AVENUE

Avenue™ signal integration system

Model 7400 HD/SD Sync Pulse Generator and Test Signal Generator Data Pack

including

7400-GPS Option

7400-EX Option

ENSEMBLE DESIGNS

Revision 1.2 SW v2.2.1

Contents

MODULE OVERVIEW 6

7400 SPG/TSG—Reliable and Easy-To-Use 6

Favorite Test Patterns 6

Customizable Test Patterns 7

Audio Generators 7

Multiple Timecode Generators 7

7400-EX Expando Module for Total Flexibility 7

7400-GPS Option for Maximum Precision Reference 7

APPLICATIONS 10

A Complete SPG and TSG System 10

Broadcast 11

Mobile 12

Post Production 13

Custom Test Patterns 13

TIMECODE 15

How the Timecode is Generated 15

Analog Timecode 15

Vertical Interval Timecode (VITC) and Digital Vertical Interval Timecode (DVITC) 16

Locking to a Black Burst Signal with VITC 16

AUDIO GENERATION AND ROUTING 16

Audio Generators 16

Support for Analog and Digital Audio 16

Sixteen Independently Programmable Audio Channels Per Generator 16

Audio Embedded in the SDI Outputs 16

INSTALLATION 19

7400-GPS Installation 19

7400 without GPS 19

7400-GPS Option Kit 20

7400-GPS Cabling Detail 20

7400-GPS Rear View 21

H1 Jumper 22

Safety and Outdoor Antenna Grounding 23

7400-EX Installation 23

CABLING 24

Generator A 26

Additional Outputs Available with 7400-EX Option 26

Generator B 26

MODULE CONFIGURATION AND CONTROL 27

Front Panel Controls and Indicators 27

Avenue PC Remote Configuration 28

7400 Avenue PC Menus 29

Selecting the Reference Source and Output Standard for Sync Pulse Generator A (SPG A Menu) 29

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator A (TSG A Menu) 31

Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator A (Timing A Menu) 33

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1A (Pgm 1A Menu) 34

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2A and 3A (Pgm 2/3 A Menu) 36

Setting the Audio Generation and Routing Parameters for Audio Generator A (Aud Gen A Menu) 38

Setting the Parameters for Timecode A (TCode A Menu) 40

Setting the Parameters for Slate A (Slate A Menu) 41

Selecting the Reference Source and Output Standard for Sync Pulse Generator B (SPG B Menu) 42

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator B (TSG B Menu) 44

Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator B (Timing B Menu) 46

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1B (Pgm 1B Menu) 47

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2B and 3B (Pgm 2/3 B Menu) 49

Setting the Audio Generation and Routing Parameters for Audio Generator B (Aud Gen B Menu) 51

Setting the Parameters for Timecode B (TCode B Menu) 53

Setting the Parameters for Slate B (Slate B Menu) 54

Setting Global Parameters for Module Reference and Audio Reference Levels (Global Menu) 55

Loading Custom Test Signals, Viewing Status (Storage Menu) 56

7400 Avenue Touch Screen Remote Configuration 57

Selecting the Reference Source and Output Standard for Sync Pulse Generator A (SPG A Menu) 57

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator A (TSG A Menu) 59

Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator A (Timing A Menu) 61

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1A (Pgm 1A Menu) 62

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2A and 3A (Pgm 2/3 A Menu) 64

Setting the Audio Generation and Routing Parameters for Audio Generator A (Aud Gen A Menu) 66

Setting the Parameters for Timecode A (TCode A Menu) 68

Setting the Parameters for Slate A (Slate A Menu) 69

Selecting the Reference Source and Output Standard for Sync Pulse Generator B (SPG B Menu) 70

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator B (TSG B Menu) 72

Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator B (Timing B Menu) 74

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1B (Pgm 1B Menu) 75

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2B and 3B (Pgm 2/3 B Menu) 77

Setting the Audio Generation and Routing Parameters for Audio Generator B (Aud Gen B Menu) 79

Setting the Parameters for Timecode B (TCode B Menu) 81

Setting the Parameters for Slate B (Slate B Menu) 82

Setting Global Parameters for Module Reference and Audio Reference Levels (Global Menu) 83

Loading Custom Test Signals, Viewing Status (Storage Menu) 84

TROUBLESHOOTING 85

No Generator A or Generator B LED indication 85

Cannot control module 85

Module controls are grayed out 85

No signal out of module 85

SOFTWARE UPDATING 86

WARRANTY AND FACTORY SERVICE 86

Warranty 86

Factory Service 86

SPECIFICATIONS 87

MODULE OVERVIEW

7400 SPG/TSG—Reliable and Easy-To-Use

The 7400 HD/SD Sync Pulse Generator/Test Signal Generator is a stable timing source that is perfect for local reference generation in broadcast, remote trucks and post. The 7400 generates the following reference outputs:

- HD SDI
- SD SDI
- Analog Composite
- HD Tri-Level Sync
- Timecode
- AES Audio
- Analog Audio

The 7400 can operate from an internal precision standard and act as a stand-alone Master Sync Generator or it can lock to a video reference or 10 Mhz precision reference. Alternately, the 7400-GPS option can be used to provide an extremely precise frequency reference.

The 7400 can output multiple formats of Tri-Level Sync, HD SDI test signals, SD SDI and composite test signals, and color black reference. The 7400 can simultaneously deliver both 525 (NTSC) and 625 (PAL) based signals. Color framing tracks the reference signal. All of the video outputs are derived from the same time base and can be timed with respect to each other. The 7400 has two identical generators, Generator A and Generator B, each with a variety of outputs. Each set of outputs can be timed with respect to the reference to any point in the television frame. All of the outputs from a particular Generator must be selected within the same frame rate family:

- 50 Hz (625) Derived Family: 1080i/50, 720p/50, 1080p/25, 1080sF/25, 625i/50
- 59.94 Hz (525) Derived Family: 1080i/59.94, 720p/59.94, 1080p/23.98, 1080sF/23.98, 525i/59.94
- 60 Hz Derived Family: 1080i/60, 720p/60, 1080p/24, 1080sF/24

Favorite Test Patterns

There are over 30 test signals including a wide range of color bars: Full Field 75, Full Field 100, SMPTE 75, Split Field 75, Split Field 100, Red Field, Black, Flat Field 20, Flat Field 50, Flat Field 80, White, Video Ramp, Data Ramp, Shallow, 5 Step, Sweep, MultiBurst, Full Field Window, Component, Digital Blanking, Cosite, Interlace, Black, Crosshatch, Safe Title, Pathological. The Cyclops feature adds a motion element to the selected video test signal to assist in locating a signal that might be frozen in a frame sync somewhere in the signal chain. An ID slate with user-programmable text can overlay the test pattern.

Customizable Test Patterns

In addition to the standard suite of test patterns, users can create custom test patterns on a computer. Simply transfer test patterns to the included Secure Digital flash memory card using Avenue Logo software and a standard card reader, then insert the memory card into the 7400. Test patterns can include motion and an associated audio clip.

Audio Generators

The 7400 provides extensive support for analog and digital audio. Because all of the video outputs can be locked to a common time base, the AES digital audio outputs are always synchronous with all of the video outputs – regardless of format. Multiple tone generators make it easy to identify multi-channel content. With the 7400-EX Expando option, an AES input is provided which can be fed by a multi-channel encoded bitstream. This bitstream will be included in the set of signals that can be embedded into the test signal outputs.

The audio section of each generator supports sixteen audio channels. The content of each channel is independently programmable. Choices include adjustable frequency tone generators, tone sweeps, Silence, Timecode, Audio Clip playback from Secure Digital Card, and the external AES input. Left/Right Channel ID that synchronizes to the Cyclops feature can also be selected.

All sixteen of these channels can be embedded in the SDI outputs. Each AES output can select from any of the 8 pairs that make up these 16 channels. Similarly, the stereo analog output of each generator can be driven from any of these audio signal pairs.

Multiple Timecode Generators

Multiple timecode generators make the 7400 convenient for post applications. Timecode is delivered as LTC both 75 Ohm BNC and 110 Ohm Balanced), VITC, and DVITC. One generator can be configured to produce 525/59.94 drop frame timecode while the other generator is making 1080sF/23.98.

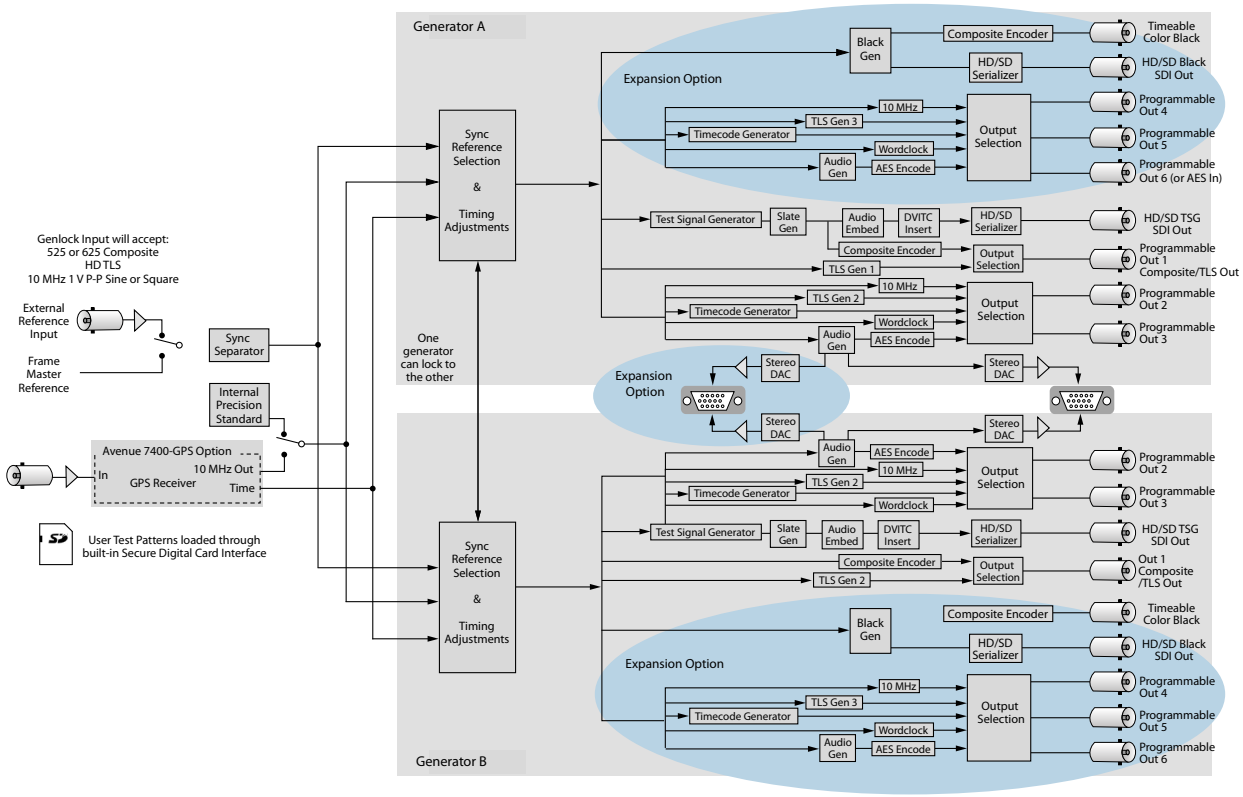
7400-EX Expando Module for Total Flexibility

For facilities that need more test and reference signals than what is provided by the 7400, the 7400-EX Expando Module can be added. Two generators provide myriad reference signals including: 12 types of HD SDI black and bars, SD SDI bars and black, composite bards and black, HD Tri-Level Sync, Word clock, AES and analog audio tone, and LTC. The two generators can be independent or one generator can be locked to the other. The control system lets you assign signal types to the 17 output BNCs and 2 high-density D connectors. The 7400-EX option can be installed in the field.

7400-GPS Option for Maximum Precision Reference

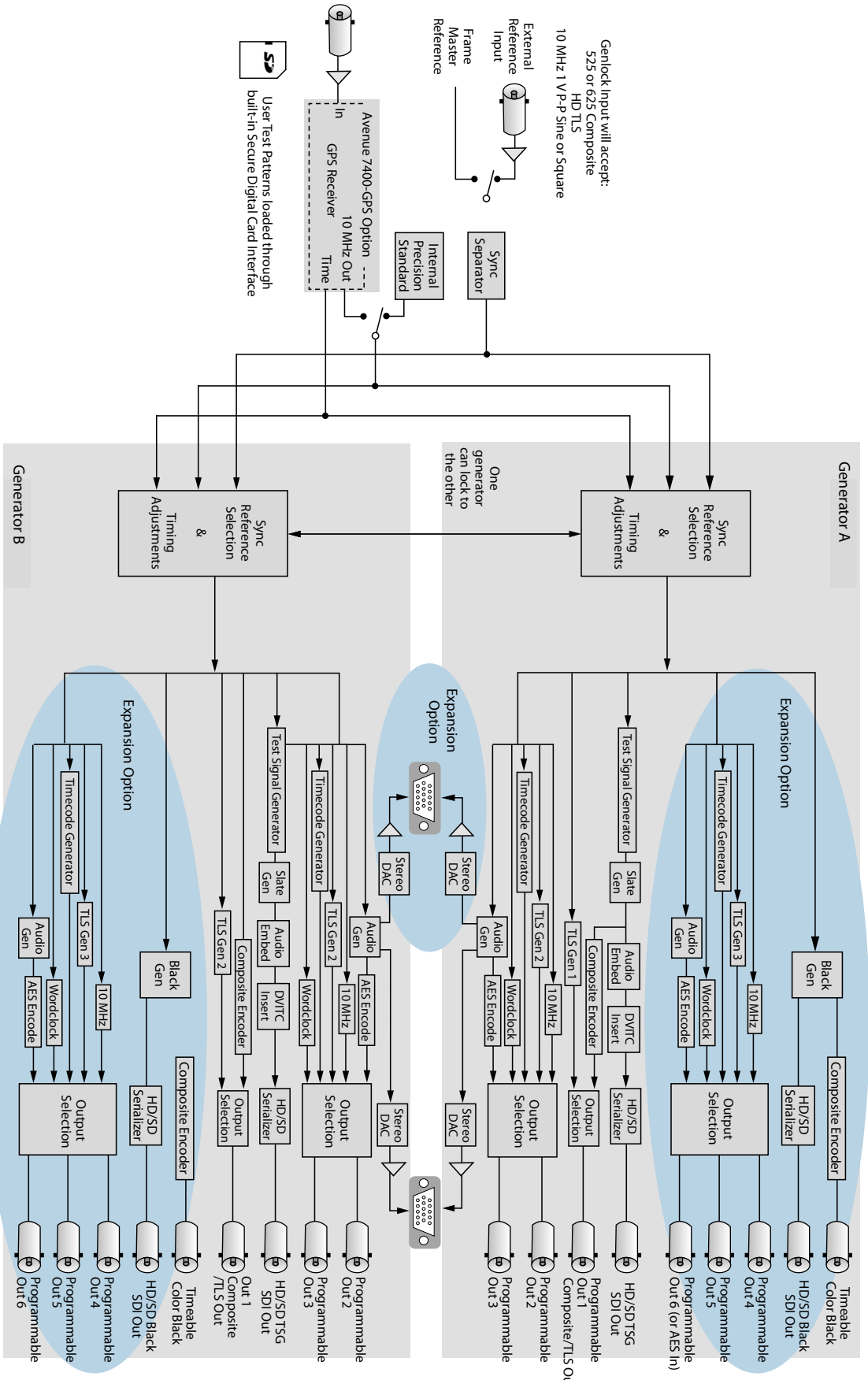
For the ultimate in precision, the 7400-GPS option can be used with the 7400 module. The purpose of this GPS option is to provide an extremely precise frequency reference. The oscillator on the 7400-GPS is more accurate than a typical internal precision standard and is equivalent in accuracy to an atomic standard. Increased frequency accuracy makes it possible to frame synchronize signals between different facilities with virtually no dropped or doubled frames. The GPS option also provides precise time of day information, which can be used to drive the 7400 module's internal timecode generators.

The 7400-GPS option seamlessly integrates into the Avenue system by plugging directly onto the 7400 module. It can be easily installed in the field. The 7400-GPS option consists of a compact, weatherproof antenna (with internal high-gain pre-amp) and a receiver sub module which mounts directly to the 7400 module. The included GPS antenna mounts onto standard 3/4" threaded pipe, metal or plastic. Connection from the F-style coaxial fitting on the antenna to the appropriate BNC on the Avenue Frame can be made with customer supplied standard 75 ohm cable. The coax cable can be routed through the center of the pipe for a completely waterproof installation. When low loss cable such as Belden 1694A is used, the antenna can be placed up to 200 feet (60 meters) from the frame. Ideally, the antenna is mounted outdoors where it has an unobstructed view of the sky.



Functional Block Diagram, portrait

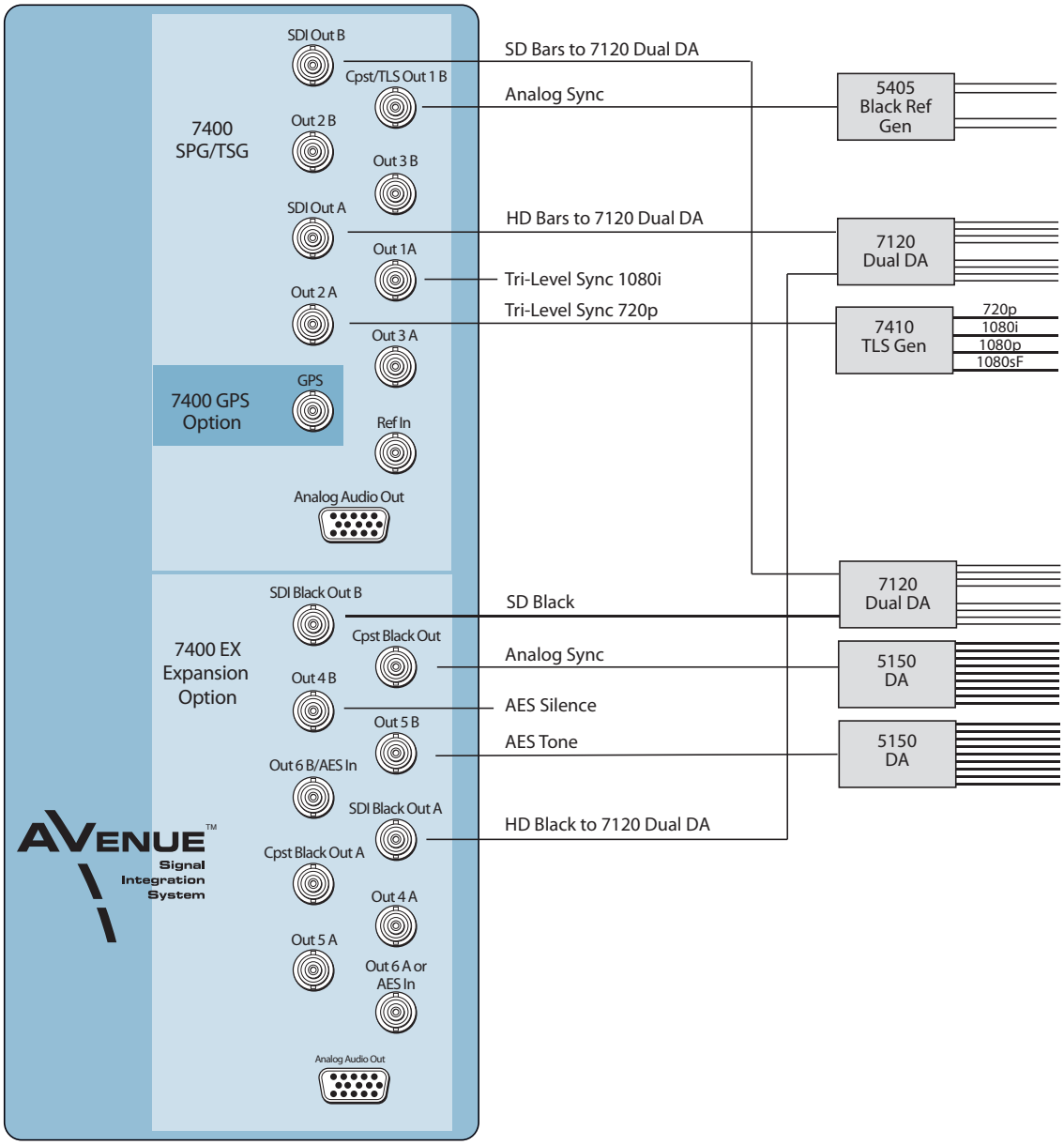
Functional Block Diagram, landscape



APPLICATIONS

A Complete SPG and TSG System

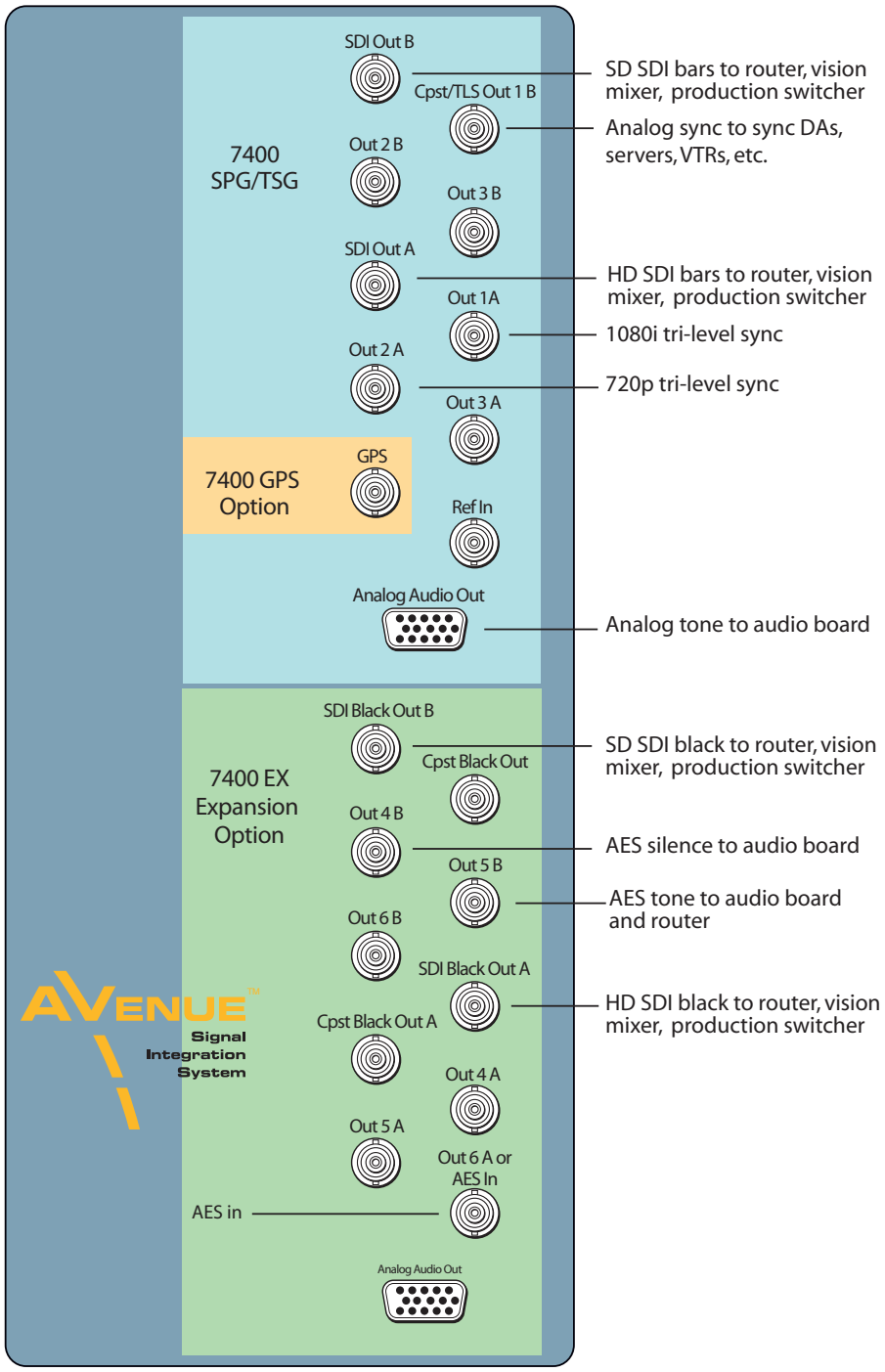
The 7400 can be combined with other Avenue modules to create a complete sync pulse and test signal chain. The 7410 is a four channel HD Tri-Level Sync generator that can output four different types of Tri-Level Sync simultaneously and is very useful in post and hybrid facilities. When additional composite black is needed, the 5405 can be used to provide two independent pairs of composite outputs. The 5150 distribution amplifier can be used to distribute multiple copies of AES audio, Tri-Level Sync or composite black signals as needed. For HD test signal and black distribution, either the 7110 DA or 7125 DA are a good fit.



A Complete Sync Pulse and Test Signal Chain Example

Broadcast

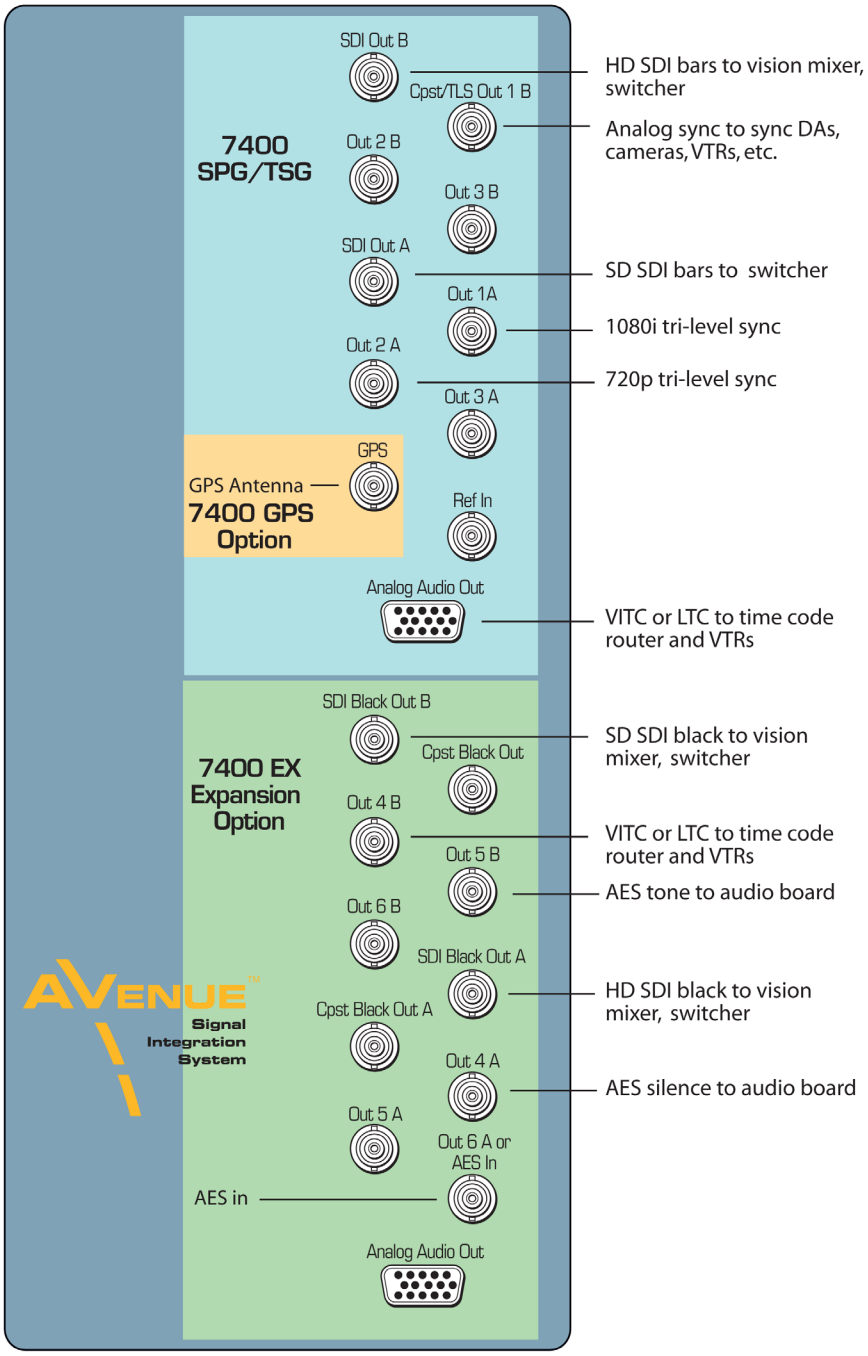
The Avenue 7400 provides a comprehensive set of signals for TV stations. Analog sync, SD bars and black, HD bars and black and audio reference are simultaneously available. You can even output multiple kinds of Tri-Level Sync to support all of your HD equipment. Programmable outputs allow you to select the signals you need for your station. An external AES source can be embedded into your test patterns as well. Sync changeover and redundant power options offer added security.



Broadcast Application Configuration Example

Mobile

All of the Avenue SPG/TSGs are rugged enough for use in mobile trucks, ENG and helicopters. The Avenue frame has a retainer bar on it that ensures modules in the frame are completely stable. The Avenue 7400 has a wide range of test signals to choose from. Test patterns can have a moving element so that you can be sure that a signal is not frozen in a frame sync somewhere in the signal chain. Time code is available on BNC and 15 pin D for your convenience. The 7400's GPS option is integrated nicely onto the main 7400. The GPS antenna connects to a BNC on the 7400 module providing precision timing accuracy along with time of day data.



Mobile Application Configuration Example

Post Production

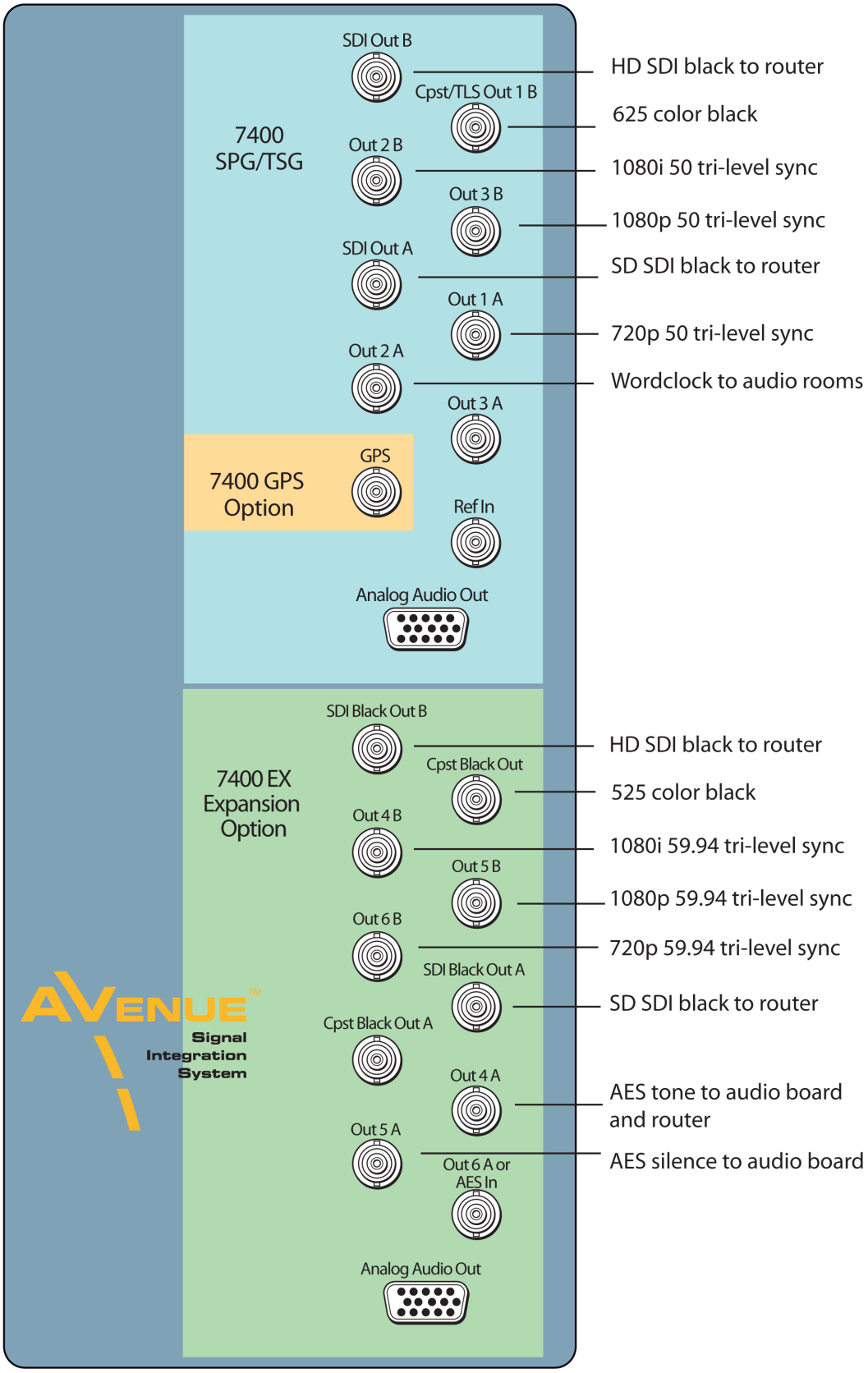
The 7400 can output multiple formats of Tri-Level Sync at the same time, fitting the requirements of busy post production houses. At the same time, the 7400 will output HD-SDI test signals, SD SDI and composite test signals, and color black reference. All of these video outputs are derived from the same time base and can be timed with respect to each other. The 7400 can simultaneously deliver both 525 (NTSC) and 625 (PAL) based signals.

The 7400 provides extensive support for analog and digital audio. Because all of the video outputs can be locked to a common time base, the AES digital audio outputs are always synchronous with all of the video outputs--regardless of format. Multiple tone generators make it easy to identify multi-channel content. With the 7400-EX Expando option, an AES input is provided which can be fed by a multi-channel encoded bitstream. This bitstream will be included in the set of signals that can be embedded into the test signal outputs.

Multiple time code generators, another feature of the 7400, work very well for post. Time code is delivered as LTC (both 75 Ohm BNC and 110 Ohm Balanced), VITC, and DVITC. One generator can be configured to produce 525/59.94 drop frame time code while the other generator is making 1080sF/23.98.

Custom Test Patterns

Using the Secure Digital Card slot on the front of the 7400, users can load custom test patterns and video slates into the 7400. With simultaneous audio and video playback, you can have branded color bars available everywhere in the facility.



Post House Configuration Example

TIMECODE

How the Timecode is Generated

Each of the two (independent) SPG/TSGs on a 7400 module has its own timecode generator. The timecode generator will always run at the same frame rate as the SDI output of that SPG/TSG.

SDI Output	TC Frame Rate	VITC on SD Output	Drop
720p/59.94	The current SMPTE spec (SMPTE-12M) does not allow >30Hz framerate		
1080i/59.94	29.97 Frames/second	yes	On or Off
1080i/50	25 Frames/second	yes	N/A
1080sF/23.98	23.98 Frames/second	no	On or Off
1080sF/24	24 Frames/second	no	N/A
SD 525	29.97 Frames/second	yes	On or Off
SD 625	25 Frames/second	yes	N/A

The user can "Jam" a specific time setting into the timecode generator. If the GPS option is installed, the Timecode generator can be commanded to pick up current time of day. The Timecode generator can be configured for drop or non-drop operation when running in the NTSC related frame rates.

Analog Timecode

There are four ways to have analog timecode, described as follows:

1. Route LTC (linear timecode) to user-programmable BNC 2 or 3. The signal will be 1 V P-P, unbalanced (i.e., single ended). This is an analog timecode signal. Many devices want timecode on a BNC.

2. Select LTC to appear as one of the module's analog audio output signals. This will be exactly the same signal as when it is routed to a BNC, but it will be a balanced analog signal. It would appear on the HD-15 connector as one of the four balanced audio outputs.

3. LTC can be selected as one of the audio signals to be embedded in the SDI output stream.

4. LTC can be selected as one of the audio signals to be output as AES on User Pgm Outputs 2 or 3.

You can output an analog timecode signal with any of the methods described above. The difference between them is a choice between balanced or unbalanced. If you need to feed timecode to a device with an XLR input, you would generally want to use the balanced output. However, it is also possible to use the unbalanced through user-programmable BNC output and connect it to the destination with a balancing transformer. This would be much like the DATS adaptors for AES.

The advantage of using the unbalanced BNC output is that you can run it through a 5150 Distribution Amplifier to make more copies.

Vertical Interval Timecode (VITC) and Digital Vertical Interval Timecode (DVITC)

The 7400 offers the following ways to have Vertical Interval Timecode (VITC) and Digital Vertical Interval Timecode (DVITC):

1. The Analog Composite output of each generator (User-Progammable Output 1) can have VITC carried in the vertical interval.

2. When the SDI output is standard definition, it can have VITC in the vertical interval. This is basically a digitized version of the VITC that would be in an analog composite signal.

3. When the SDI output is high definition, it can have DVITC packets carried in the ancillary data spaces.

Locking to a Black Burst Signal with VITC

The 7400 can lock to a black burst signal which has VITC in it. In that case, the timecode generator in the 7400 will track that VITC reference.

AUDIO GENERATION AND ROUTING

Audio Generators

The diagram shown below depicts the audio signal generation and routing for a single SPG/TSG Generator. There are two generators on each 7400, Generator A and Generator B. Each of the two generators on the 7400 are identical, with completely independent controls.

Support for Analog and Digital Audio

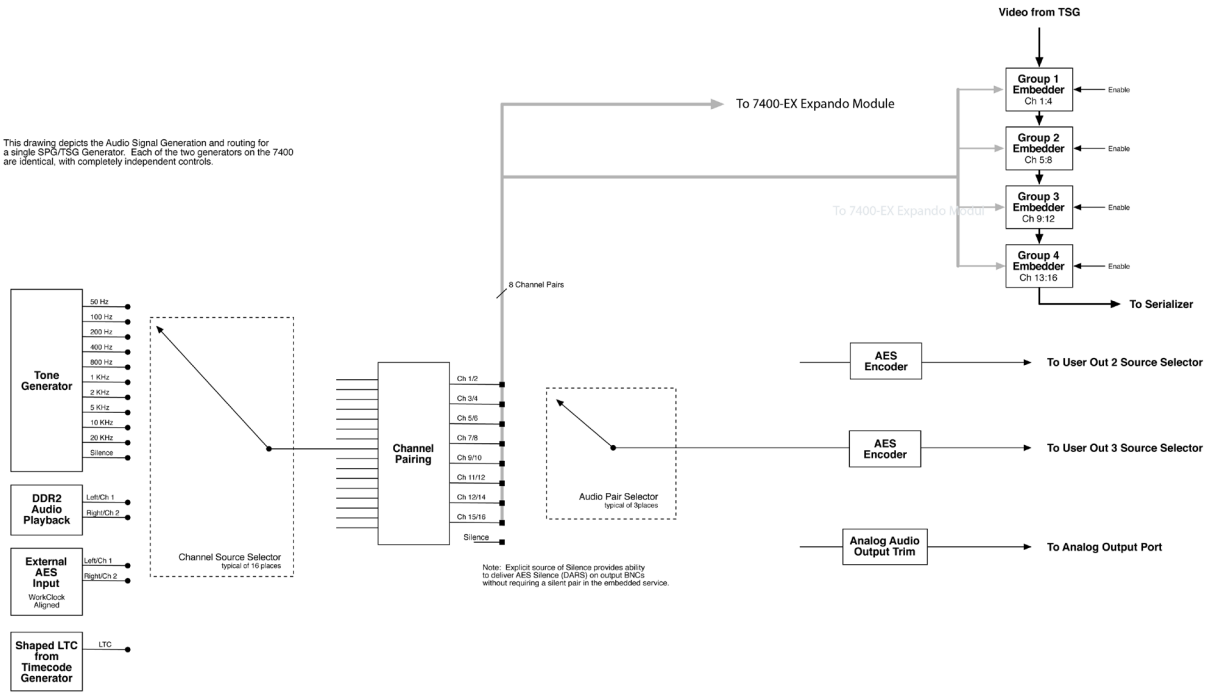
The AES digital audio outputs are always synchronous with all of the video outputs – regardless of format – because all of the video outputs can be locked to a common time base. Multiple tone generators can be used to identify multi-channel content. With the 7400-EX Expando option (not yet implemented), an AES input is provided which can be fed by a multi-channel encoded bitstream. This audio bitstream will be included in the set of signals that can be embedded into the test signal outputs.

Sixteen Independently Programmable Audio Channels Per Generator

Each generator supports sixteen audio channels and the content of each channel is independently programmable. Choices include adjustable frequency tone generators, tone sweeps, silence, timecode, audio clip playback from the 7400's secure digital card, and the external AES input. Left/right channel ID that synchronizes to the cyclops feature can also be selected.

Audio Embedded in the SDI Outputs

All sixteen of these channels can be embedded in the SDI outputs. Each AES output can select from any of the eight pairs that make up these sixteen channels. Similarly, the stereo analog output of each generator can be driven from any of these audio signal pairs.



7400 Audio Generation and Routing Diagram, portrait

7400 Audio Generation and Routing Diagram, landscape

INSTALLATION

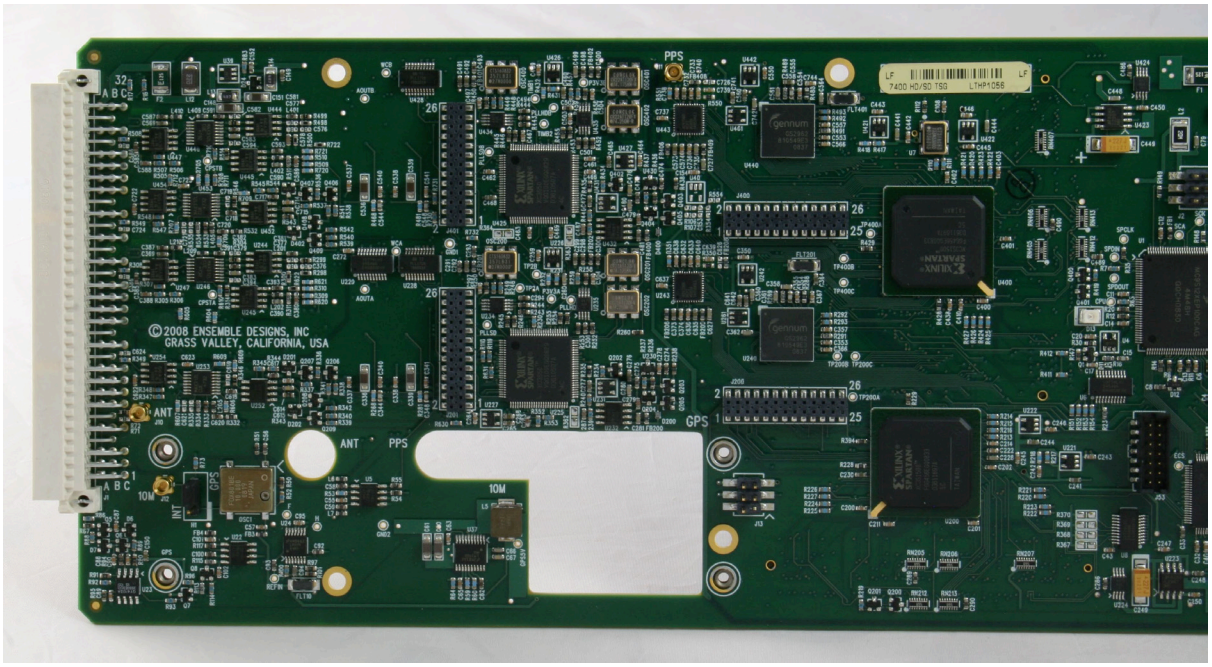
Plug the 7400 module into any one of the slots in the 3RU frame or any slot (except slot 3) in the 1RU frame. Install the plastic overlay provided onto the corresponding group of rear BNC connectors associated with the module location. Note that the plastic overlay has an optional adhesive backing for 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.

7400-GPS Installation

The 7400-GPS option seamlessly integrates into the Avenue system by plugging directly onto the 7400 module. It can be easily installed in the field. The 7400-GPS option consists of a compact, weatherproof antenna (with internal high-gain pre-amp) and a receiver submodule which mounts directly to the 7400 module. The included GPS antenna mounts onto standard 3/4" threaded pipe, metal or plastic. Connection from the F-style coaxial fitting on the antenna to the appropriate BNC on the Avenue Frame can be made with customer supplied standard 75 ohm cable. The coax cable can be routed through the center of the pipe for a completely waterproof installation. When low loss cable such as Belden 1694A is used, the antenna can be placed up to 200 feet (60 meters) from the frame. Ideally, the antenna is mounted outdoors where it has an unobstructed view of the sky.

7400 without GPS

The following photo, "7400 without GPS," shows the main 7400 module without the GPS submodule installed.

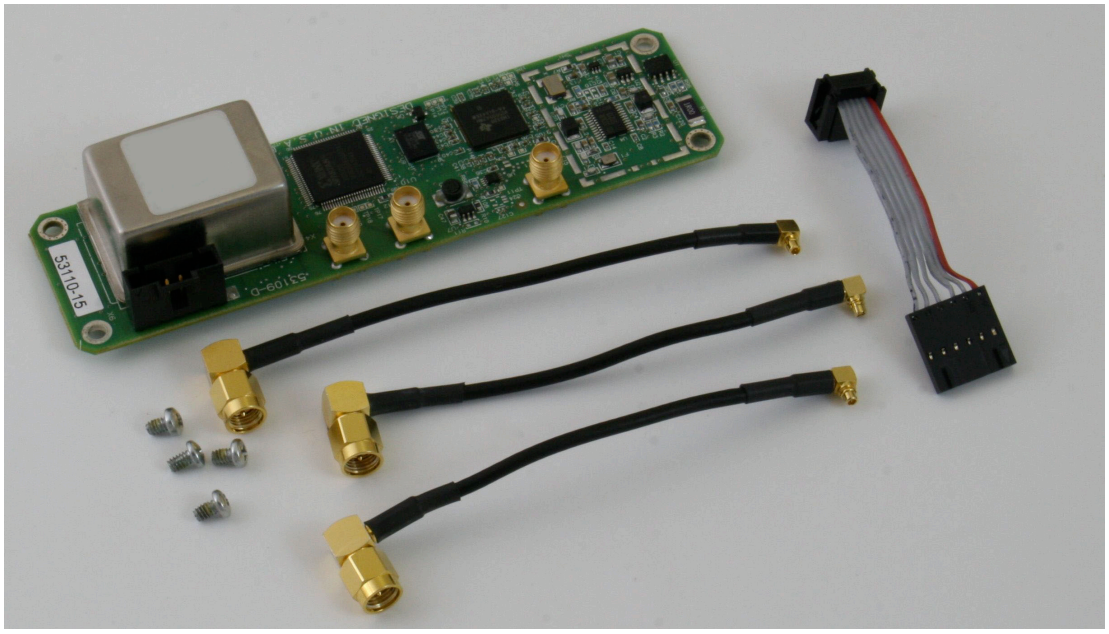


7400 without GPS

7400-GPS Option Kit

The 7400-GPS Option consists of the following components, depicted in the photograph below:

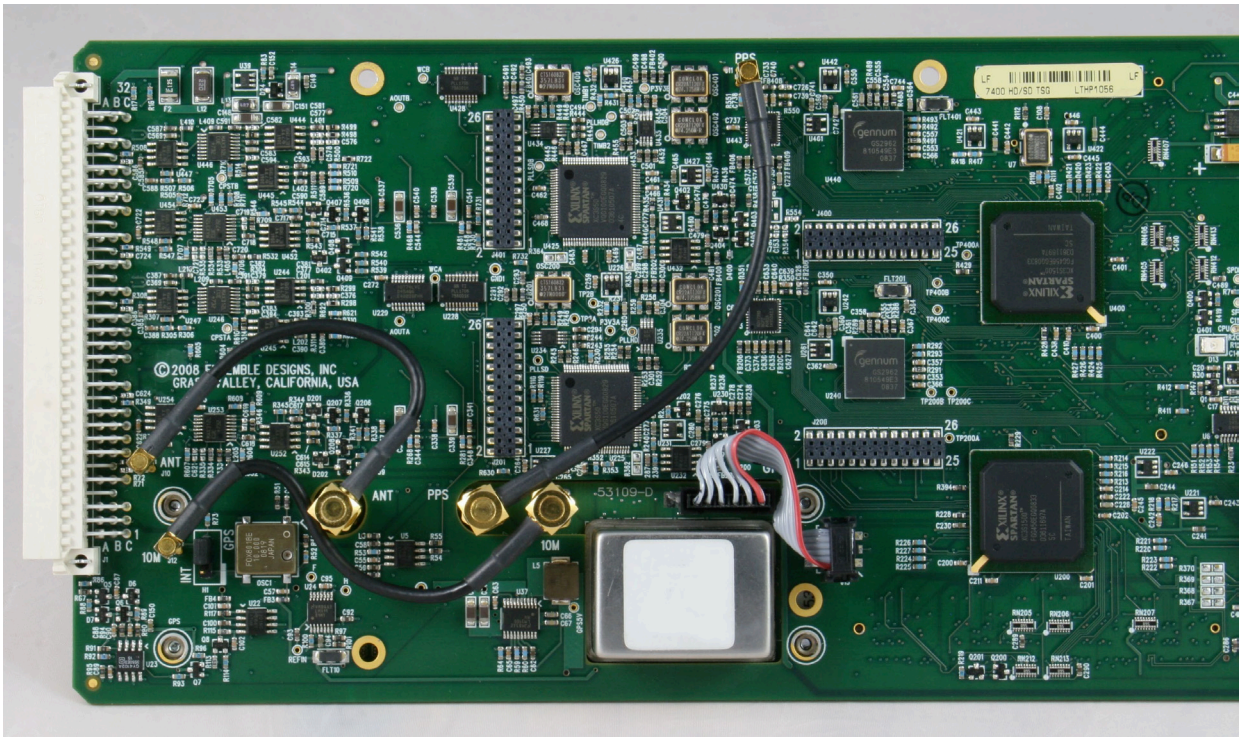
- GPS Option submodule
- Three coaxial jumper cables
- Power and control cable
- Four Phillips machine screws



7400-GPS Option Kit

7400-GPS Cabling Detail

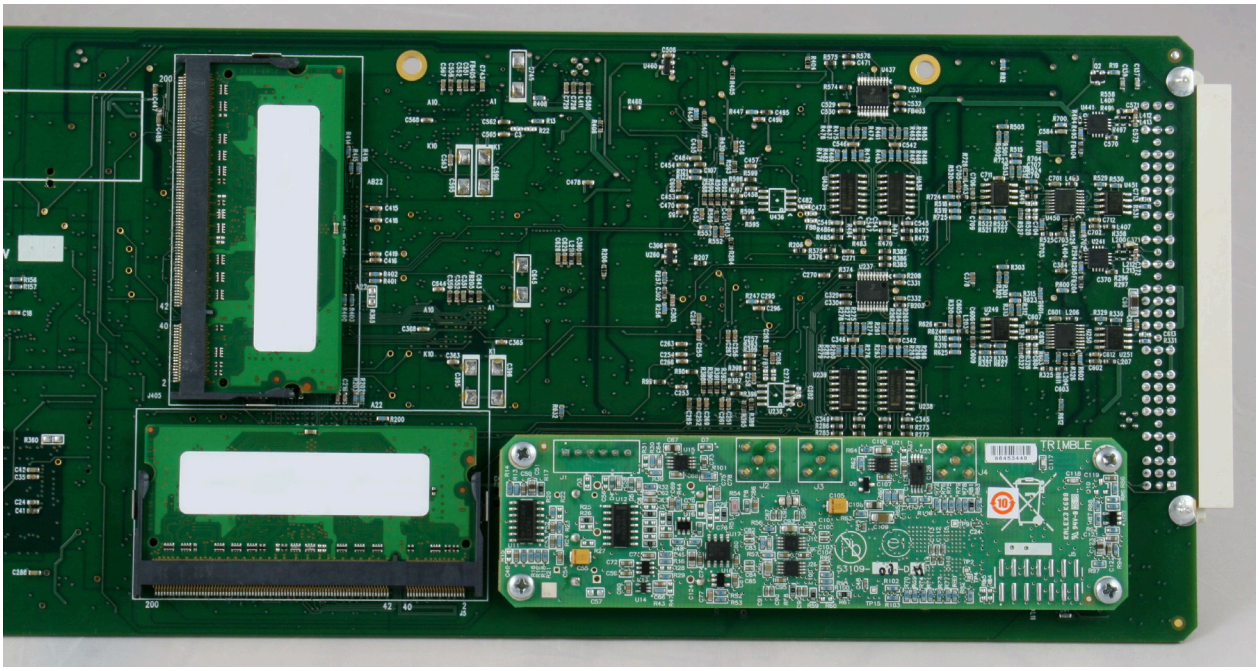
Mount the 7400-GPS submodule onto the main 7400 module using four screws. Then connect the cables as shown on the photo on the following page, "7400 GPS cabling detail." Note that for each of the three coaxial cables, the PC board connectors have matching labels: 10M goes to 10MANT, 10MANT goes to ANTPPS, ANTPPS goes to PPS. Notice also how the ribbon cable connects when the 7400-GPS Option is installed.



7400-GPS cabling detail

7400-GPS Rear View

The next photo, "7400-GPS rear view," shows the installed GPS submodule from the back of the 7400 board. This photo shows the four screws that retain the GPS submodule to the main 7400 module.



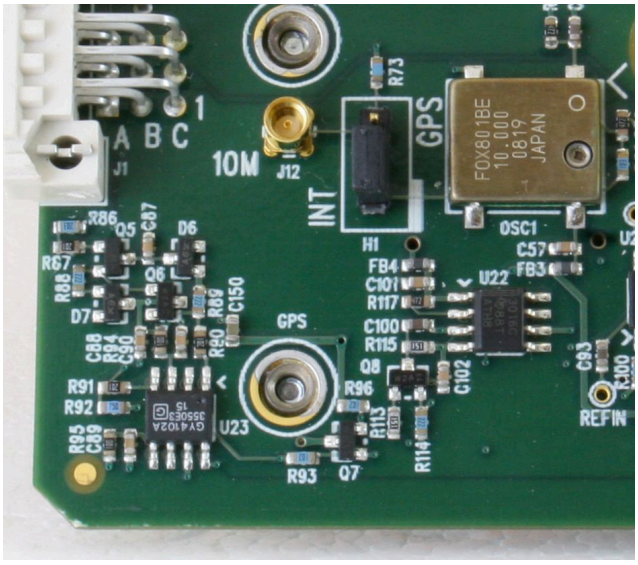
7400-GPS rear view

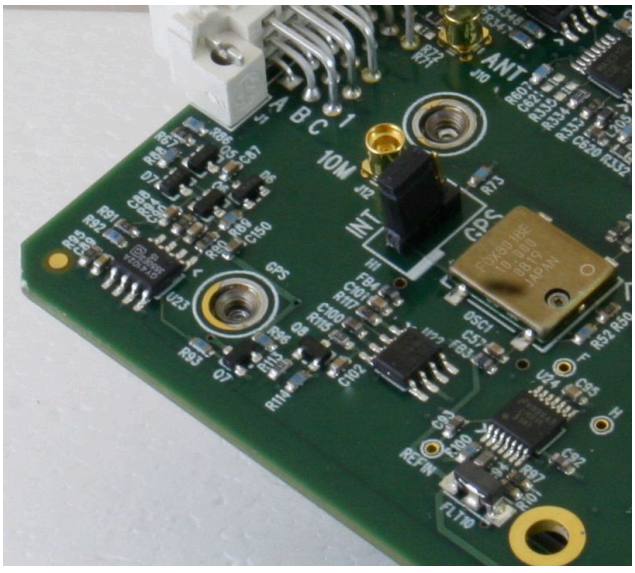
Even if you do not connect the GPS antenna to the 7400-GPS module, it will nevertheless provide greater accuracy than the module's internal TCXO (Temperature Compensated Crystal Oscillator).

H1 Jumper

For the 7400-GPS option to function properly, you must install the H1 jumper onto the 7400 module. If you do not install the H1 jumper, the 7400 will operate in free run.

The H1 jumper can be installed in one of two ways: INT or GPS. Install in the INT position to lock to the 7400's internal TCXO (Temperature Compensated Crystal Oscillator). Install in the GPS position to lock to the GPS time signal.



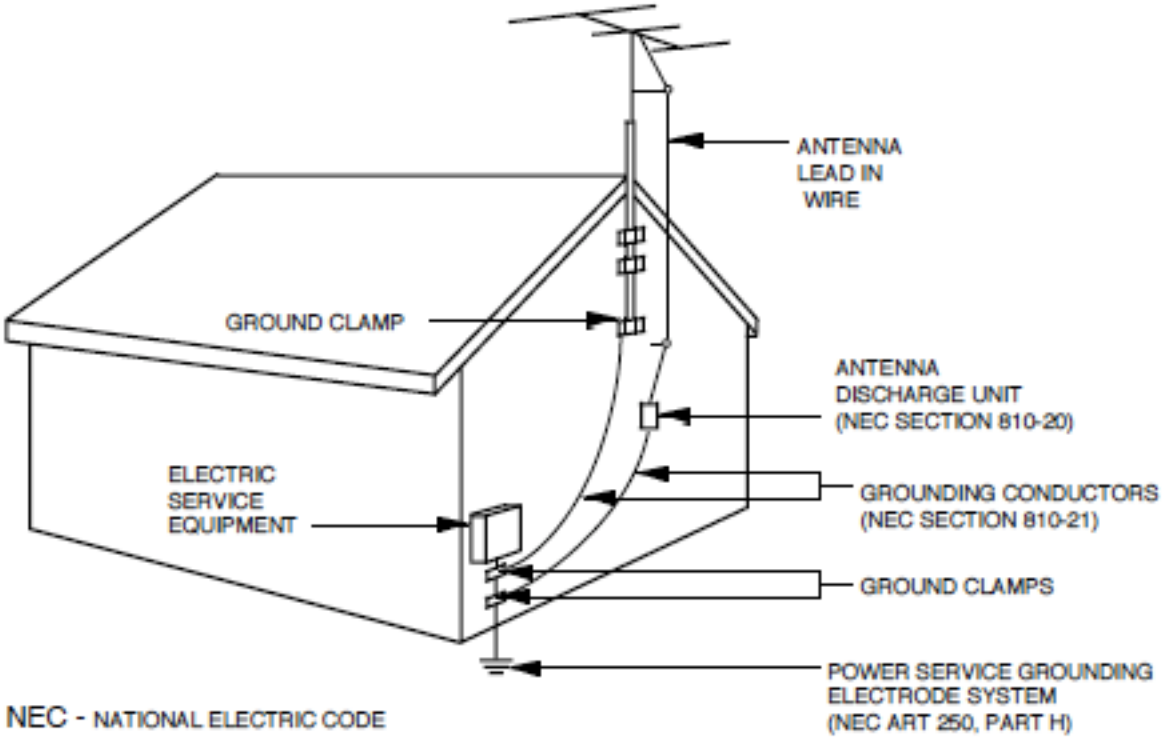


Safety and Outdoor Antenna Grounding

When installing the antenna for the 7400-GPS option, please be aware of safety precautions with respect to outdoor antenna grounding. Please read the following excerpt from the National Electric Code:

> "If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode."

Example of antenna grounding as per National Electrical Code, ANSI/NFPA 70

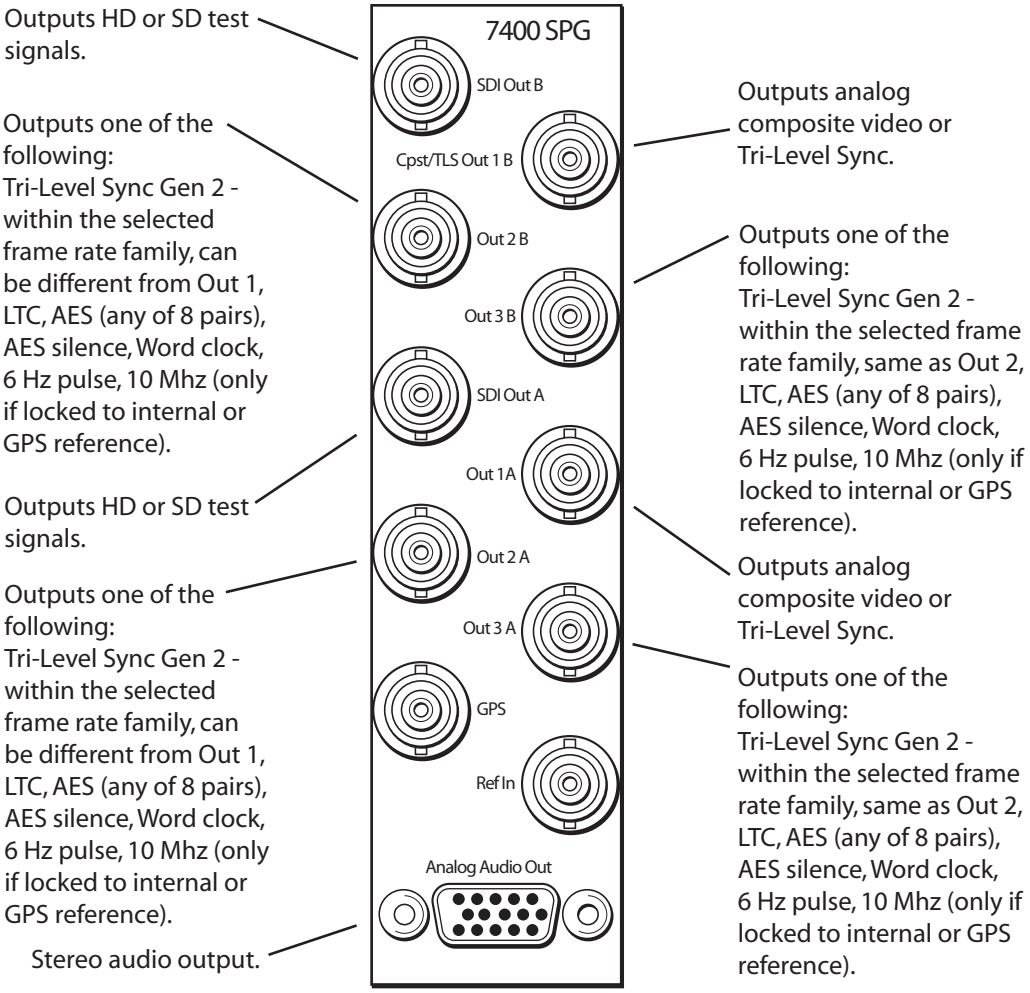


7400-EX Installation

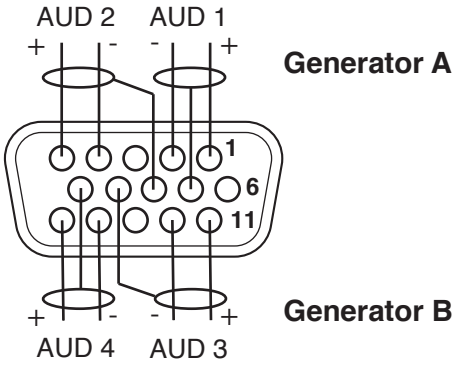
Ensemble Designs is not yet shipping the 7400-EX option.

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.



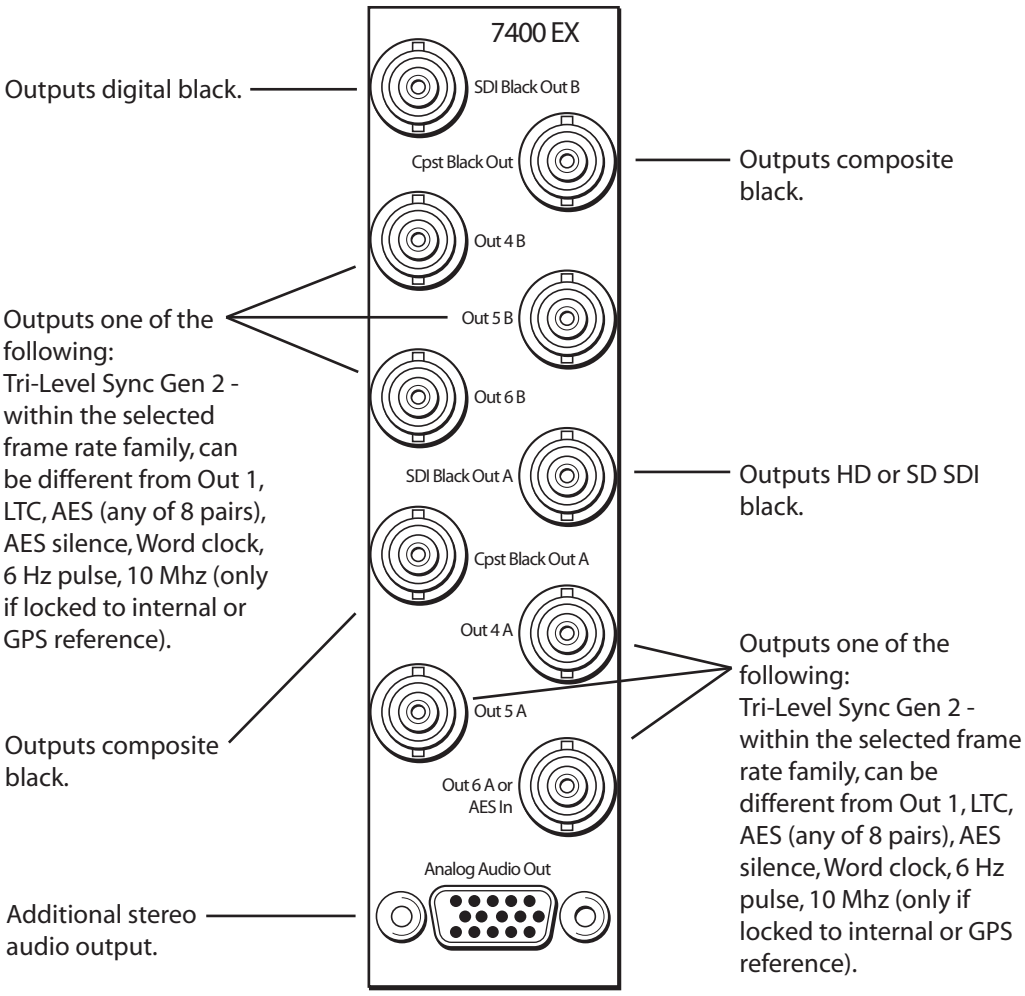
3RU Backplane for 7400



You can access four mono channels of audio analog tone outputs according to the pinout at left. Channels 1 and 2 come from Audio Generator A; Channels 3 and 4 come from Audio Generator B. Channels 1 through 4 can be assigned to any of the 16 channels of audio from the Aud Gen A/B menu pages. (See pages 38 and 51.)

AUD 1 is on pins 1 and 2 and the associated ground is pin 7. Pin 1 is positive. AUD 2 is on pins 4 and 5 and the associated ground is pin 8. Pin 5 is positive.

AUD 3 is on pins 11 and 12 and the associated ground is pin 9. Pin 11 is positive. AUD 4 is on pins 14 and 15 and the associated ground is pin 10. Pin 15 is positive.



3RU Backplane for 7400-EX

Generator A

SDI Out A – Outputs HD or SD test signals. Select frame rate family for all of **Generator A**; 59.94, 50 or 60. Output can include 16 channels of embedded audio – tone, silence, external audio, or audio file. Can also include DVITC.

Programmable Out 1A – Outputs analog composite video (Bars or Black), or Tri-Level Sync Gen 1 within selected frame rate family. Composite output can include VITC.

Programmable Out 2A – Outputs one of the following: Tri-Level Sync Gen 2 - within the selected frame rate family, can be different from Out 1, LTC, AES (any of 8 pairs), AES silence, Word clock, 6 Hz pulse, 10 Mhz (only if locked to internal or GPS reference).

Programmable Out 3A – Outputs one of the following: Tri-Level Sync Gen 2 - within the selected frame rate family, same as Out 2, LTC, AES (any of 8 pairs), AES silence, Word clock, 6 Hz pulse,10 Mhz (only if locked to internal or GPS reference).

Analog Audio - stereo output, 1 of 8 pairs from the audio generator.

Additional Outputs Available with 7400-EX Option

When the 7400-EX option is installed, the following additional outputs are available for **Generator A:**

Cpst Black Out A – Outputs composite black, 525 or 625 as per the selected frame family for the Generator. Can include VITC.

SDI Black Out A – Outputs digital black in the same standard and frame family as test signal SDI Out A. Up to sixteen channels of embedded audio. Can include DVITC.

Programmable Out 4A – Outputs one of the following: Tri-Level Sync Gen 2 - within the selected frame rate family, can be different from Out 1, LTC, AES (any of 8 pairs), AES silence, Word clock, 6 Hz pulse, 10 Mhz (only if locked to internal or GPS reference).

Programmable Out 5A – Outputs one of the following: Tri-Level Sync Gen 2 - within the selected frame rate family, can be different from Out 1, LTC, AES (any of 8 pairs), AES silence, Word clock, 6 Hz pulse, 10 Mhz (only if locked to internal or GPS reference).

Programmable Out 6A – Outputs one of the following: Tri-Level Sync Gen 2 - within the selected frame rate family, can be different from Out 1, LTC, AES (any of 8 pairs), AES silence, Word clock, 6 Hz pulse, 10 Mhz (only if locked to internal or GPS reference).

Expanded Analog Audio - provides an additional stereo output, 1 of 8 pairs from the audio generator.

Generator B

Has the same outputs as noted for **Generator A**. **Generator B** is completely independent from **Generator A**. **Generator B** can operate in a different frame rate family and its set of outputs can be timed independently.

MODULE CONFIGURATION AND CONTROL

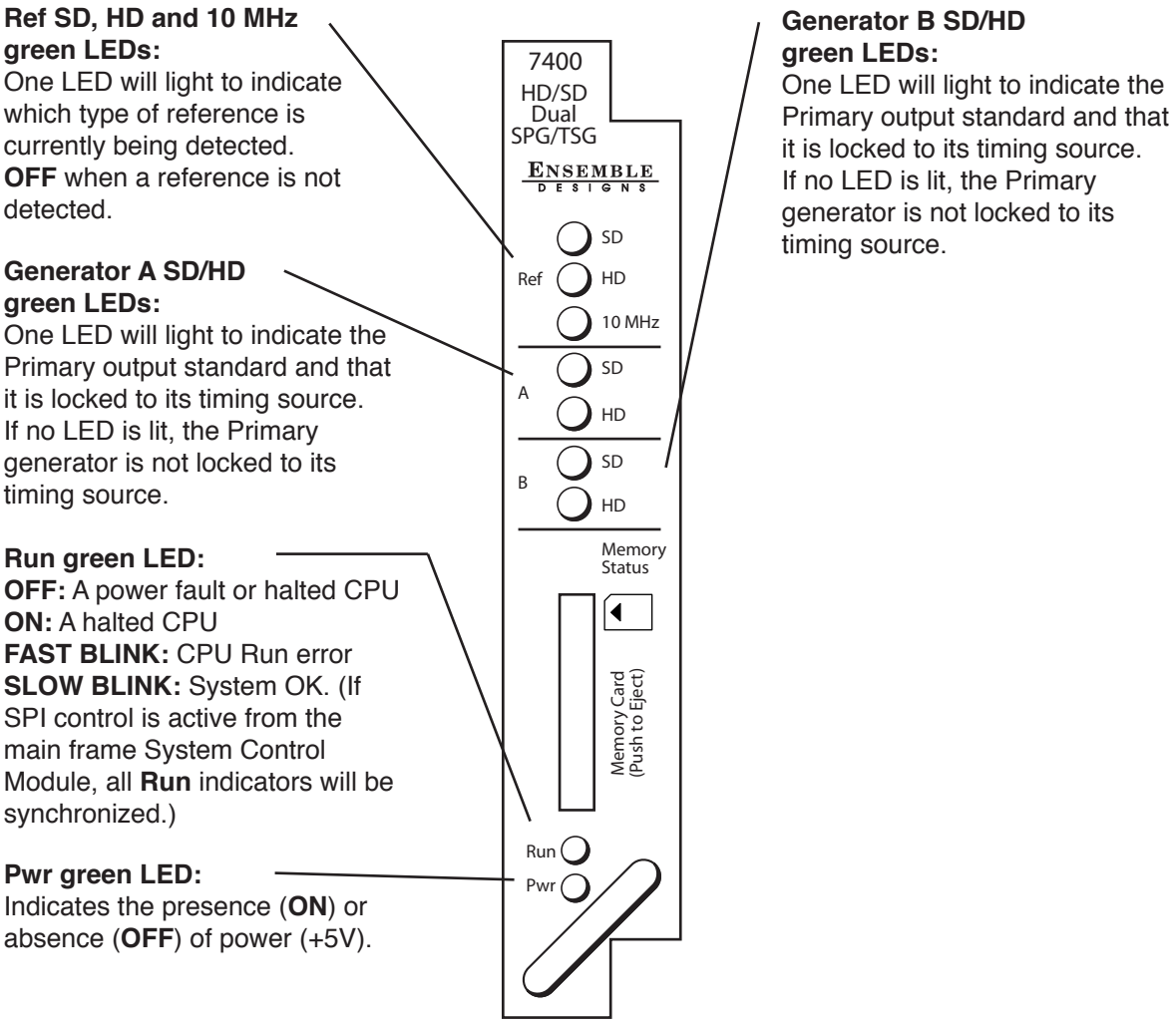
Avenue module parameters can be configured and controlled remotely from one or both of the remote control options: the Avenue Touch Screen or the Avenue PC Application. Once the module parameters have been set remotely, the information is stored on the module CPU. This allows the module be moved to a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

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 data pack following the Avenue PC Remote Configuration section.

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 menu for this module is illustrated and explained below. Refer to each menu's description in the following pages for a summary of available parameters that can be set remotely through the menus illustrated. 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.

7400 Avenue PC Menus

Selecting the Reference Source and Output Standard for Sync Pulse Generator A (SPG A Menu)

The **SPG A** menu controls the **SDI Out A** BNC. The standard selected determines what signal will be output on the **SDI Out A** BNC.

Important: Additionally, the standard selected in the **SPG A** menu determines the frame rate family for all of the **Generator A** BNC outputs (**SDI Out A**, **Out 1A**, **Out 2A**, **Out 3A**). For example, if the standard is set to SD 525 or 720p/59.94, then all **Generator A** outputs will be in the 59.94 Hz frame rate family. If the standard is set to SD 625 or 1080i/50, then all **Generator A** outputs will be in the 50 Hz frame rate family.

To select the reference source and output standard of **Sync Pulse Generator A**, select the **SPG A** menu shown below. Set the parameters for the **Source** and **Standard** fields. The standard that the module is locked to is shown in the **Sync Lock** field. Use the controls to set the following:

- **Source** – select the reference source for **Generator A**. Select from:

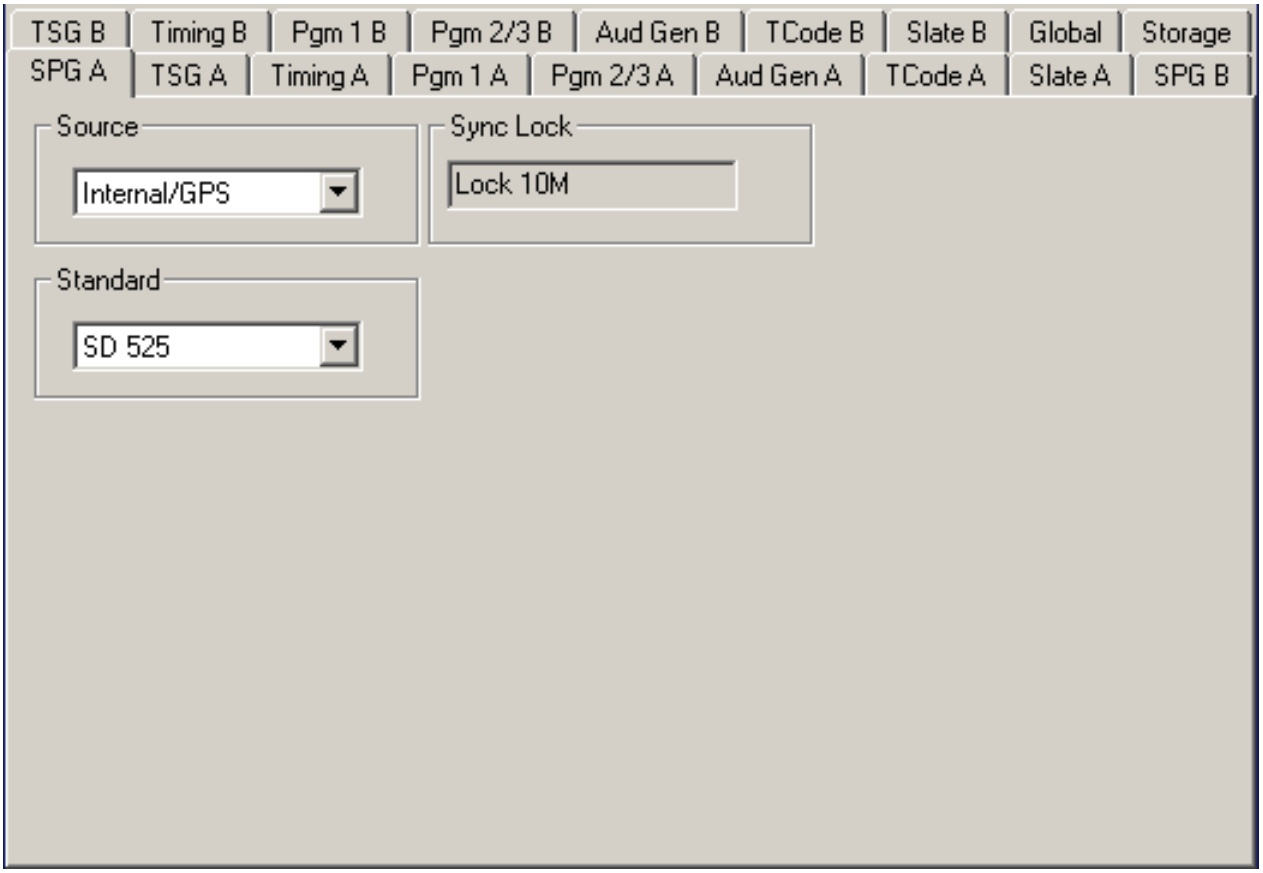
  - **Internal/GPS** -- the module's Internal Precision Standard reference signal, or the signal from the GPS Receiver (with 7400-GPS Option installed). If the GPS signal is present, the 7400 will lock to that. If the GPS signal is not present, the 7400 will lock to its internal TCXO.

  - **Config Ref** -- locks to the source selected as the **Config Ref** in the **Global** menu. If you choose **Config Ref**, you must have configured that parameter in the **Global** menu. *See the description of the* **Global** *menu on page 55 for more information.*

- **Sync Lock** – shows what standard the module is locked to. If the module is not locked to a standard, it displays No Lock. (**Note:** With the GPS option, you must install the H1 jumper. Otherwise, the module will not lock and will be in free run. *See the GPS Installation section on page 19 for more information.*)

- **Standard** – select the output standard you want from the following:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24
  SD 525
  SD 625


TSG B
Timing B
Pgm 1 B
Pgm 2/3 B
Aud Gen B
TCode B
Slate B
Global
Storage
SPG A
TSG A
Timing A
Pgm 1 A
Pgm 2/3 A
Aud Gen A
TCode A
Slate A
SPG B
Source
Internal/GPS
Sync Lock
Lock 10M
Standard
SD 525

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator A (TSG A Menu)

The **TSG A** menu affects the **SDI Out A** BNC. It also affects the **Out 1A** BNC if it has been set to "Follow SDI."

To set the type of test pattern for the output of **Test Signal Generator A**, select the **TSG A** menu shown below. This menu also has controls for turning on and off the Y, Cr and Cb channels.

Use the controls to set the following:

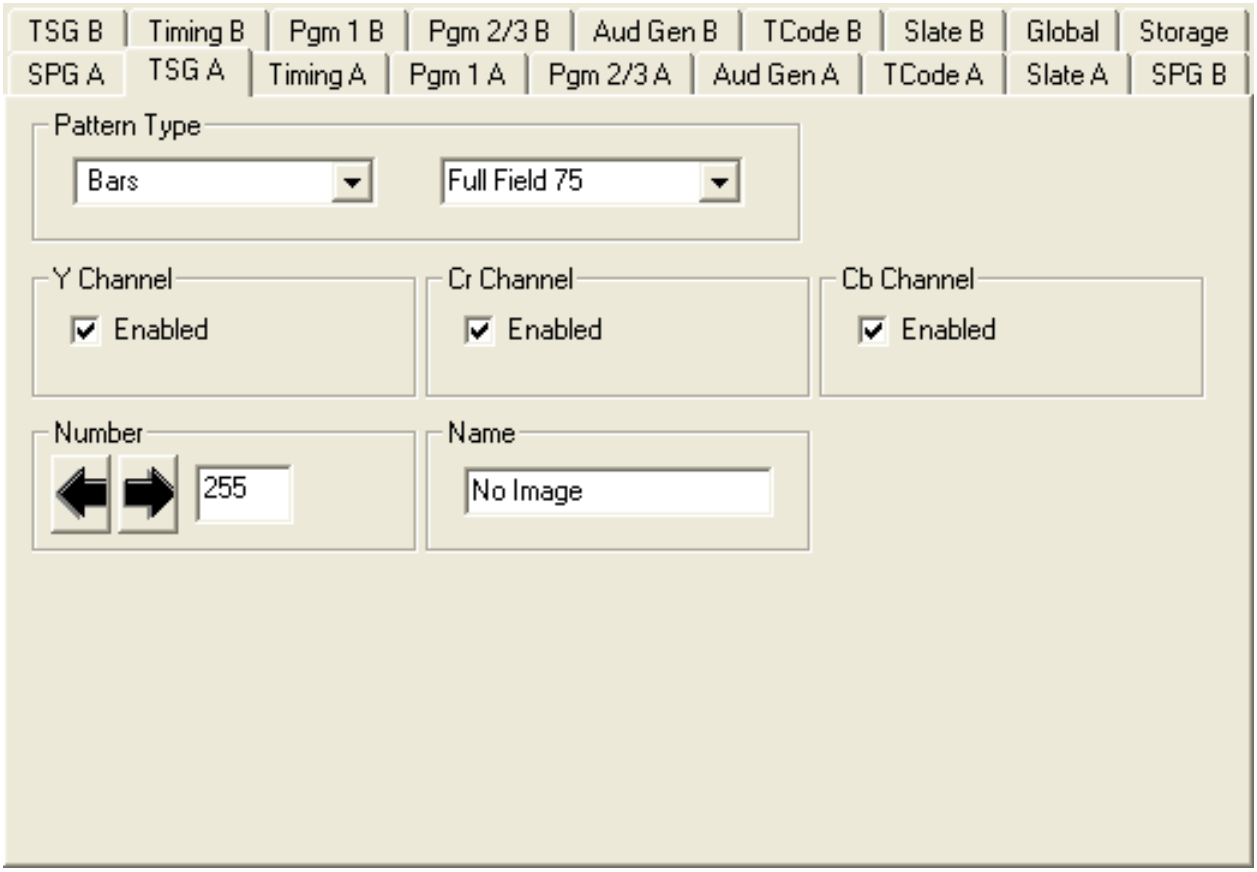
- **Pattern Type** – Select the pattern group in the first drop-down menu and the test signal in the second drop-down menu.

Pattern Group	Test Signal
Bars	Full Field 75 Full Field 100 SMPTE 75 Split Field 75 Split Field 100 Red Field
Black	Black Flat Field 20 Flat Field 50 Flat Field 80 White
Ramp	Video Ramp Data Ramp Shallow 5 Step
Sweep	Sweep MultiBurst
Pulse & Bar	Full Field Window Component
Timing	Digital Blanking Cosite Interlace
Misc	Black Crosshatch Safe Title Pathological

- **Y Channel, Cr Channel, Cb Channel checkboxes** – There are independent enables for each channel so that Y, Cr and Cb can be controlled separately. You may choose to turn off the Y, Cr and/or Cb Channels if desired for test purposes (such as setting up a monitor, for example). To turn off one or more channels, deselect the Enabled check box.

- **Number** – Select from 0 to 255. This refers to the number associated with up to 255 custom test patterns.

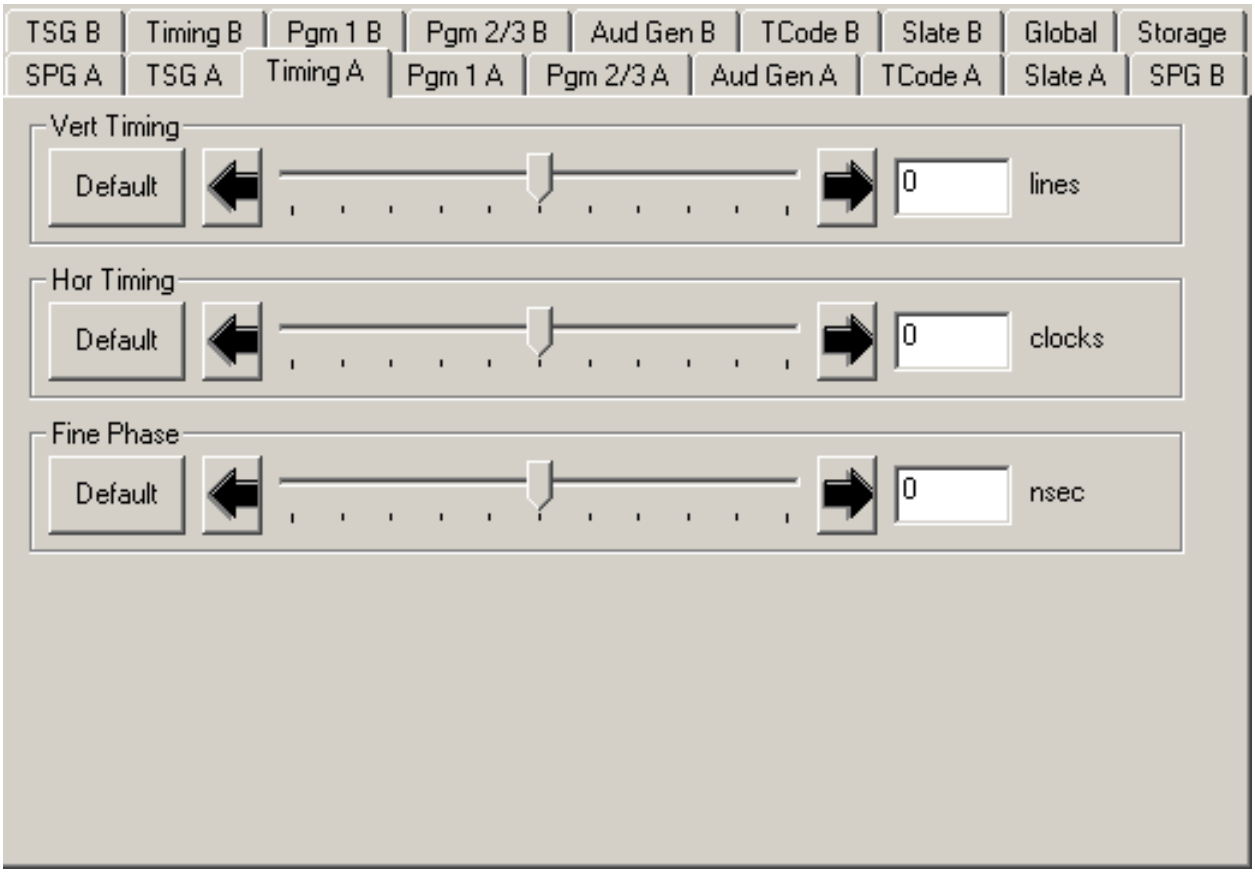
- **Name** – Each of the up to 255 custom test patterns will have a name when loaded from the storage card.



Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator A (Timing A Menu)

The **Timing A** menu shown below allows you to set the timing of the **Generator A** outputs with respect to the reference selected in the **SPG A** menu. This menu affects the SDI output, the principal output of the generator, which applies to **SDI Out A** and **Programmable Output 1A** (**Out 1A** BNC). Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the Primary output in nanoseconds.



Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1A (Pgm 1A Menu)

The **Pgm 1 A** menu shown below allows you to set the **Programmable Output 1A**, the Tri-Level Sync output standard, vertical and horizontal timing and fine phase. This menu affects the **Out 1A** BNC.

Note: The selections you make from the **Pgm 1 OutSel** and **TLS Gen 1 Std** drop-down menus have to be from the same frame rate family as the standard selected in the **SPG A** menu.

Use the controls to set the following:

- **Pgm 1 OutSel** – Choose from:

  Black
  Color Bars
  Follow SDI Out
  TLS Gen 1

  When "Follow SDI Out" is selected, the settings from the **TSG A** menu are being used.

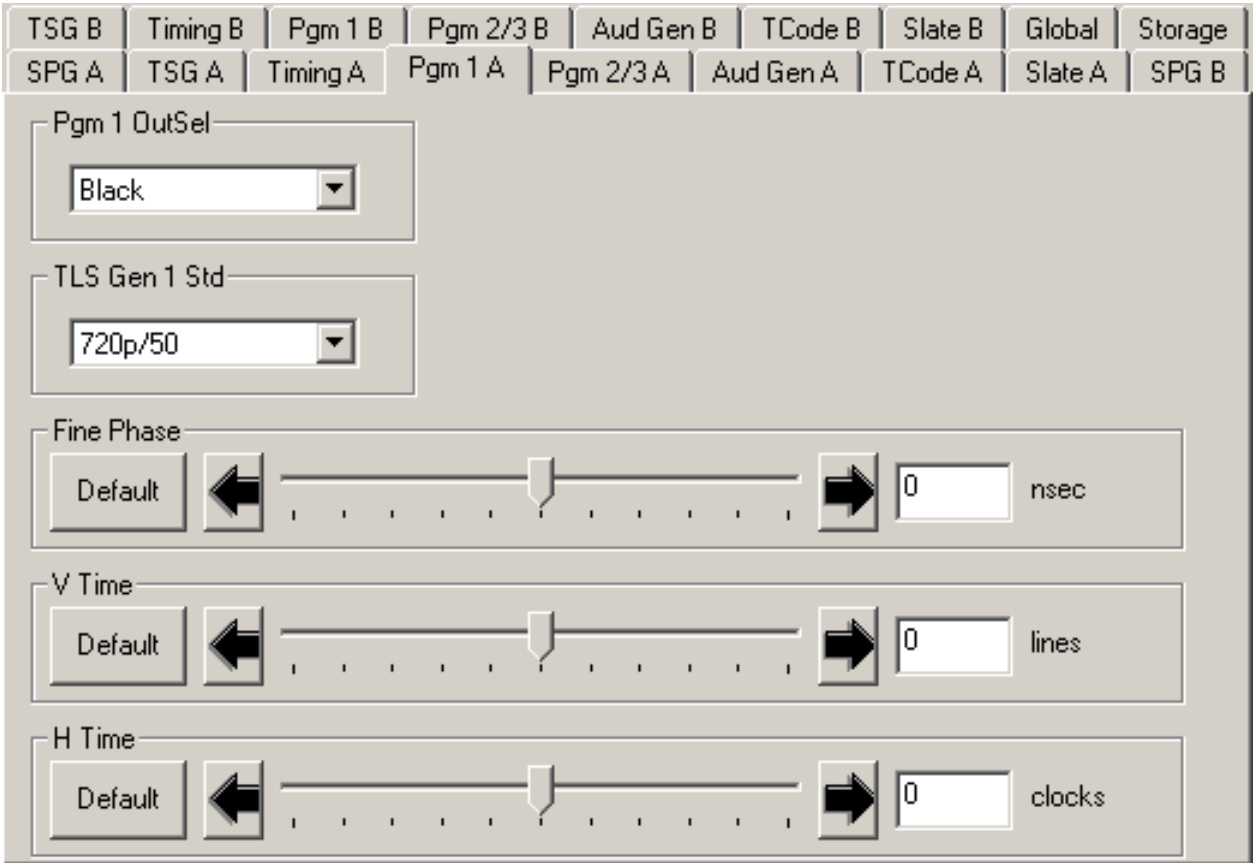
- **TLS Gen 1 Std** – Choose an output standard from the following options:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the output in nanoseconds.

Note: If you select "Follow SDI Out" from the **Pgm 1 OutSel** drop-down menu, the **Vert Timing**, **Hor Timing** and **Fine Phase** controls will not be usable and will be grayed out.


TSG B
Timing B
Pgm 1 B
Pgm 2/3 B
Aud Gen B
TCode B
Slate B
Global
Storage
SPG A
TSG A
Timing A
Pgm 1 A
Pgm 2/3 A
Aud Gen A
TCode A
Slate A
SPG B
Pgm 1 OutSel
Black
TLS Gen 1 Std
720p/50
Fine Phase
Default
0
nsec
V Time
Default
0
lines
H Time
Default
0
clocks

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2A and 3A (Pgm 2/3 A Menu)

The **Pgm 2/3 A** menu shown below allows you to set the **Programmable Output 2A and 3A**, the output standard and the vertical and horizontal timing for Tri-Level Sync Generator 2. This menu affects the **Out 2A** and **Out 3A** BNCs.

Use the controls to set the following:

- **Pgm 2 OutSel** – Affects **Out 2A** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

- **Pgm 3 OutSel** – Affects **Out 3A** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

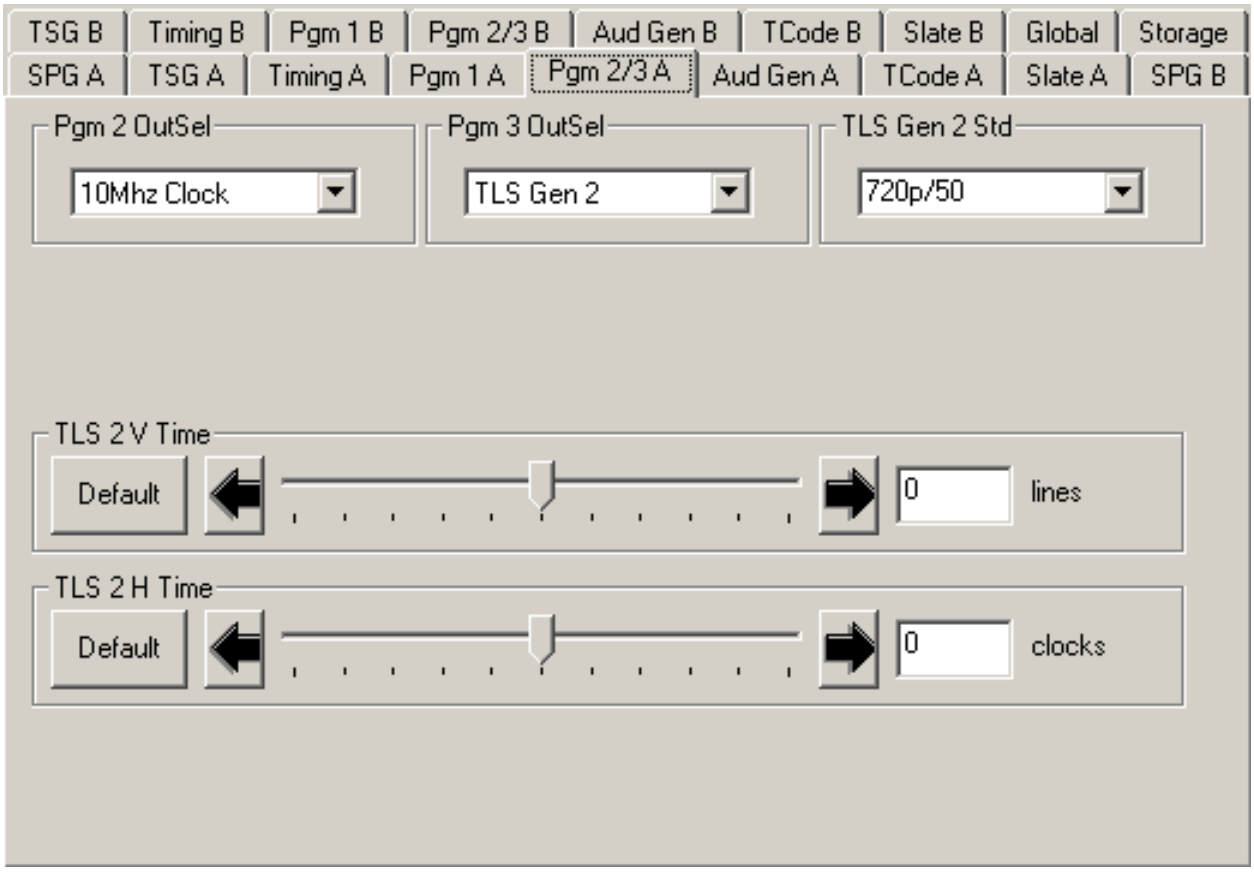
- **TLS Gen 2 Std** – Choose the output standard for Tri-Level Sync Generator 2. Choose from:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

- **TLS 2 V Time** – Set the vertical timing in lines for **Tri-Level Sync Generator 2**.

- **TLS 2 H Time** – Set the horizontal timing in clocks for **Tri-Level Sync Generator 2**.

  Use the slider controls or arrows to select a value or enter a value into the number fields.



Setting the Audio Generation and Routing Parameters for Audio Generator A (Aud Gen A Menu)

There are two generators on each 7400, **Generator A** and **Generator B**. Each of the two generators on the 7400 are identical, with completely independent controls. The two AES digital audio outputs are always synchronous with all of the video outputs – regardless of format – because all of the video outputs can be locked to a common time base. Multiple tone generators can be used to identify multi-channel content. Each generator supports sixteen audio channels and the content of each channel is independently programmable. Choices include adjustable frequency tone generators, tone sweeps, silence, timecode, audio clip playback from the 7400's secure digital card, and the external AES input. All sixteen of these channels can be embedded in the SDI outputs. Each AES output can select from any of the eight pairs that make up these sixteen channels.

This menu affects the **Out 2A** and **Out 3A** BNCs.

There are three types of audio output: Embedding, AES—goes to user-programmable output 2 (**Out 2A**) and 3 (**Out 3A**)—and Analog (output goes to **15-pin D connector**).

The **Aud Gen A** menu shown below allows you to set the **Channel Number**, the **Audio Source**, to make Embedded Audio selections, and to choose the channel for **Analog Out**.

Use the controls to set the following:

- **Chan Number** – Available selections are 1 through 16
- **Audio Source** – Available selections are:

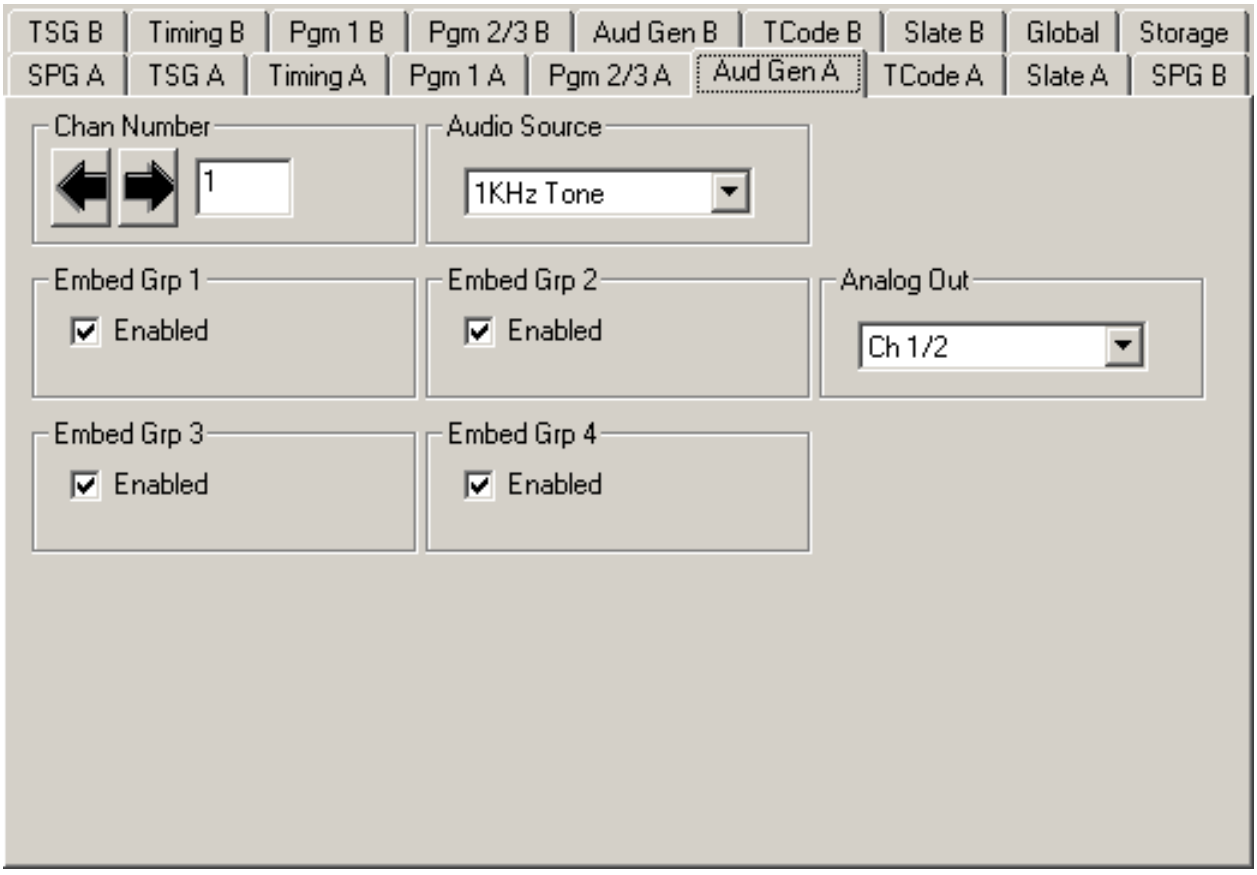
  50Hz Tone
  100Hz Tone
  200Hz Tone
  400Hz Tone
  800Hz Tone
  1kHz Tone
  2kHz Tone
  5kHz Tone
  Silence
  TSG Audio
  Timecode
  External AES

- **Embed Grp 1 through 4**

  Group 1 includes channels 1/2 and 3/4.
  Group 2 includes channels 5/6 and 7/8.
  Group 3 includes channels 9/10 and 11/12.
  Group 4 includes channels 13/14 and 15/16.

- **Analog Out** – Available selections are:

  Channels 1/2
  Channels 3/4
  Channels 5/6
  Channels 7/8
  Channels 9/10
  Channels 11/12
  Channels 13/14
  Channels 15/16

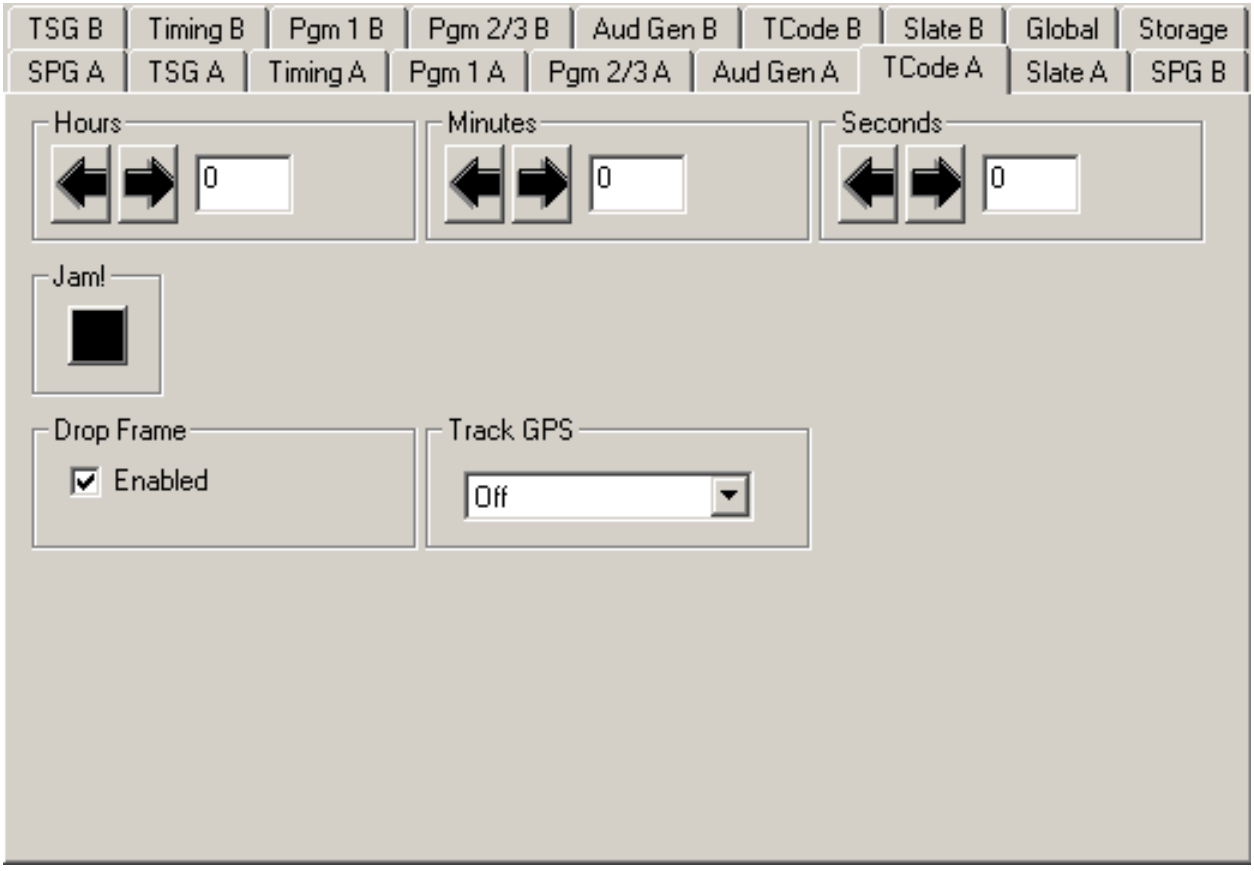


Setting the Parameters for Timecode A (TCode A Menu)

The **TCode A** menu shown below allows you to set the parameters for Timecode A.

Use the controls to set the following:

- **Hours** – 1 through 23
- **Minutes** – 1 through 59
- **Seconds** – 1 through 59
- **Jam!** – To manually enter the stating timecode value, type in the desired values in the **Hours**, **Minutes** and **Seconds** fields, then click the **Jam!** button.
- **Drop Frame** – Select the checkbox to enable Drop Frame (dropping two frames every minute except on every tenth minute) to allow time code to match a real-time clock.
- **Track GPS** – On or Off. If you select On, make sure that you have installed the GPS submodule properly and connected the H1 jumper correctly. *See the GPS submodule installation section on page 19 for more information.*

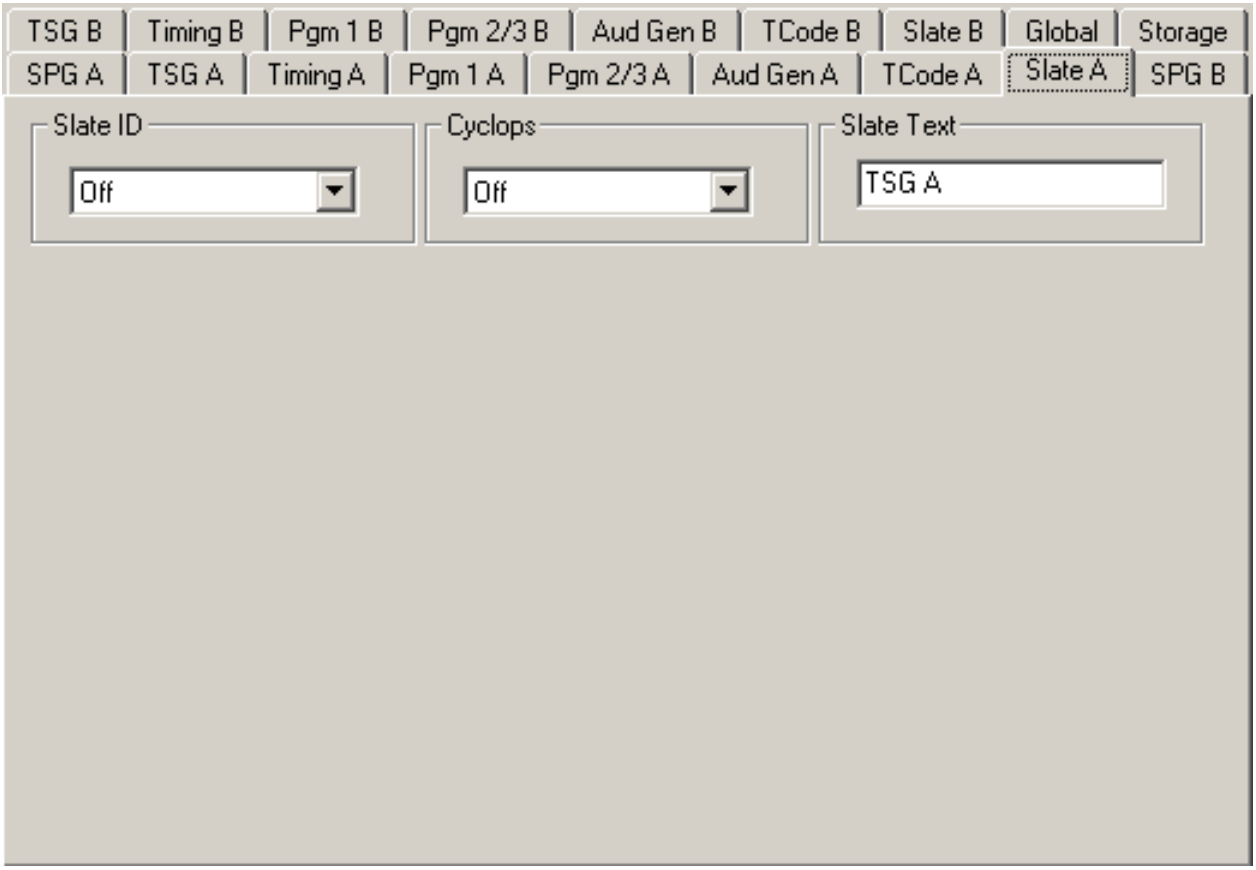


Setting the Parameters for Slate A (Slate A Menu)

The **Slate A** menu shown below allows you to set the parameters for **Slate A**, an ID Slate with user-programmable text that can overlay the test pattern.

Use the controls to set the following:

- **Slate ID** – On or Off. Select On if you want to use the Slate A feature.
- **Cyclops** – On or Off. Adds a motion element to the video test signal which proves that the signal reaching this destination is a true live signal and not a freeze frame from a frame synchronizer that has lost its input.
- **Slate Text** – Enter the text that you want to overlay on the test pattern and hit enter on your computer keyboard.



Selecting the Reference Source and Output Standard for Sync Pulse Generator B (SPG B Menu)

The **SPG B** menu controls the **SDI Out B** BNC. The standard selected determines what signal will be output on the **SDI Out B** BNC.

Important: Additionally, the standard selected in the **SPG B** menu determines the frame rate family for all of the **Generator B** BNC outputs (**SDI Out B**, **Out 1B**, **Out 2B**, **Out 3B**). For example, if the standard is set to SD 525 or 720p/59.94, then all **Generator B** outputs will be in the 59.94 Hz frame rate family. If the standard is set to SD 625 or 1080i/50, then all **Generator B** outputs will be in the 50 Hz frame rate family.

To select the reference source and output standard of **Sync Pulse Generator B**, select the **SPG B** menu shown below. Set the parameters for the **Source** and **Standard** fields. The standard that the module is locked to is shown in the **Sync Lock** field. Use the controls to set the following:

- **Source** – select the reference source for **Generator B**. Select from:

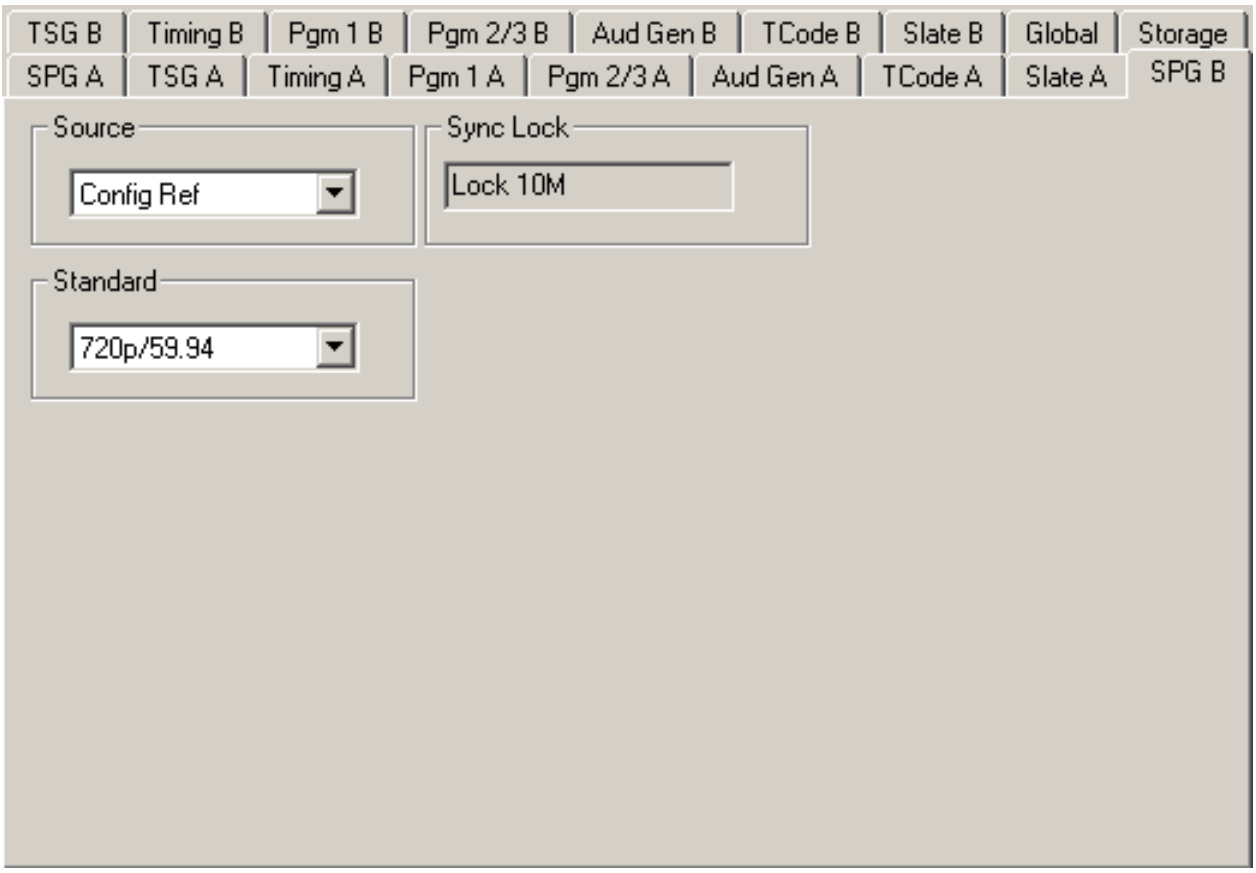
  - **Internal/GPS** -- the module's Internal Precision Standard reference signal, or the signal from the GPS Receiver (with 7400-GPS Option installed). If the GPS signal is present, the 7400 will lock to that. If the GPS signal is not present, the 7400 will lock to its internal TCXO.

  - **Config Ref** -- locks to the source selected as the **Config Ref** in the **Global** menu. If you choose **Config Ref**, you must have configured that parameter in the **Global** menu. *See the description of the **Global** menu on page 55 for more information.*

- **Sync Lock** – shows what standard the module is locked to. If the module is not locked to a standard, it displays No Lock. (Note: With the GPS option, you must install the H1 jumper. Otherwise, the module will not lock and will be in free run. *See the GPS Installation section on page 19 for more information.*)

- **Standard** – select the output standard you want from the following:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24
  SD 525
  SD 625


TSG B
Timing B
Pgm 1 B
Pgm 2/3 B
Aud Gen B
TCode B
Slate B
Global
Storage
SPG A
TSG A
Timing A
Pgm 1 A
Pgm 2/3 A
Aud Gen A
TCode A
Slate A
SPG B
Source
Config Ref
Sync Lock
Lock 10M
Standard
720p/59.94

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator B (TSG B Menu)

The **TSG B** menu affects the **SDI Out B** BNC. It also affects the **Out 1B** BNC if it has been set to "Follow SDI."

To set the type of test pattern for the output of **Test Signal Generator B**, select the **TSG B** menu shown below. This menu also has controls for turning on and off the Y, Cr and Cb channels.

Use the controls to set the following:

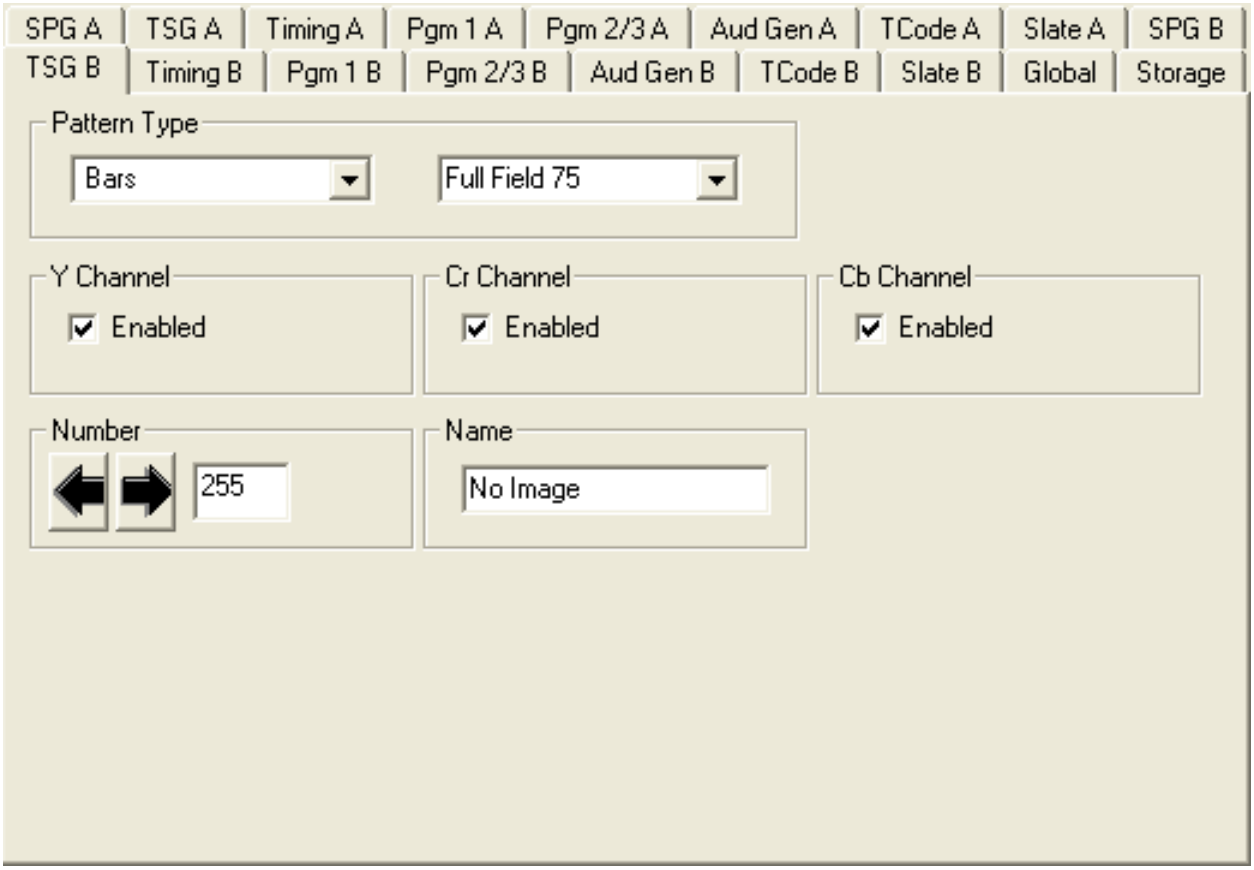
- **Pattern Type** – Select the pattern group in the first drop-down menu and the test signal in the second drop-down menu.

Pattern Group	Test Signal
Bars	Full Field 75 Full Field 100 SMPTE 75 Split Field 75 Split Field 100 Red Field
Black	Black Flat Field 20 Flat Field 50 Flat Field 80 White
Ramp	Video Ramp Data Ramp Shallow 5 Step
Sweep	Sweep MultiBurst
Pulse & Bar	Full Field Window Component
Timing	Digital Blanking Cosite Interlace
Misc	Black Crosshatch Safe Title Pathological

- **Y Channel, Cr Channel, Cb Channel checkboxes** – There are independent enables for each channel so that Y, Cr and Cb can be controlled separately. You may choose to turn off the Y, Cr and/or Cb Channels if desired for test purposes (such as setting up a monitor, for example). To turn off one or more channels, deselect the Enabled check box.

- **Number** – Select from 0 to 255. This refers to the number associated with up to 255 custom test patterns.

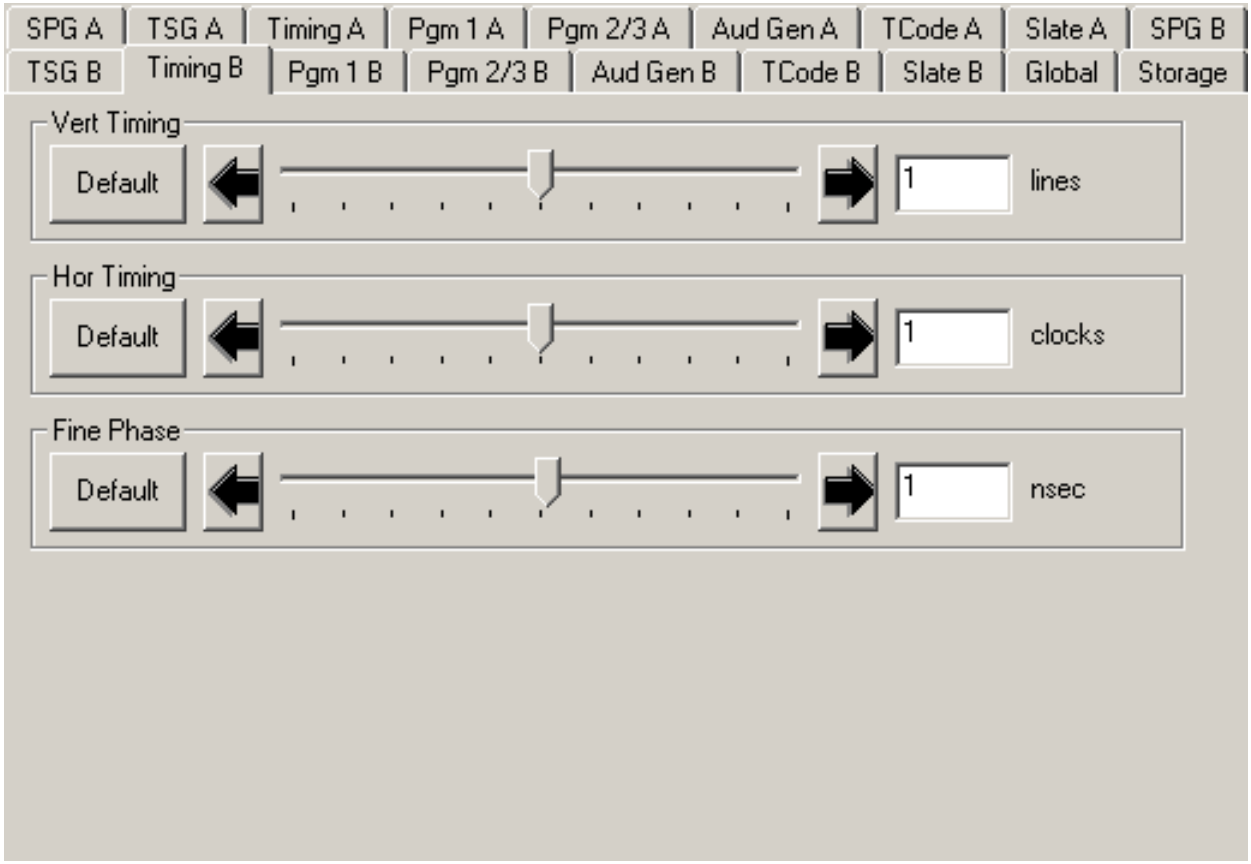
- **Name** – Each of the up to 255 custom test patterns will have a name when loaded from the storage card.



Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator B (Timing B Menu)

The **Timing B** menu shown below allows you to set the timing of the **Generator B** outputs with respect to the reference selected in the **SPG B** menu. This menu affects the SDI output, the principal output of the generator, which applies to **SDI Out B** and **Programmable Output 1B** (**Out 1B** BNC). Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the Primary output in nanoseconds.



Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1B (Pgm 1B Menu)

The **Pgm 1 B** menu shown below allows you to set the **Programmable Output 1B**, the Tri-Level Sync output standard, vertical and horizontal timing and fine phase. This menu affects the **Out 1B** BNC.

Note: The selections you make from the **Pgm 1 OutSel** and **TLS Gen 1 Std** drop-down menus have to be from the same frame rate family as the standard selected in the **SPG B** menu.

Use the controls to set the following:

- **Pgm 1 OutSel** – Choose from:

  Black
  Color Bars
  Follow SDI Out
  TLS Gen 1

  When "Follow SDI Out" is selected, the settings from the **TSG B** menu are being used.

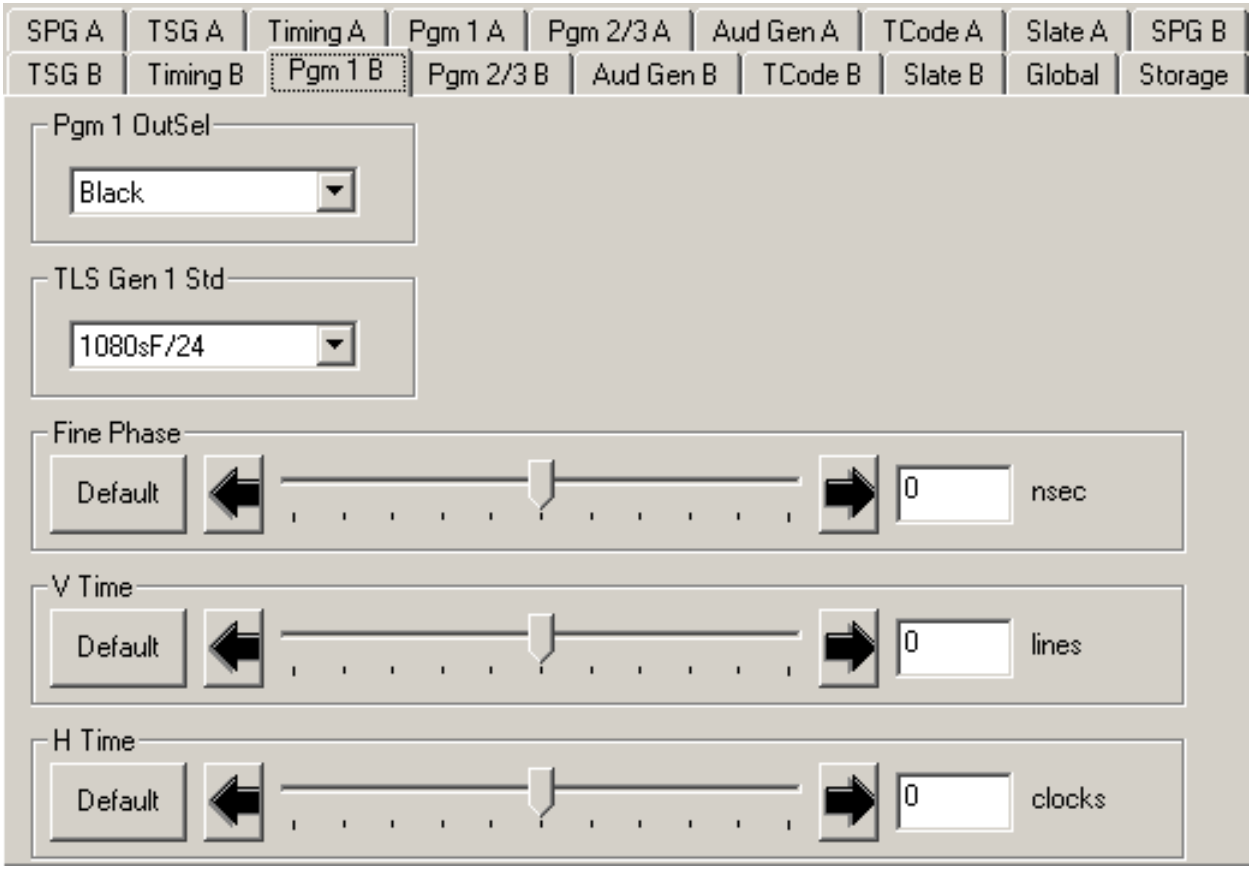
- **TLS Gen 1 Std** – Choose an output standard from the following options:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the output in nanoseconds.

Note: If you select "Follow SDI Out" from the **Pgm 1 OutSel** drop-down menu, the **Vert Timing**, **Hor Timing** and **Fine Phase** controls will not be usable and will be grayed out.


SPG A
TSG A
Timing A
Pgm 1 A
Pgm 2/3 A
Aud Gen A
TCode A
Slate A
SPG B
TSG B
Timing B
Pgm 1 B
Pgm 2/3 B
Aud Gen B
TCode B
Slate B
Global
Storage
Pgm 1 OutSel
Black
TLS Gen 1 Std
1080sF/24
Fine Phase
Default
0
nsec
V Time
Default
0
lines
H Time
Default
0
clocks

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2B and 3B (Pgm 2/3 B Menu)

The **Pgm 2/3 B** menu shown below allows you to set the **Programmable Output 2B and 3B**, the output standard and the vertical and horizontal timing for Tri-Level Sync Generator 2. This menu affects the **Out 2B** and **Out 3B** BNCs.

Use the controls to set the following:

- **Pgm 2 OutSel** – Affects **Out 2B** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

- **Pgm 3 OutSel** – Affects **Out 3B** BNC. Choose from:

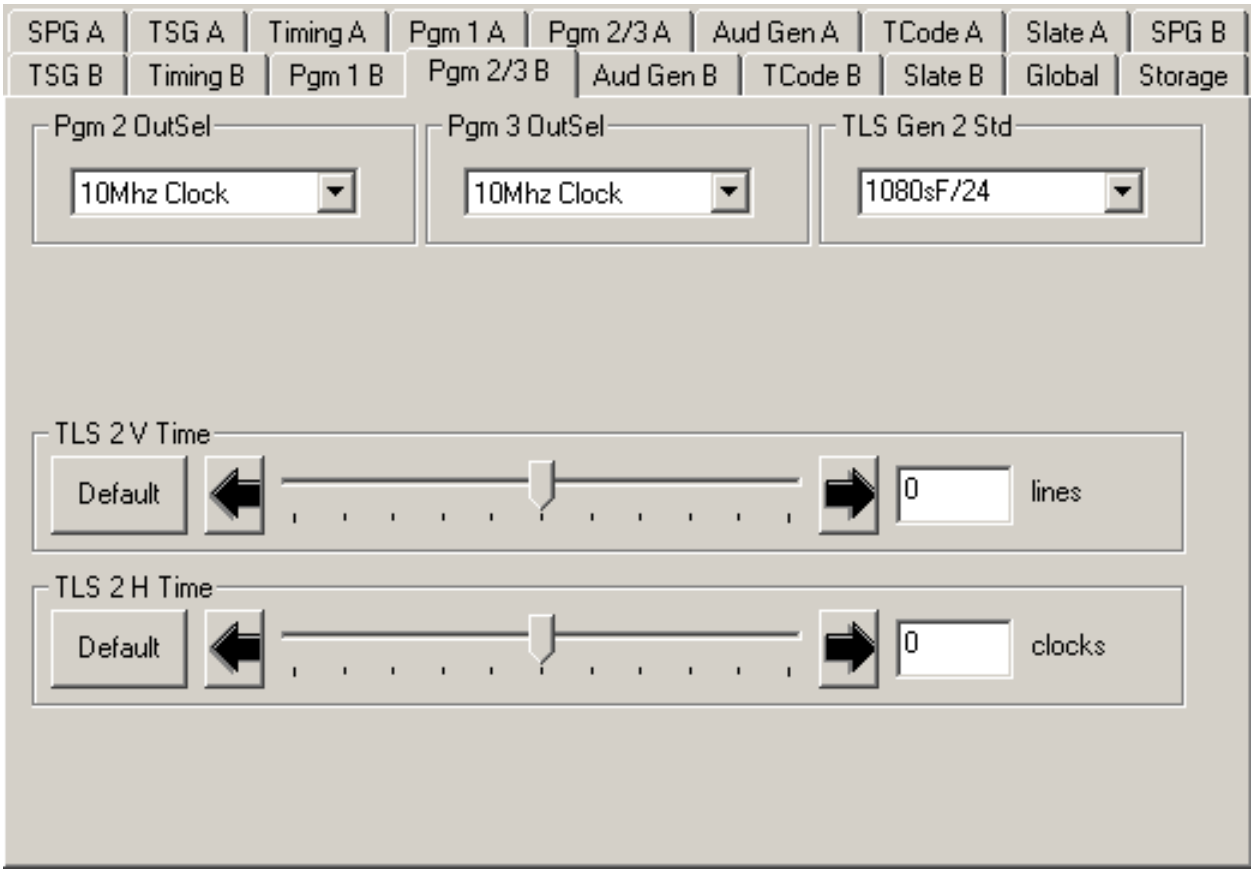
  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

- **TLS Gen 2 Std** – Choose the output standard for Tri-Level Sync Generator 2. Choose from:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

- **TLS 2 V Time** – Set the vertical timing in lines for **Tri-Level Sync Generator 2**.
- **TLS 2 H Time** – Set the horizontal timing in clocks for **Tri-Level Sync Generator 2**.

  Use the slider controls or arrows to select a value or enter a value into the number fields.



Setting the Audio Generation and Routing Parameters for Audio Generator B (Aud Gen B Menu)

There are two generators on each 7400, **Generator A** and **Generator B**. Each of the two generators on the 7400 are identical, with completely independent controls. The two AES digital audio outputs are always synchronous with all of the video outputs – regardless of format – because all of the video outputs can be locked to a common time base. Multiple tone generators can be used to identify multi-channel content. Each generator supports sixteen audio channels and the content of each channel is independently programmable. Choices include adjustable frequency tone generators, tone sweeps, silence, timecode, audio clip playback from the 7400's secure digital card, and the external AES input. All sixteen of these channels can be embedded in the SDI outputs. Each AES output can select from any of the eight pairs that make up these sixteen channels.

This menu affects the **Out 2B** and **Out 3B** BNCs.

There are three types of audio output: Embedding, AES (goes to user-programmable output 2 (**Out 2B**) and 3 (**Out 3B**)), and Analog (output goes to **15-pin D connector**).

The **Aud Gen B** menu shown below allows you to set the **Channel Number**, the **Audio Source**, to make Embedded Audio selections, and to choose the channel for **Analog Out**.

Use the controls to set the following:

- **Chan Number** – Available selections are 1 through 16
- **Audio Source** – Available selections are:

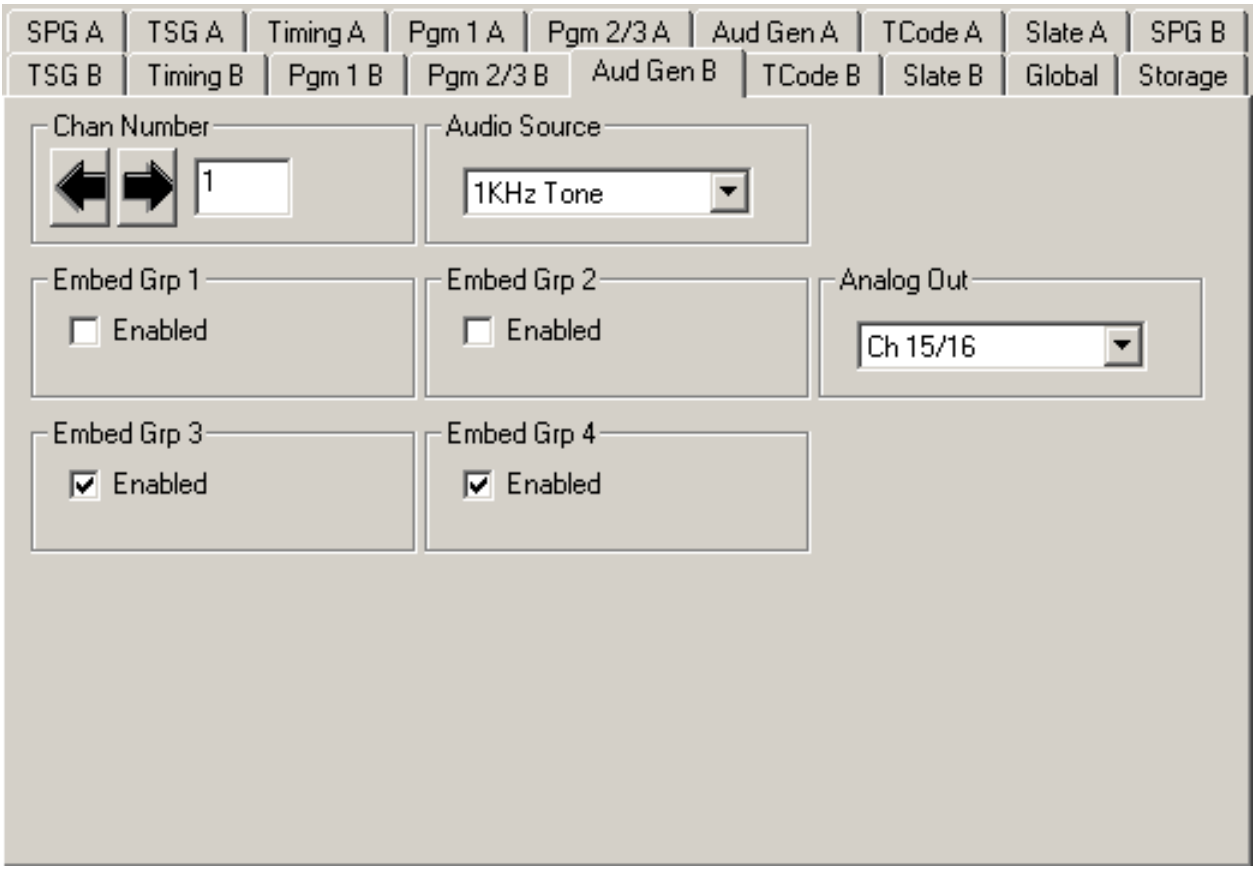
  50Hz Tone
  100Hz Tone
  200Hz Tone
  400Hz Tone
  800Hz Tone
  1kHz Tone
  2kHz Tone
  5kHz Tone
  Silence
  TSG Audio
  Timecode
  External AES

- **Embed Grp 1 through 4**

  Group 1 includes channels 1/2 and 3/4.
  Group 2 includes channels 5/6 and 7/8.
  Group 3 includes channels 9/10 and 11/12.
  Group 4 includes channels 13/14 and 15/16.

- **Analog Out** – Available selections are:

  Channels 1/2
  Channels 3/4
  Channels 5/6
  Channels 7/8
  Channels 9/10
  Channels 11/12
  Channels 13/14
  Channels 15/16

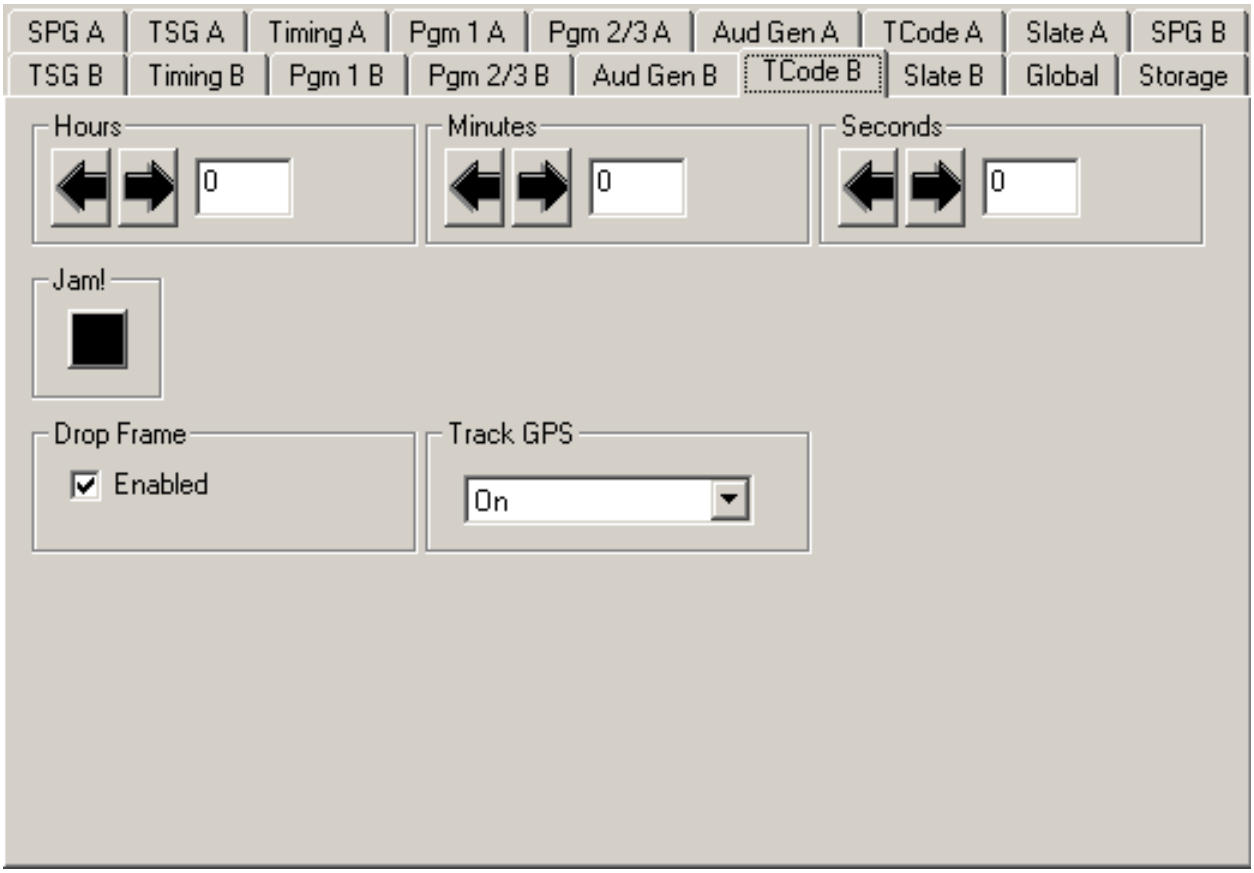


Setting the Parameters for Timecode B (TCode B Menu)

The **TCode B** menu shown below allows you to set the parameters for Timecode B.

Use the controls to set the following:

- **Hours** – 1 through 23
- **Minutes** – 1 through 59
- **Seconds** – 1 through 59
- **Jam!** – To manually enter the stating timecode value, type in the desired values in the **Hours**, **Minutes** and **Seconds** fields, then click the **Jam!** button.
- **Drop Frame** – Select the checkbox to enable Drop Frame (dropping two frames every minute except on every tenth minute) to allow time code to match a real-time clock.
- **Track GPS** – On or Off. If you select On, make sure that you have installed the GPS submodule properly and connected the H1 jumper correctly. *See the GPS submodule installation section on page 19 for more information.*

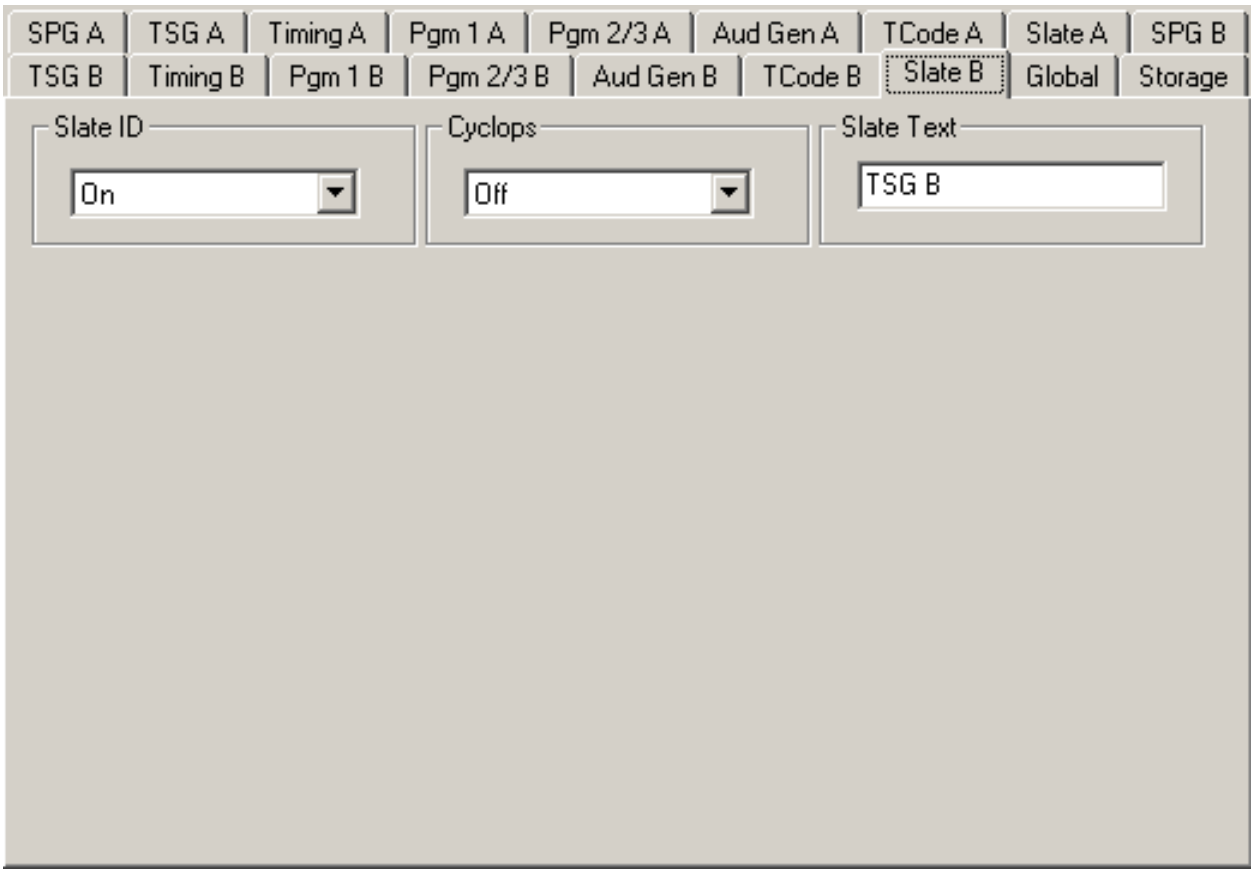


Setting the Parameters for Slate B (Slate B Menu)

The **Slate B** menu shown below allows you to set the parameters for **Slate B**, an ID Slate with user-programmable text that can overlay the test pattern.

Use the controls to set the following:

- **Slate ID** – On or Off. Select On if you want to use the Slate B feature.
- **Cyclops** – On or Off. Adds a motion element to the video test signal which proves that the signal reaching this destination is a true live signal and not a freeze frame from a frame synchronizer that has lost its input.
- **Slate Text** – Enter the text that you want to overlay on the test pattern and hit enter on your computer keyboard.



Setting Global Parameters for Module Reference and Audio Reference Levels (Global Menu)

The parameters set in the **Global** menu affect the entire 7400 module. These settings can be applied to **Generator A** and **Generator B**.

The **Global** menu shown below allows you to set the parameters for Configuration Reference, Digital Audio Reference Level, Analog Audio Tone Output and Composite Setup.

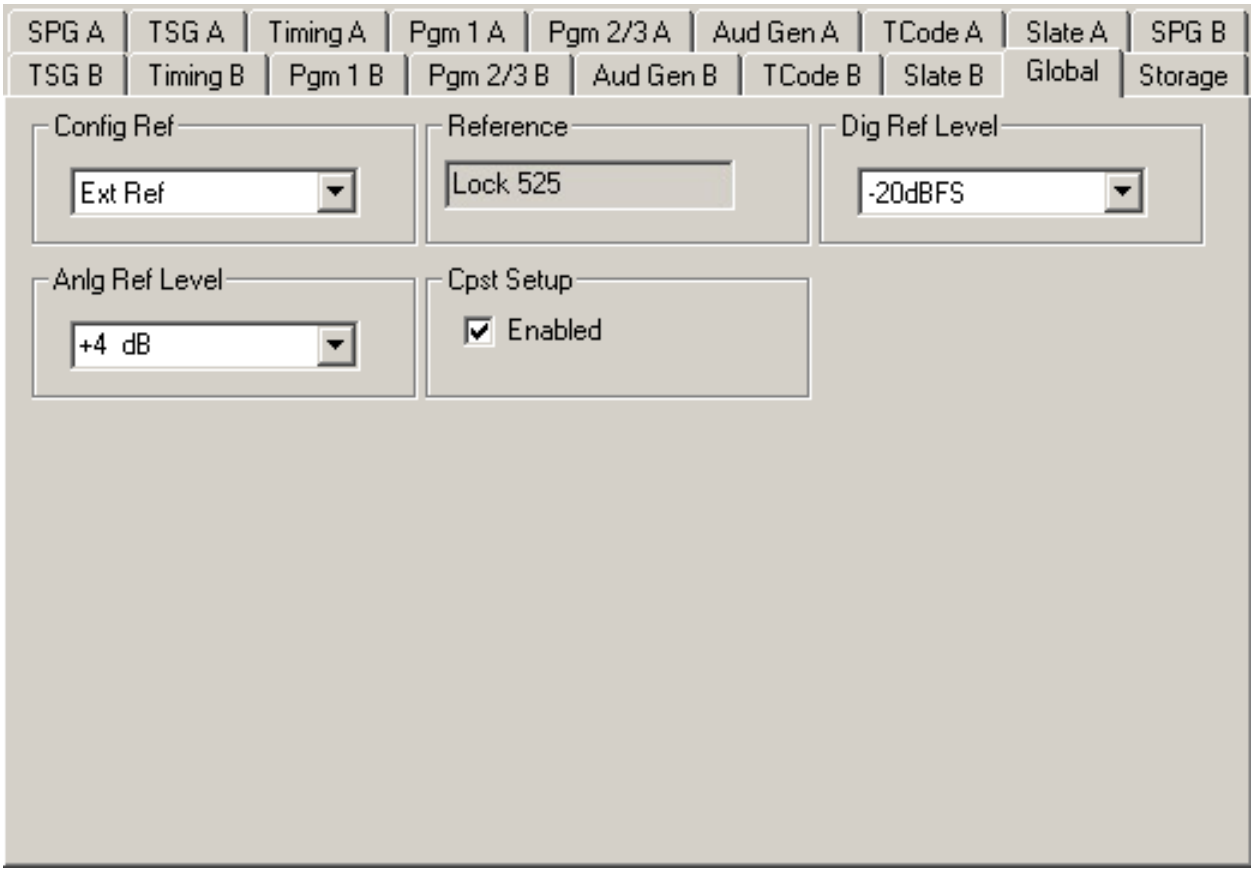
Use the controls to set the following:

- **Config Ref** – Select the desired module reference from the External Reference (525, 625, Tri-Level Sync or 10 MHz sine wave) or Master Reference (Frame Reference). The presence of the reference will be reported in the adjacent window.

- **Dig Ref Level** – Digital Audio Reference Level. Applies to AES digital. -20dBFS or -18dBFS.

- **Anlg Ref Level** – Set the Analog Reference Level from -10 dB to +4 dB for the analog tone output.

- **Cpst Setup** – Turns Composite Setup On or Off for 525/60 Hz outputs. For most 60 Hz applications, this option is typically enabled.

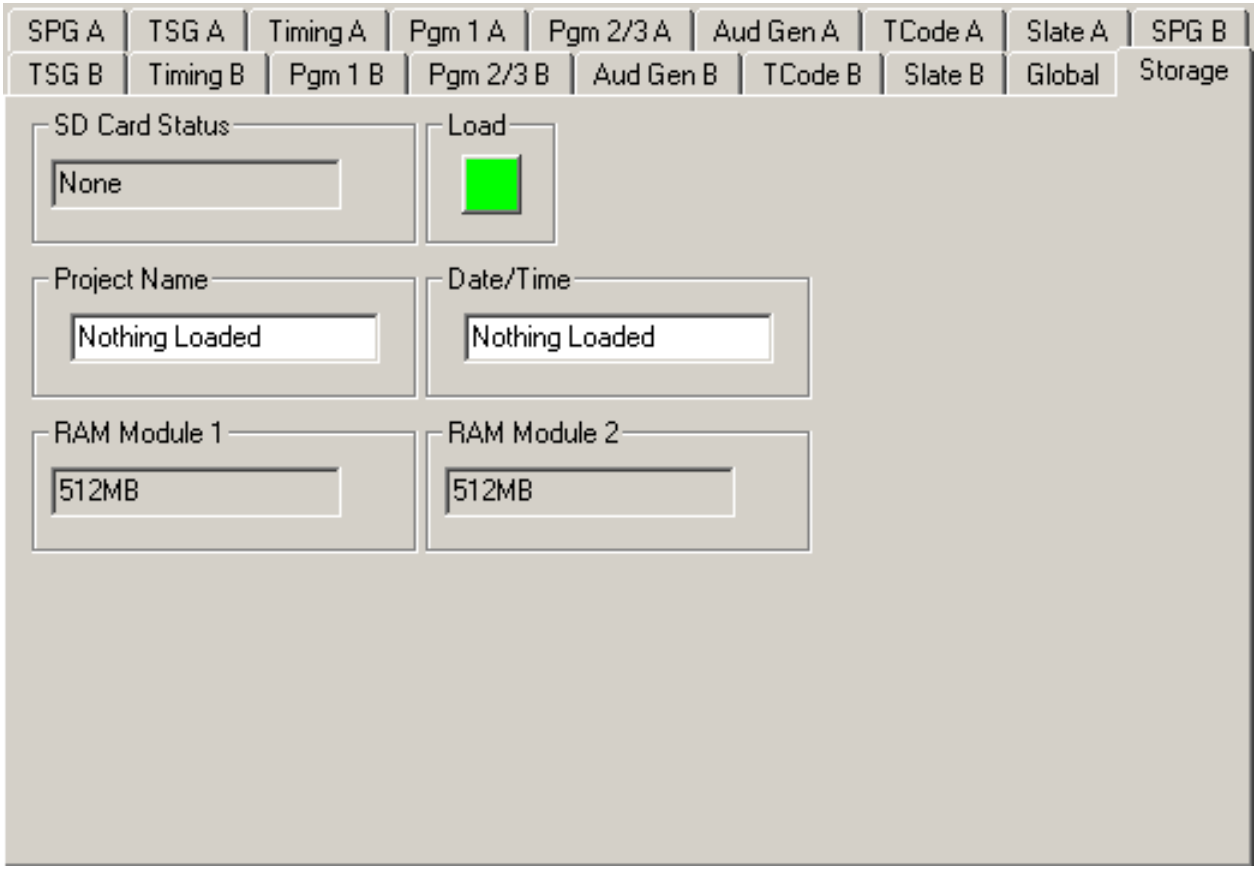


Loading Custom Test Signals, Viewing Status (Storage Menu)

With the **Storage** menu shown below, you can load custom test signals from an SD card, view the SD Card Status, Project Name, the Date and Time of the test signal, and the RAM for both generators.

Use the controls to set the following:

- **SD Card Status** – Reflects the status of the SD Card.
- **Load** – Press to load the contents of the SD Card.
- **Project Name** – Reflects the name of the project that is loaded from the SD card.
- **Date/Time** – Reflects the date and time of the project loaded from the SD card.
- **RAM Module 1** – Shows the RAM capacity of Generator 1.
- **RAM Module 2** – Shows the RAM capacity of Generator 2.



7400 Avenue Touch Screen Remote Configuration

Selecting the Reference Source and Output Standard for Sync Pulse Generator A (SPG A Menu)

The **SPG A** menu controls the **SDI Out A** BNC. The standard selected determines what signal will be output on the **SDI Out A** BNC.

Important: Additionally, the standard selected in the **SPG A** menu determines the frame rate family for all of the **Generator A** BNC outputs (**SDI Out A**, **Out 1A**, **Out 2A**, **Out 3A**). For example, if the standard is set to SD 525 or 720p/59.94, then all **Generator A** outputs will be in the 59.94 Hz frame rate family. If the standard is set to SD 625 or 1080i/50, then all **Generator A** outputs will be in the 50 Hz frame rate family.

To select the reference source and output standard of **Sync Pulse Generator A**, select the **SPG A** menu shown below. Set the parameters for the **Source** and **Standard** fields. The standard that the module is locked to is shown in the **Sync Lock** field. Use the controls to set the following:

- **Source** – select the reference source for **Generator A**. Select from:

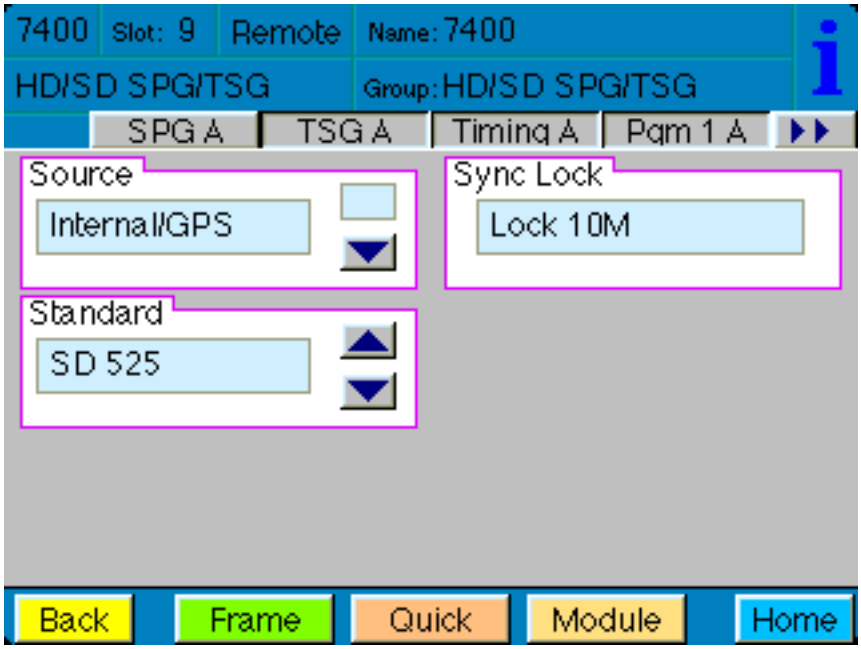
    - **Internal/GPS** -- the module's Internal Precision Standard reference signal, or the signal from the GPS Receiver (with 7400-GPS Option installed). If the GPS signal is present, the 7400 will lock to that. If the GPS signal is not present, the 7400 will lock to its internal TCXO.

    - **Config Ref** -- locks to the source selected as the **Config Ref** in the **Global** menu. If you choose **Config Ref**, you must have configured that parameter in the **Global** menu. *See the description of the **Global** menu on page 83 for more information.*

- **Sync Lock** – shows what standard the module is locked to. If the module is not locked to a standard, it displays No Lock. (Note: With the GPS option, you must install the H1 jumper. Otherwise, the module will not lock and will be in free run. *See the GPS Installation section on page 19 for more information.*)

- **Standard** – select the output standard you want from the following:

    720p/50
    720p/59.94
    720p/60
    1080i/50
    1080i/59.94
    1080i/60
    1080p/25
    1080p/23.98
    1080p/24
    1080sF/25
    1080sF/23.98
    1080sF/24
    SD 525
    SD 625


7400
Slot: 9
Remote
Name: 7400
HD/SD SPG/TSG
Group: HD/SD SPG/TSG
SPG A
TSG A
Timing A
Pgm 1 A
Source
Internal/GPS
Sync Lock
Lock 10M
Standard
SD 525
Back
Frame
Quick
Module
Home

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator A (TSG A Menu)

The **TSG A** menu affects the **SDI Out A** BNC. It also affects the **Out 1A** BNC if it has been set to "Follow SDI."

To set the type of test pattern for the output of **Test Signal Generator A**, select the **TSG A** menu shown below. This menu also has controls for turning on and off the Y, Cr and Cb channels.

Use the controls to set the following:

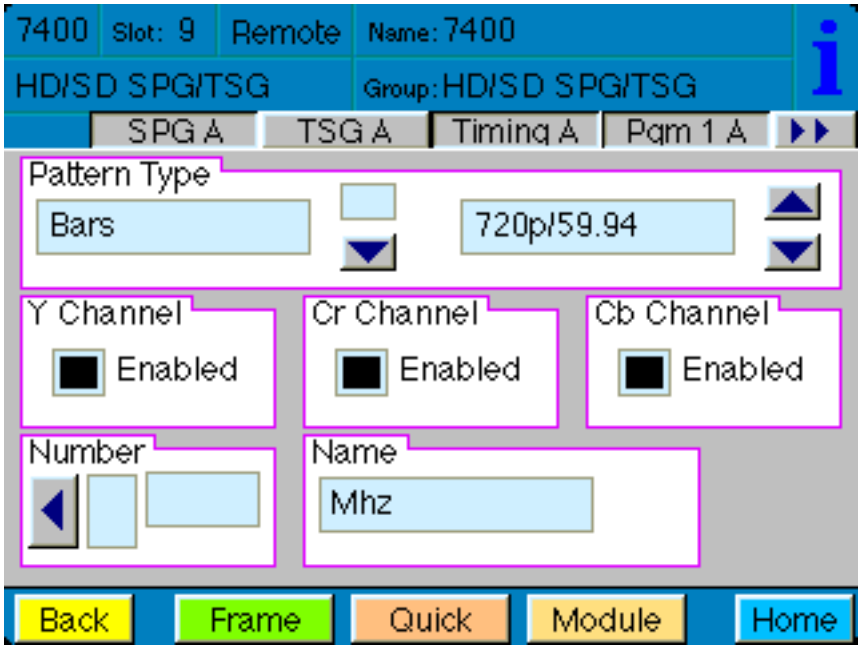
- **Pattern Type** – Select the pattern group in the first drop-down menu and the test signal in the second drop-down menu.

Pattern Group	Test Signal
Bars	Full Field 75 Full Field 100 SMPTE 75 Split Field 75 Split Field 100 Red Field
Black	Black Flat Field 20 Flat Field 50 Flat Field 80 White
Ramp	Video Ramp Data Ramp Shallow 5 Step
Sweep	Sweep MultiBurst
Pulse & Bar	Full Field Window Component
Timing	Digital Blanking Cosite Interlace
Misc	Black Crosshatch Safe Title Pathological

- **Y Channel, Cr Channel, Cb Channel checkboxes** – There are independent enables for each channel so that Y, Cr and Cb can be controlled separately. You may choose to turn off the Y, Cr and/or Cb Channels if desired for test purposes (such as setting up a monitor, for example). To turn off one or more channels, deselect the Enabled check box.

- **Number** – Select from 0 to 255. This refers to the number associated with up to 255 custom test patterns.

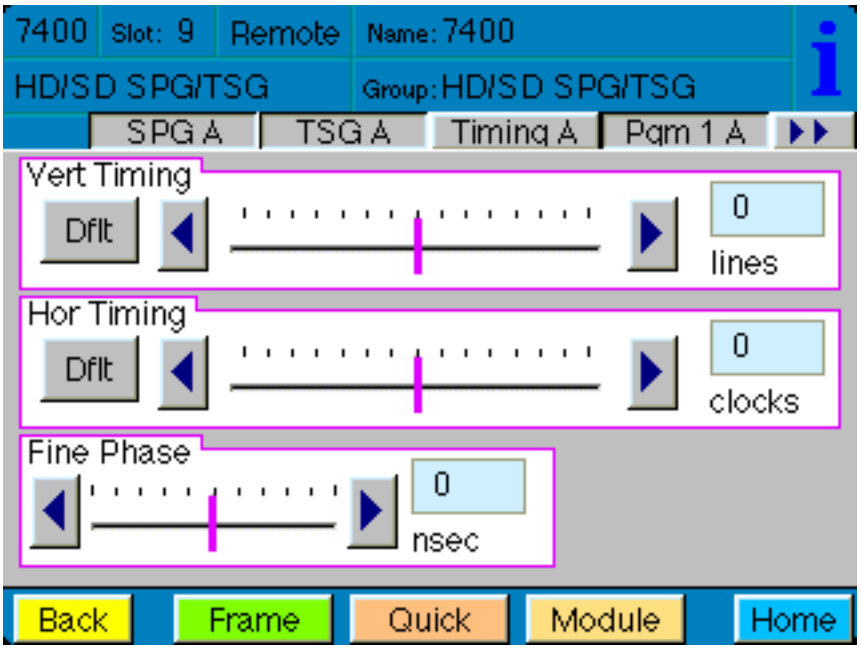
- **Name** – Each of the up to 255 custom test patterns will have a name when loaded from the storage card.



Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator A (Timing A Menu)

The **Timing A** menu shown below allows you to set the timing of the **Generator A** outputs with respect to the reference selected in the **SPG A** menu. This menu affects the SDI output, the principal output of the generator, which applies to **SDI Out A** and **Programmable Output 1A** (**Out 1A** BNC). Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the Primary output in nanoseconds.



Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1A (Pgm 1A Menu)

The **Pgm 1 A** menu shown below allows you to set the **Programmable Output 1A**, the Tri-Level Sync output standard, vertical and horizontal timing and fine phase. This menu affects the **Out 1A** BNC.

Note: The selections you make from the **Pgm 1 OutSel** and **TLS Gen 1 Std** drop-down menus have to be from the same frame rate family as the standard selected in the **SPG A** menu.

Use the controls to set the following:

- **Pgm 1 OutSel** – Choose from:

  Black
  Color Bars
  Follow SDI Out
  TLS Gen 1

  When "Follow SDI Out" is selected, the settings from the **TSG A** menu are being used.

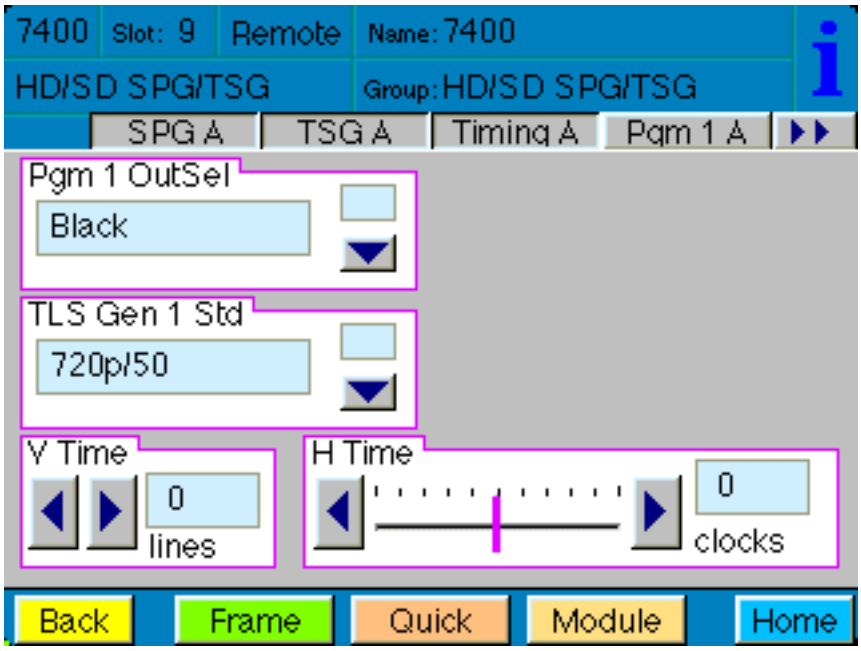
- **TLS Gen 1 Std** – Choose an output standard from the following options:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the output in nanoseconds.

Note: If you select "Follow SDI Out" from the **Pgm 1 OutSel** drop-down menu, the **Vert Timing**, **Hor Timing** and **Fine Phase** controls will not be usable and will be grayed out.


7400
Slot: 9
Remote
Name: 7400
HD/SD SPG/TSG
Group: HD/SD SPG/TSG
SPG A
TSG A
Timing A
Pgm 1 A
Pgm 1 OutSel
Black
TLS Gen 1 Std
720p/50
V Time
0
lines
H Time
0
clocks
Back
Frame
Quick
Module
Home

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2A and 3A (Pgm 2/3 A Menu)

The **Pgm 2/3 A** menu shown below allows you to set the **Programmable Output 2A and 3A**, the output standard and the vertical and horizontal timing for Tri-Level Sync Generator 2. This menu affects the **Out 2A** and **Out 3A** BNCs.

Use the controls to set the following:

- **Pgm 2 OutSel** – Affects **Out 2A** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

- **Pgm 3 OutSel** – Affects **Out 3A** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

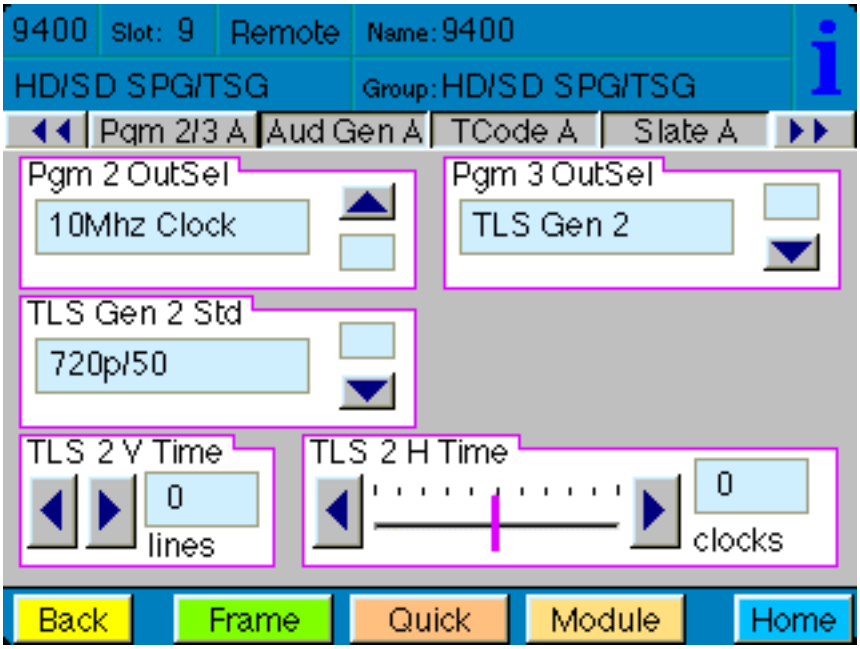
- **TLS Gen 2 Std** – Choose the output standard for Tri-Level Sync Generator 2. Choose from:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

- **TLS 2 V Time** – Set the vertical timing in lines for **Tri-Level Sync Generator 2**.

- **TLS 2 H Time** – Set the horizontal timing in clocks for **Tri-Level Sync Generator 2**.

  Use the slider controls or arrows to select a value or enter a value into the number fields.



Setting the Audio Generation and Routing Parameters for Audio Generator A (Aud Gen A Menu)

There are two generators on each 7400, **Generator A** and **Generator B**. Each of the two generators on the 7400 are identical, with completely independent controls. The two AES digital audio outputs are always synchronous with all of the video outputs – regardless of format – because all of the video outputs can be locked to a common time base. Multiple tone generators can be used to identify multi-channel content. Each generator supports sixteen audio channels and the content of each channel is independently programmable. Choices include adjustable frequency tone generators, tone sweeps, silence, timecode, audio clip playback from the 7400's secure digital card, and the external AES input. All sixteen of these channels can be embedded in the SDI outputs. Each AES output can select from any of the eight pairs that make up these sixteen channels.

This menu affects the **Out 2A** and **Out 3A** BNCs.

There are three types of audio output: Embedding, AES (goes to user-programmable output 2 (**Out 2A**) and 3 (**Out 3A**)), and Analog (output goes to **15-pin D connector**).

The **Aud Gen A** menu shown below allows you to set the **Channel Number**, the **Audio Source**, to make Embedded Audio selections, and to choose the channel for **Analog Out**.

Use the controls to set the following:

- **Chan Number** – Available selections are 1 through 16
- **Audio Source** – Available selections are:

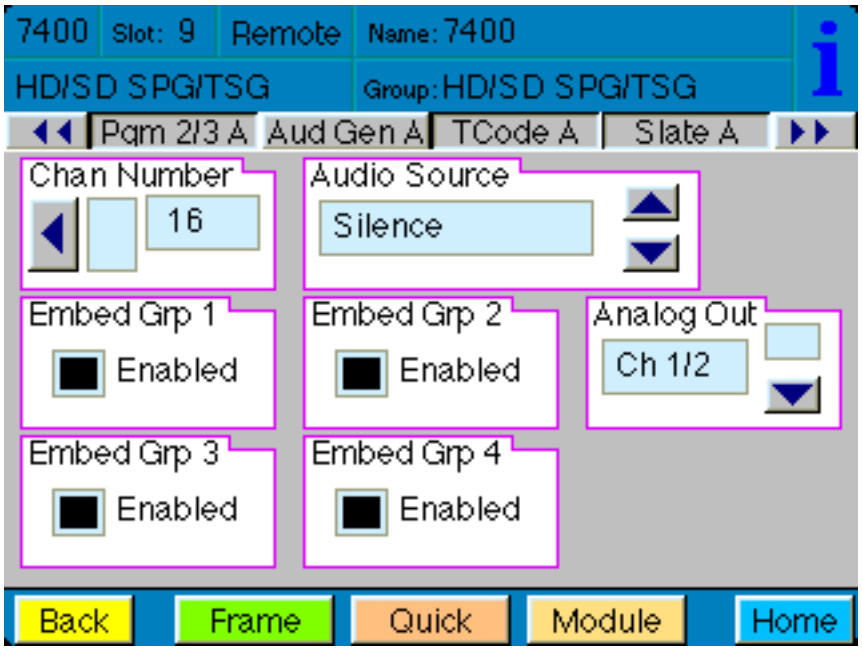
  50Hz Tone
  100Hz Tone
  200Hz Tone
  400Hz Tone
  800Hz Tone
  1kHz Tone
  2kHz Tone
  5kHz Tone
  Silence
  TSG Audio
  Timecode
  External AES

- **Embed Grp 1 through 4**

  Group 1 includes channels 1/2 and 3/4.
  Group 2 includes channels 5/6 and 7/8.
  Group 3 includes channels 9/10 and 11/12.
  Group 4 includes channels 13/14 and 15/16.

- Analog Out – Available selections are:

  Channels 1/2
  Channels 3/4
  Channels 5/6
  Channels 7/8
  Channels 9/10
  Channels 11/12
  Channels 13/14
  Channels 15/16

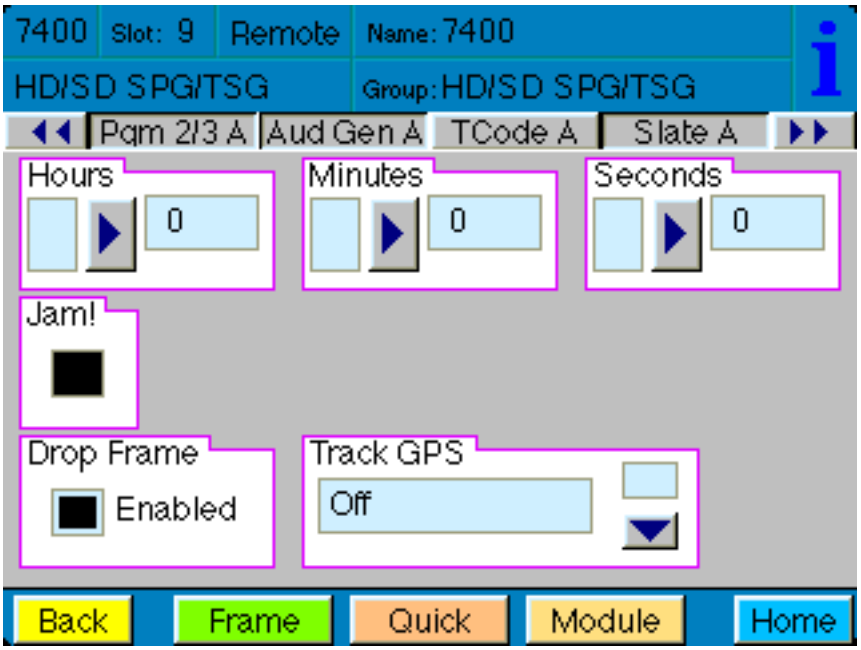


Setting the Parameters for Timecode A (TCode A Menu)

The **TCode A** menu shown below allows you to set the parameters for Timecode A.

Use the controls to set the following:

- **Hours** – 1 through 23
- **Minutes** – 1 through 59
- **Seconds** – 1 through 59
- **Jam!** – To manually enter the stating timecode value, type in the desired values in the Hours, Minutes and Seconds fields, then click the Jam! button.
- **Drop Frame** – Select the checkbox to enable Drop Frame (dropping two frames every minute except on every tenth minute) to allow time code to match a real-time clock.
- **Track GPS** – On or Off. If you select On, make sure that you have installed the GPS submodule properly and connected the H1 jumper correctly. *See the GPS submodule installation section on page 19 for more information.*

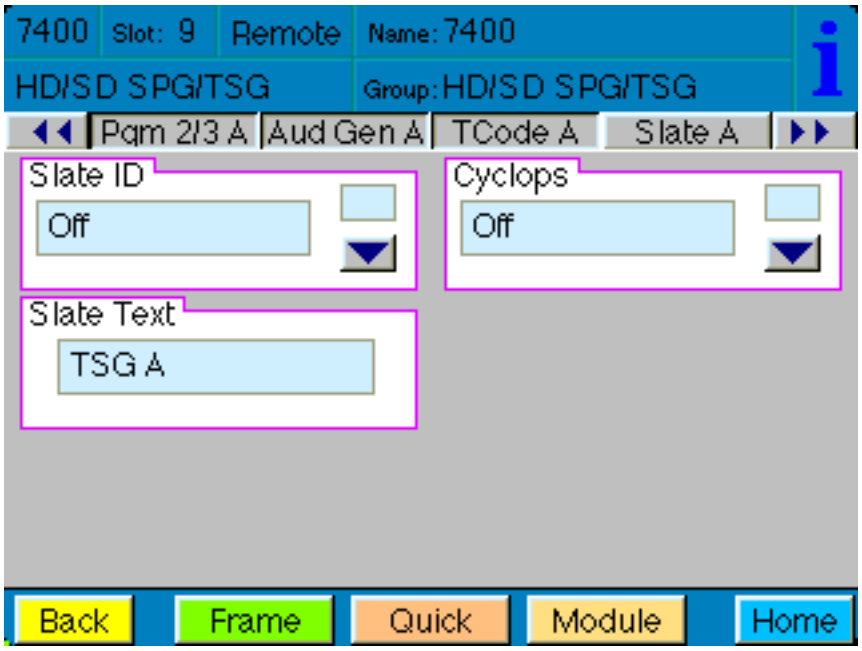


Setting the Parameters for Slate A (Slate A Menu)

The **Slate A** menu shown below allows you to set the parameters for **Slate A**, an ID Slate with user-programmable text that can overlay the test pattern.

Use the controls to set the following:

- **Slate ID** – On or Off. Select On if you want to use the Slate A feature.
- **Cyclops** – On or Off. Adds a motion element to the video test signal which proves that the signal reaching this destination is a true live signal and not a freeze frame from a frame synchronizer that has lost its input.
- **Slate Text** – Enter the text that you want to overlay on the test pattern.



Selecting the Reference Source and Output Standard for Sync Pulse Generator B (SPG B Menu)

The **SPG B** menu controls the **SDI Out B** BNC. The standard selected determines what signal will be output on the **SDI Out B** BNC.

Important: Additionally, the standard selected in the **SPG B** menu determines the frame rate family for all of the **Generator B** BNC outputs (**SDI Out B**, **Out 1B**, **Out 2B**, **Out 3B**). For example, if the standard is set to SD 525 or 720p/59.94, then all **Generator B** outputs will be in the 59.94 Hz frame rate family. If the standard is set to SD 625 or 1080i/50, then all **Generator B** outputs will be in the 50 Hz frame rate family.

To select the reference source and output standard of **Sync Pulse Generator B**, select the **SPG B** menu shown below. Set the parameters for the **Source** and **Standard** fields. The standard that the module is locked to is shown in the **Sync Lock** field. Use the controls to set the following:

- **Source** – select the reference source for **Generator B**. Select from:

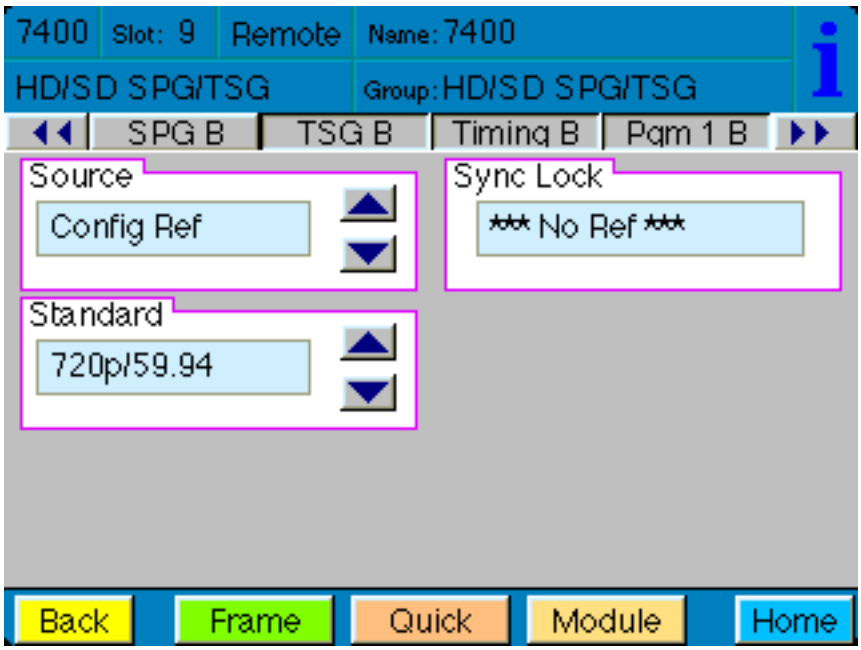
    - **Internal/GPS** -- the module's Internal Precision Standard reference signal, or the signal from the GPS Receiver (with 7400-GPS Option installed). If the GPS signal is present, the 7400 will lock to that. If the GPS signal is not present, the 7400 will lock to its internal TCXO.

    - **Config Ref** -- locks to the source selected as the **Config Ref** in the **Global** menu. If you choose **Config Ref**, you must have configured that parameter in the **Global** menu. *See the description of the Global menu on page 83 for more information.*

- **Sync Lock** – shows what standard the module is locked to. If the module is not locked to a standard, it displays No Lock. (Note: With the GPS option, you must install the H1 jumper. Otherwise, the module will not lock and will be in free run. *See the GPS Installation section on page 19 for more information.*)

- **Standard** – select the output standard you want from the following:

    720p/50
    720p/59.94
    720p/60
    1080i/50
    1080i/59.94
    1080i/60
    1080p/25
    1080p/23.98
    1080p/24
    1080sF/25
    1080sF/23.98
    1080sF/24
    SD 525
    SD 625


7400
Slot: 9
Remote
Name: 7400
HD/SD SPG/TSG
Group: HD/SD SPG/TSG
SPG B
TSG B
Timing B
Pgm 1 B
Source
Config Ref
Sync Lock
*** No Ref ***
Standard
720p/59.94
Back
Frame
Quick
Module
Home

Selecting the Pattern Type, Output Standard and Y, Cr and Cb Channels for Test Signal Generator B (TSG B Menu)

The **TSG B** menu affects the **SDI Out B** BNC. It also affects the **Out 1B** BNC if it has been set to "Follow SDI."

To set the type of test pattern for the output of **Test Signal Generator B**, select the **TSG B** menu shown below. This menu also has controls for turning on and off the Y, Cr and Cb channels.

Use the controls to set the following:

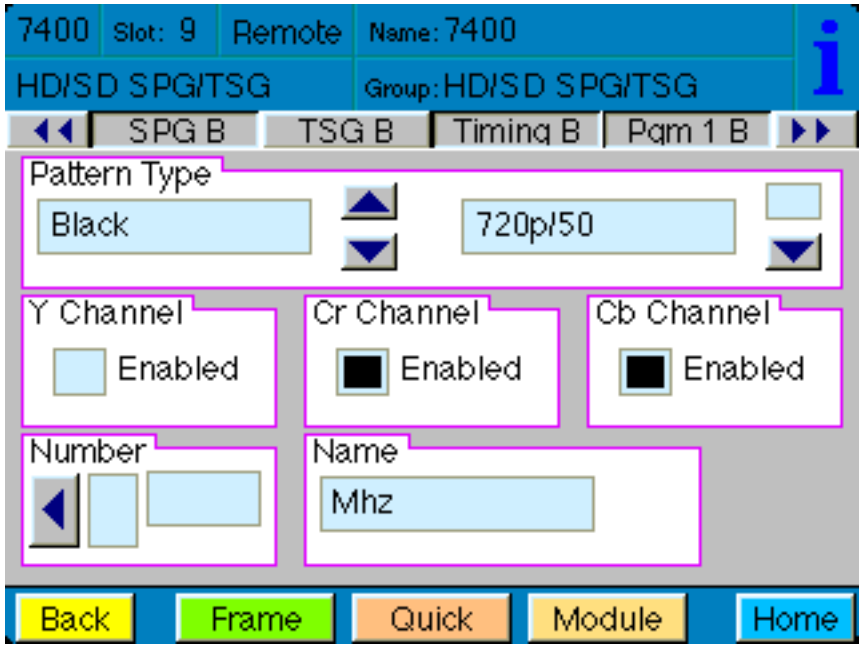
- **Pattern Type** – Select the pattern group in the first drop-down menu and the test signal in the second drop-down menu.

Pattern Group	Test Signal
Bars	Full Field 75 Full Field 100 SMPTE 75 Split Field 75 Split Field 100 Red Field
Black	Black Flat Field 20 Flat Field 50 Flat Field 80 White
Ramp	Video Ramp Data Ramp Shallow 5 Step
Sweep	Sweep MultiBurst
Pulse & Bar	Full Field Window Component
Timing	Digital Blanking Cosite Interlace
Misc	Black Crosshatch Safe Title Pathological

- **Y Channel, Cr Channel, Cb Channel checkboxes** – There are independent enables for each channel so that Y, Cr and Cb can be controlled separately. You may choose to turn off the Y, Cr and/or Cb Channels if desired for test purposes (such as setting up a monitor, for example). To turn off one or more channels, deselect the Enabled check box.

- **Number** – Select from 0 to 255. This refers to the number associated with up to 255 custom test patterns.

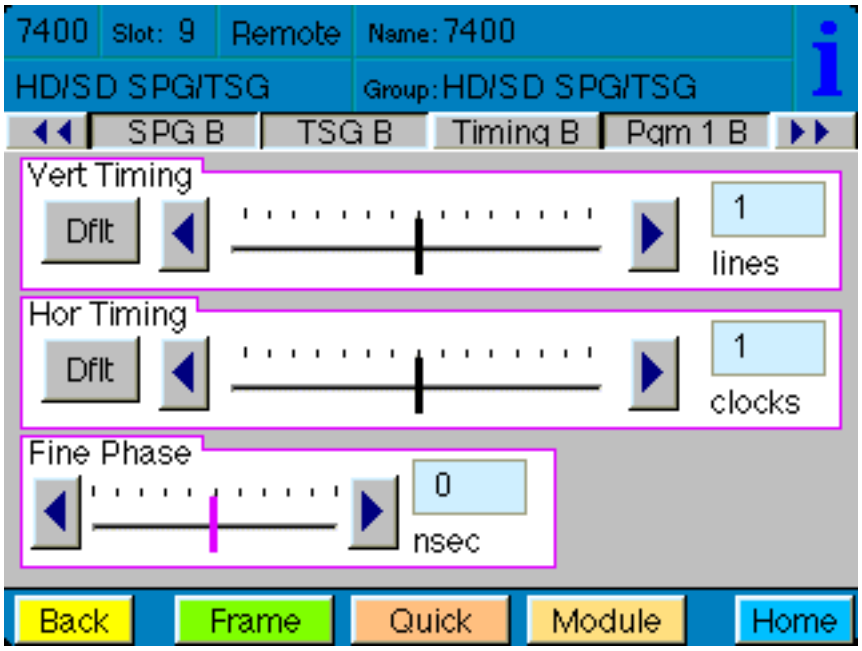
- **Name** – Each of the up to 255 custom test patterns will have a name when loaded from the storage card.



Setting the Vertical Timing, Horizontal Timing and Fine Phase for Generator B (Timing B Menu)

The **Timing B** menu shown below allows you to set the timing of the **Generator B** outputs with respect to the reference selected in the **SPG B** menu. This menu affects the SDI output, the principal output of the generator, which applies to **SDI Out B** and **Programmable Output 1B** (**Out 1B** BNC). Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the Primary output in nanoseconds.



Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing and Fine Phase for Programmable Output 1B (Pgm 1B Menu)

The **Pgm 1 B** menu shown below allows you to set the **Programmable Output 1B**, the Tri-Level Sync output standard, vertical and horizontal timing and fine phase. This menu affects the **Out 1B** BNC.

Note: The selections you make from the **Pgm 1 OutSel** and **TLS Gen 1 Std** drop-down menus have to be from the same frame rate family as the standard selected in the **SPG B** menu.

Use the controls to set the following:

- **Pgm 1 OutSel** – Choose from:

  Black
  Color Bars
  Follow SDI Out
  TLS Gen 1

  When "Follow SDI Out" is selected, the settings from the **TSG B** menu are being used.

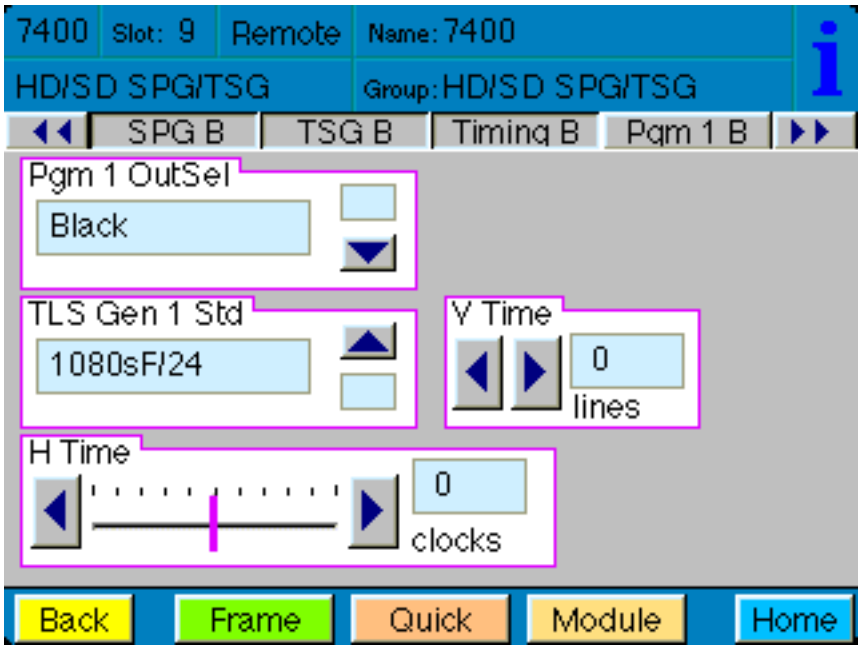
- **TLS Gen 1 Std** – Choose an output standard from the following options:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

Use the slider controls or arrows to select a value or enter a value into the number fields.

- **Vert Timing** – Set the vertical timing in lines.
- **Hor Timing** – Set the horizontal timing in clocks.
- **Fine Phase** – Set the fine phase of the output in nanoseconds.

Note: If you select "Follow SDI Out" from the **Pgm 1 OutSel** drop-down menu, the **Vert Timing**, **Hor Timing** and **Fine Phase** controls will not be usable and will be grayed out.


7400
Slot: 9
Remote
Name: 7400
HD/SD SPG/TSG
Group: HD/SD SPG/TSG
SPG B
TSG B
Timing B
Pgm 1 B
Pgm 1 OutSel
Black
TLS Gen 1 Std
1080sF/24
V Time
0
lines
H Time
0
clocks
Back
Frame
Quick
Module
Home

Setting the Output, Tri-Level Sync Output Standard, Vertical Timing, Horizontal Timing for Programmable Output 2B and 3B (Pgm 2/3 B Menu)

The **Pgm 2/3 B** menu shown below allows you to set the **Programmable Output 2B and 3B**, the output standard and the vertical and horizontal timing for Tri-Level Sync Generator 2. This menu affects the **Out 2B** and **Out 3B** BNCs.

Use the controls to set the following:

- **Pgm 2 OutSel** – Affects **Out 2B** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

- **Pgm 3 OutSel** – Affects **Out 3B** BNC. Choose from:

  TLS Gen 2
  LTC Timecode
  AES Audio 1/2
  AES Audio 3/4
  AES Audio 5/6
  AES Audio 7/8
  AES Audio 9/10
  AES Audio 11/12
  AES Audio 13/14
  AES Audio 15/16
  AES Silence
  Word Clock
  6Hz Pulse
  10Mhz Clock

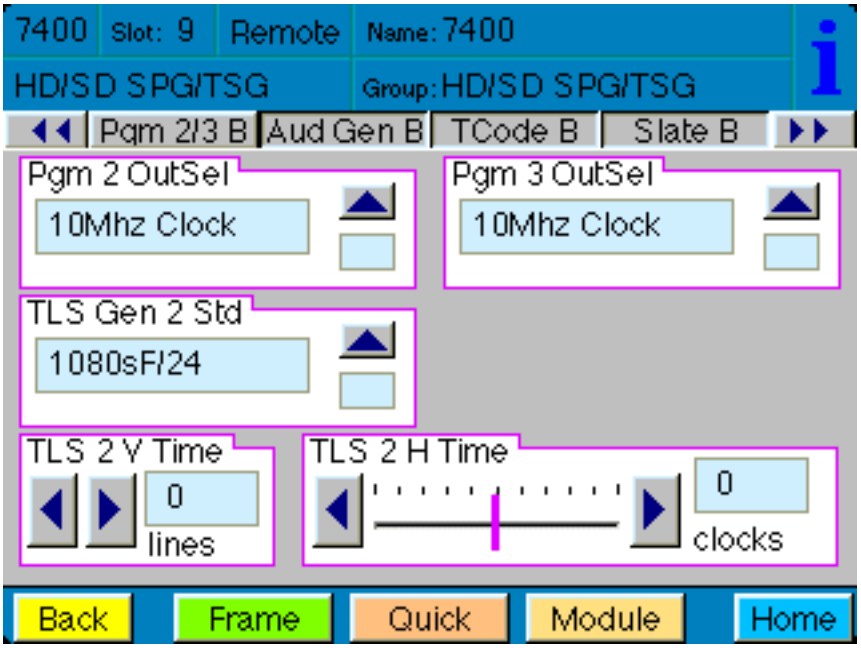
- **TLS Gen 2 Std** – Choose the output standard for Tri-Level Sync Generator 2. Choose from:

  720p/50
  720p/59.94
  720p/60
  1080i/50
  1080i/59.94
  1080i/60
  1080p/25
  1080p/23.98
  1080p/24
  1080sF/25
  1080sF/23.98
  1080sF/24

- **TLS 2 V Time** – Set the vertical timing in lines for **Tri-Level Sync Generator 2**.

- **TLS 2 H Time** – Set the horizontal timing in clocks for **Tri-Level Sync Generator 2**.

  Use the slider controls or arrows to select a value or enter a value into the number fields.



Setting the Audio Generation and Routing Parameters for Audio Generator B (Aud Gen B Menu)

There are two generators on each 7400, **Generator A** and **Generator B**. Each of the two generators on the 7400 are identical, with completely independent controls. The two AES digital audio outputs are always synchronous with all of the video outputs – regardless of format – because all of the video outputs can be locked to a common time base. Multiple tone generators can be used to identify multi-channel content. Each generator supports sixteen audio channels and the content of each channel is independently programmable. Choices include adjustable frequency tone generators, tone sweeps, silence, timecode, audio clip playback from the 7400's secure digital card, and the external AES input. All sixteen of these channels can be embedded in the SDI outputs. Each AES output can select from any of the eight pairs that make up these sixteen channels.

This menu affects the **Out 2B** and **Out 3B** BNCs.

There are three types of audio output: Embedding, AES (goes to user-programmable output 2 (**Out 2B**) and 3 (**Out 3B**)), and Analog (output goes to **15-pin D connector**).

The **Aud Gen B** menu shown below allows you to set the **Channel Number**, the **Audio Source**, to make Embedded Audio selections, and to choose the channel for **Analog Out**.

Use the controls to set the following:

- **Chan Number** – Available selections are 1 through 16
- **Audio Source** – Available selections are:

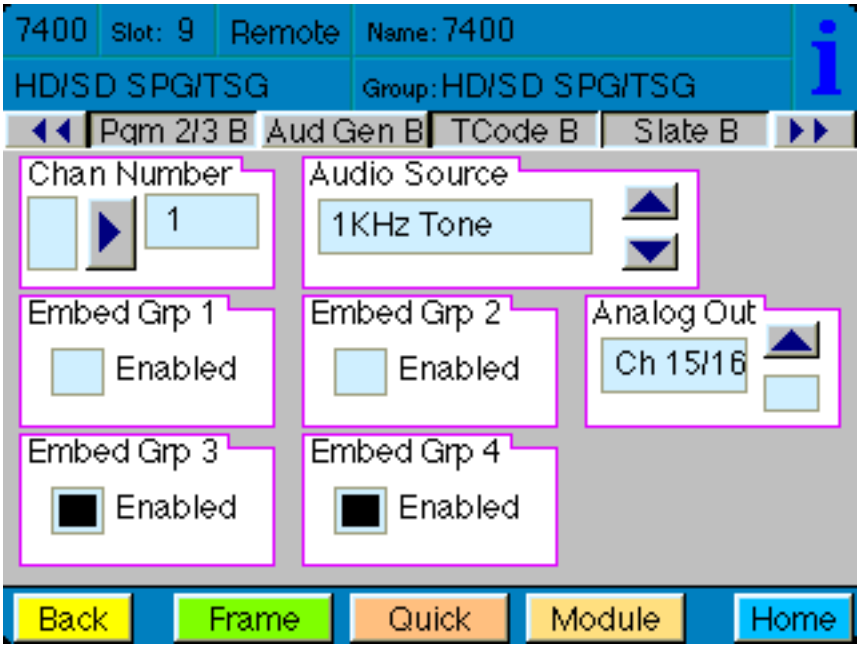
  50Hz Tone
  100Hz Tone
  200Hz Tone
  400Hz Tone
  800Hz Tone
  1kHz Tone
  2kHz Tone
  5kHz Tone
  Silence
  TSG Audio
  Timecode
  External AES

- **Embed Grp 1 through 4**

  Group 1 includes channels 1/2 and 3/4.
  Group 2 includes channels 5/6 and 7/8.
  Group 3 includes channels 9/10 and 11/12.
  Group 4 includes channels 13/14 and 15/16.

- Analog Out – Available selections are:

  Channels 1/2
  Channels 3/4
  Channels 5/6
  Channels 7/8
  Channels 9/10
  Channels 11/12
  Channels 13/14
  Channels 15/16

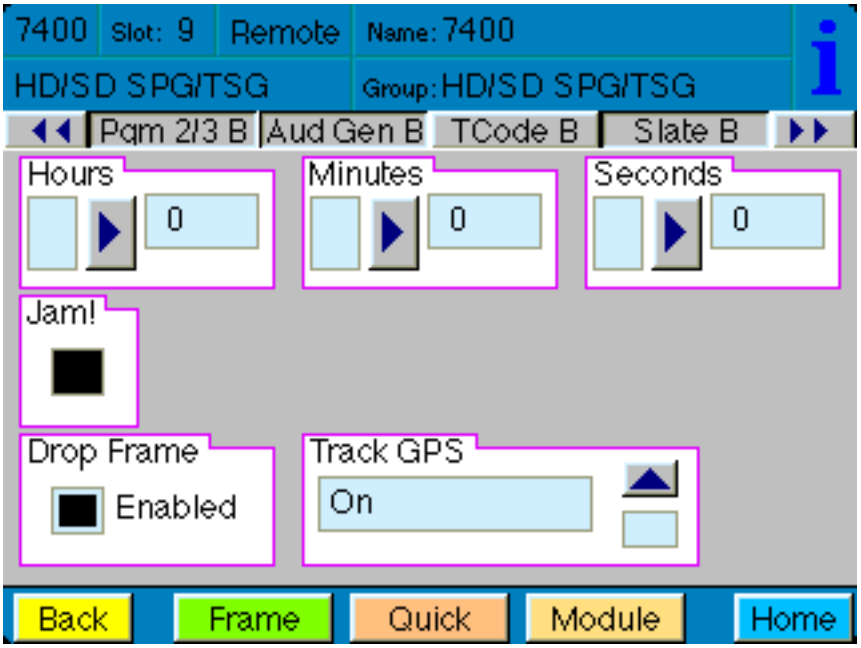


Setting the Parameters for Timecode B (TCode B Menu)

The **TCode B** menu shown below allows you to set the parameters for Timecode B.

Use the controls to set the following:

- **Hours** – 1 through 23
- **Minutes** – 1 through 59
- **Seconds** – 1 through 59
- **Jam!** – To manually enter the stating timecode value, type in the desired values in the Hours, Minutes and Seconds fields, then click the Jam! button.
- **Drop Frame** – Select the checkbox to enable Drop Frame (dropping two frames every minute except on every tenth minute) to allow time code to match a real-time clock.
- **Track GPS** – On or Off. If you select On, make sure that you have installed the GPS submodule properly and connected the H1 jumper correctly. *See the GPS submodule installation section on page 19 for more information.*

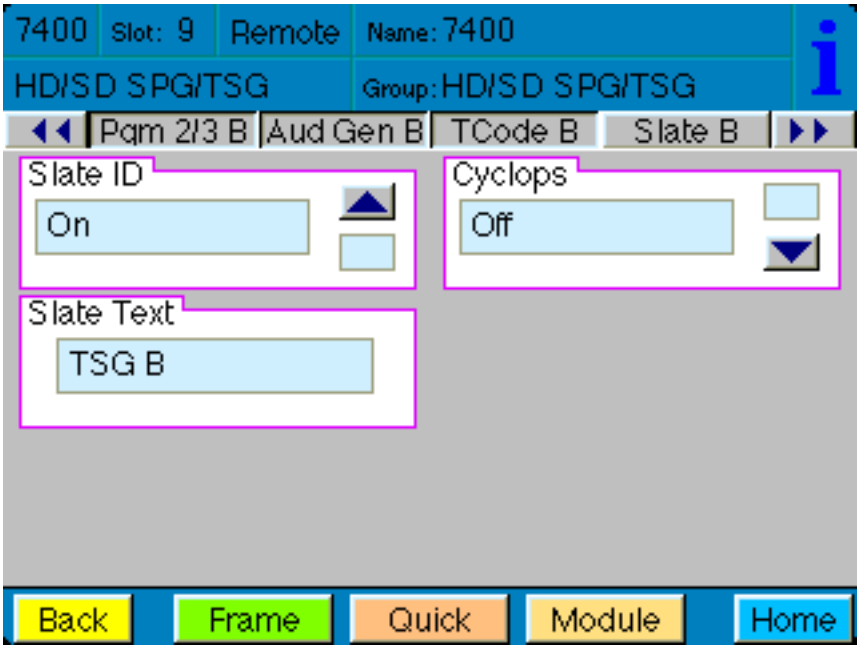


Setting the Parameters for Slate B (Slate B Menu)

The **Slate B** menu shown below allows you to set the parameters for **Slate B**, an ID Slate with user-programmable text that can overlay the test pattern.

Use the controls to set the following:

- **Slate ID** – On or Off. Select On if you want to use the Slate B feature.
- **Cyclops** – On or Off. Adds a motion element to the video test signal which proves that the signal reaching this destination is a true live signal and not a freeze frame from a frame synchronizer that has lost its input.
- **Slate Text** – Enter the text that you want to overlay on the test pattern and hit enter on your computer keyboard.



Setting Global Parameters for Module Reference and Audio Reference Levels (Global Menu)

The parameters set in the **Global** menu affect the entire 7400 module. These settings can be applied to **Generator A** and **Generator B**.

The **Global** menu shown below allows you to set the parameters for Configuration Reference, Digital Audio Reference Level, Analog Audio Tone Output and Composite Setup.

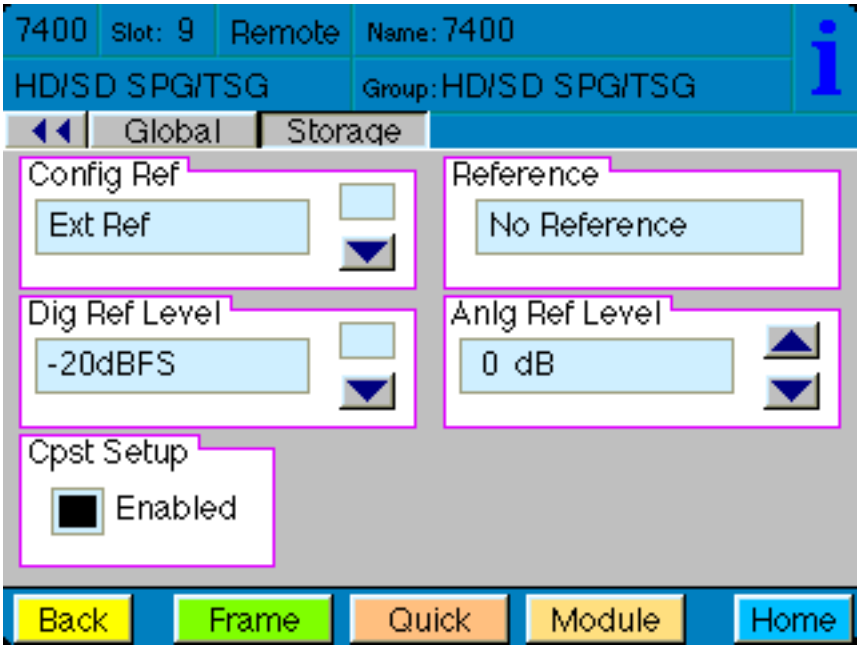
Use the controls to set the following:

- **Config Ref** – Select the desired module reference from the External Reference (525, 625, Tri-Level Sync or 10 MHz sine wave) or Master Reference (Frame Reference). The presence of the reference will be reported in the adjacent window.

- **Dig Ref Level** – Digital Audio Reference Level. Applies to AES digital. -20dBFS or -18dBFS.

- **Anlg Ref Level** – Set the Analog Reference Level from -10 dB to +4 dB for the analog tone output.

- **Cpst Setup** – Turns Composite Setup On or Off for 525/60 Hz outputs. For most 60 Hz applications, this option is typically enabled.

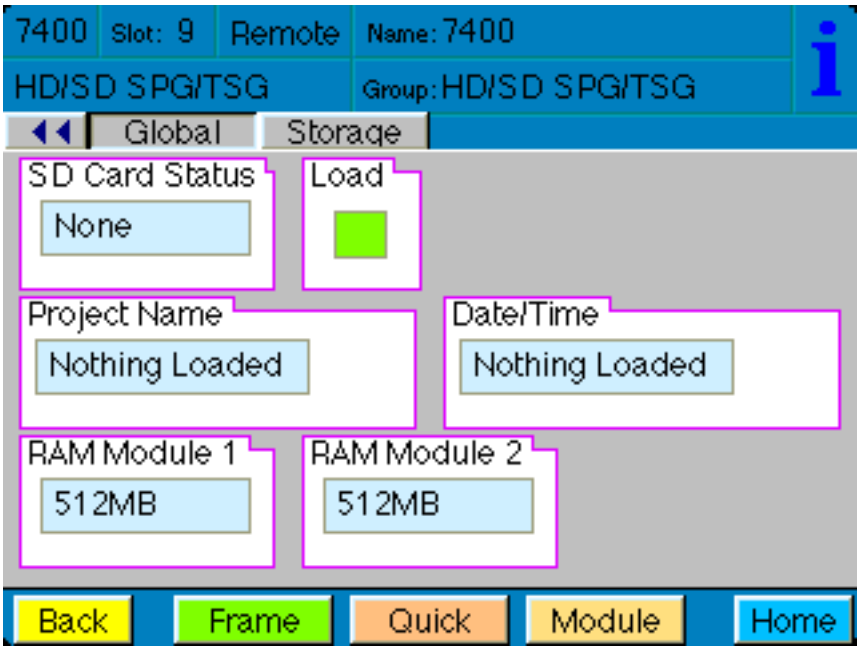


Loading Custom Test Signals, Viewing Status (Storage Menu)

With the **Storage** menu shown below, you can load custom test signals from an SD card, view the SD Card Status, Project Name, the Date and Time of the test signal, and the RAM for both generators.

Use the controls to set the following:

- **SD Card Status** – Reflects the status of the SD Card.
- **Load** – Press to load the contents of the SD Card.
- **Project Name** – Reflects the name of the project that is loaded from the SD card.
- **Date/Time** – Reflects the date and time of the project loaded from the SD card.
- **RAM Module 1** – Shows the RAM capacity of Generator 1.
- **RAM Module 2** – Shows the RAM capacity of Generator 2.



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 7400 module:

No Generator A or Generator B LED indication

- Generator is not locked to its timing source. At least one of the Generator A or Generator B LEDs should be lit to indicate the primary output line standard and that it is locked to its timing source. Check source settings in the Global, SPG A and SPG B menus.

Cannot control module

- Check status of CPU Run green LED. Should be blinking slowly and in unison with other modules if System Control module is present. If not, try removing the 7400 module 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.

No signal out of module

- Check status of Ref green LEDs. One should be lit to indicate which reference rate is currently being detected. If not, check the reference input or master frame signal for presence and quality.

- 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 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

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 50, 525i 59.94

Frame Rate Families

Each 7400 has 2 identical Generators, each with a variety of outputs. All of the outputs from a particular Generator must be selected within the same frame rate family.

50 Hz (625) Derived Family: 1080i/50, 720p/50,1080p/25, 1080sF/25, 625i/50
59.94 Hz (525) Derived Family: 1080i/59.94, 720p/59.94, 1080p/23.98, 1080sF/23.98, 525i/59.94, 60 Hz Derived Family: 1080i/60, 720p/60, 1080p/24, 1080sF/24

Reference Input

Number	Two: External or Frame Master Reference
Signal Type	PAL or NTSC composite video or HD Tri-Level Sync or 10 Mhz 1 V P-P sine or square
Return Loss	>40 dB (applies to external ref input)

Serial Digital Outputs

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

Tri-Level Sync Outputs

Signal Type	HD Tri-Level Sync
Output DC	±50 mV
Return Loss	>30 dB to 30 MHz

Composite Outputs

Signal Type	NTSC / PAL
Impedance	75 Ω
Return Loss	>40 dB DC to 5.5 MHz
Frequency Response	±0.1 dB 0 to 5.0 MHz
Output DC	±50 mV
K Factor	<1.0%
Differential Phase	<1.0 degree
SCH Phase	±2 degrees
Delay	adjustable over full frame in sub degree steps
Color Framing	tracks ref, user selectable

Accuracy and Timing Stability

Internal TCXO	
PAL Fsc	4.43361875 MHz +/- 1 Hz
NTSC Fsc	3.579545 MHz +/- 1 Hz
Digital Clock	
Freq Error	<0.2 ppm
Analog Jitter	<1 ns
Digital Jitter	<0.2 UI (0.13 UI typical)

AES Audio Outputs

Type	AES3id tone, 50 Hz to 20 KHz, or silent
Resolution	24 bit

Analog Audio Outputs

Number	two stereo pairs or four mono
Type	tone, 50 Hz to 20 KHz, or silent
Impedance	30 Ω, balanced
Reference Level	-10 to + 4 dBu, selectable

Additional Output Choices

Timecode	DVITC on the SDI outputs VITC on the composite outputs LTC on BNC unbalanced or on HD-15 balanced 1 V P-P drop or non-drop for NTSC
6 Hz Pulse	
Word Clock	
10 Mhz	when locked to internal or GPS reference

Flash Memory

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

File Type

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

General Specifications

Power Consumption	10 watts for 7400 10 watts for 7400-EX
Temperature Range	0 to 40°C ambient (all specs met)
Relative Humidity	0 to 95%, noncondensing
Altitude	0 to 10,000 ft