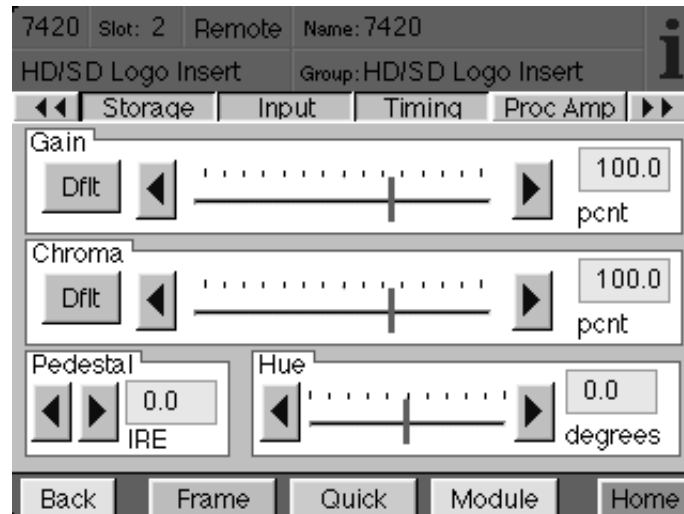
The **Timing** menu shown below provides controls for timing the outputs signals:

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



The **Proc Amp** menu shown below provides the following video processing parameters for the output signals:

- **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.



The **Config** menu shown below provides controls for the output mode:

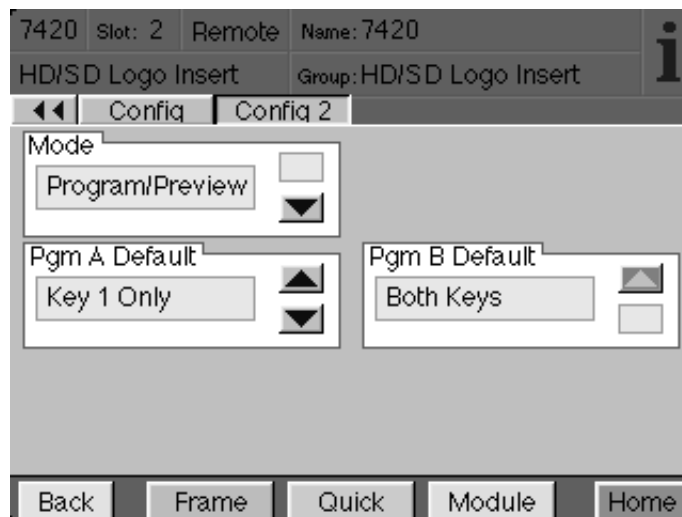
- **Mode** – select between Program/Preview, Key/Fill and Dual Channel modes.

Program/Preview mode provides separate Program and Preview outputs. In Program/Preview Mode the Pgm output appears on the BNCs labeled Program 1, Program 2, Program 3, and Program 4. The Pvw signal appears on the BNCs labeled Preview 1 and Preview 2. The Pvw output will show what the Next Tran will be.

Key/Fill mode provides separate Fill and Key signal outputs. In Fill/Key Mode the Fill signal appears on the BNCs labeled Program 1, Program 2, Program 3, and Program 4. The Key signal appears on the BNCs labeled Preview 1 and Preview 2.

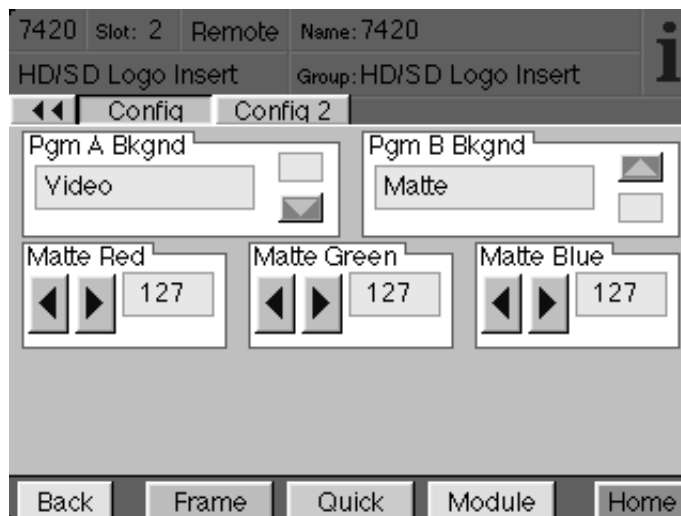
Dual Channel mode provides two independent program outputs from the 7420. Either or both of the keyers can be used in either the Program A or Program B outputs. In Dual Channel Mode the Program A signal appears on the BNCs labeled Program 1, Program 2, Program 3, and Program 4. The Program B signal appears on the BNCs labeled Preview 1 and Preview 2.

- **Pgm A Default** – select the default mode for Program A: Key 1 Only, Key 2 Only or Both Keys.
- **Pgm B Default** – select the default mode for Program B: Key 1 Only, Key 2 Only or Both Keys.



The **Config 2** menu shown below provides additional configuration controls for the module's output:

- **Pgm A Bkgnd** – Select Video to use the background video input as the background source for Program A or select Matte to use the internal matte generator as the background source.
- **Pgm B Bkgnd** – Select Video to use the background video input as the background source for Program B or select Matte to use the internal matte generator as the background source.
- **Matte Red** – use the arrows or type in the red value for the internal matte generator.
- **Matte Green** – use the arrows or type in the green value for the internal matte generator.
- **Matte Blue** – use the arrows or type in the blue value for the internal matte generator.



KEYING WITH THE 7420 - A MINI TUTORIAL

It is called a “linear” system because it responds linearly to the alpha channel. This means that the keyer will

- a) suppress ALL of the background signal where the alpha channel is full white
- b) Pass ALL of the background where the alpha channel is full black
- c) Attenuate the background signal where the alpha is grey -- and do it in proportion to the exact grayscale value of the alpha

One of the visual features that this technique provides is to have the alpha signal cause a shadow to appear to be cast on the background signal by the foreground signal.

It is called an “additive” system because the foreground (key fill) is added to the background signal in order to make the final image.

Here is a sample logo where the RGB portion and Alpha portion are shown separately.



On the left hand side, the RGB (color) portion of a logo that has been constructed over a black background. The Alpha portion is on the right hand side. Note that the alpha has two elements, a white section which matches to the text in the RGB fill, and a gray section which has no corresponding element in the RGB.

When the 7420 keys this graphic over a background, it does it in two steps. The first step is to cut a hole in the background using the linear characteristics of the alpha. The portions of the alpha that are gray will attenuate (or darken) the background video. But it will still be possible to see details of the background.

Numerically this is done by multiplying the alpha against the background. We can think of a full white alpha being equal to 1.0; a black alpha being equal to 0.0; and intermediate gray values being a fraction -- such as 0.45. If we multiply the background with the alpha signal like this:

$$\text{new Background} = \text{Background} \times (1 - \text{Alpha})$$

We will darken the background in proportion to how white the alpha is. This means that the alpha signal itself never contributes to the image the viewer sees -- it only controls how much of the background or foreground is displayed. It will then look like this:



At this point, the background has a perfectly cut hole into which the foreground video can be added.

And when that is done, the result will look like this:



In order for additive keying to work, the foreground material (the RGB of the graphic in this case) must be perfectly black EXCEPT where the foreground is intended to appear in the final output. This is because the alpha signal is only going to be applied to the background material -- not the foreground.

If we use the alpha to control both the foreground and the background, the results will not be as good. Since both the alpha and the foreground (RGB) have anti-aliasing applied to them, the foreground would have too much anti-aliasing applied if we multiply it by the alpha.

In this sample I chose to have the logo cast a shadow because it so clearly demonstrates how this technique works. The linear performance of the keyer is also essential to the appearance of the edges of the text. Here is a closeup:



One of the reasons that the additive keying technique is so powerful is that television itself relies upon “additive” color. The television signal naturally starts with a black raster and we “add” color and light to it. The primary colors in television are Red, Green, and Blue because in an additive system, they combine to produce White. This is in contrast to printing which is a subtractive process. Color printing begins with white paper -- the ink that is applied “subtracts” color from the original white background. And we can see this because the primary colors in printing are Cyan, Magenta, and Yellow.

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.
- Front panel Local/Remote switch not in Remote when using Avenue PC.

No signal out of module:

- Check status of **In OK** LED.
- Check cabling to input of module.

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 recommending 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

Serial Digital Input

Number	One
Signal Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	270 Mb/s 300 meters Belden 1694A 1.485 Gb/s 100 meters 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
625i 60, 525i 59.94	

Serial Digital Output

Number	Four Program/Fill (includes one fail-safe bypass) Two Pvw/Key
Signal Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M Output format follows input if 7490 series option is not installed
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)
Delay	4 μ Sec (without 7490 series option installed)

Reference Input

Number	One external (module's BNC) One internal (frame master ref BNC)
Signal Type	PAL or NTSC composite video or HD Tri-Level Sync
Return Loss	>40 dB (applies to external ref input)

Sub Module Options

7490	Up/Down/Cross Converter
7491	Upconverter
7492	Downconverter
7494	Aspect Ratio Converter

Fits onto the 7420 and does not take up a slot in the frame.

Conversion Directions

Up/Down Conversion between

525 (NTSC) and 1080i/59.94, 720p/59.94, 1080p/23.98, 1080sF/23.98
625 (PAL) and 1080i/50, 720p/50, 1080p/25, 1080sF/25

Cross Conversion within frame rate families

525 Derived Family: 1080i/59.94, 720p/59.94, 1080p/23.98, and 1080sF/23.98
625 Derived Family: 1080i/50, 720p/50, 1080p/25, 1080sF/25

Model 7420 HD/SD Logo Inserter

Flash Memory

Number	One
Type	Secure Digital SD Flash Memory Card
Size	1 MB card included. FAT 32

Playback/Keyer Memory

Comes standard with 512 MB in Keyer 1 and Keyer 2 positions. Must install equal amount of memory in both Keyer positions.

Number	Two positions max
Type	DDR2 SODIMM, 200 pin Type PC4200 or faster

Memory Capacity with 2 GB DDR2 Installed

One or a combination of the following:

8.5 sec	HD video
53 sec	SD video
256	HD full screen image
1595	SD full screen images
768+	HD lower thirds
4785+	SD lower thirds
3600+	HD still corner bug 300x300 px
18,000+	SD still corner bug 300x300 px
120+ sec	HD animated corner bug 300x300 px
600+ sec	SD animated corner bug 300x300 px

Capacity numbers above calculated at 60Hz frame rate.

Any combination of logos, animations and audio files can be stored.

File type

Video	.tga
Audio	.wav, .mp3, .wma

General Specifications

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

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