AVENUE

Model 5405
Dual Analog
Sync Generator
Data Pack

ENSEMBLE
D E S I G N S

Revision 2.1   SW v2.0

This data pack provides detailed installation, configuration and operation information for the **5405 Dual Analog Sync Generator** as part of the Avenue Signal Integration System.

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

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

MODULE OVERVIEW

The 5405 module is a stable timing source suitable for local reference generation for use in broadcast, remote trucks and post-production. Two dual independent composite reference signals are generated, the Primary and Secondary outputs.

The Primary and Secondary generators each consist of identical dual composite outputs. The outputs can be timed with respect to the reference to any point in the television frame. Color framing tracks the reference signal. Timing adjustments for Primary and Secondary outputs are configured independently and the 5405 can be configured to output 525 and 625 standards simultaneously.

The 5405 can operate from an internal precision frequency reference as a stand alone master sync generator or lock to a video reference from an external source. The module can also lock to an external 10 MHz source such as an atomic standard or GPS receiver for more precision.
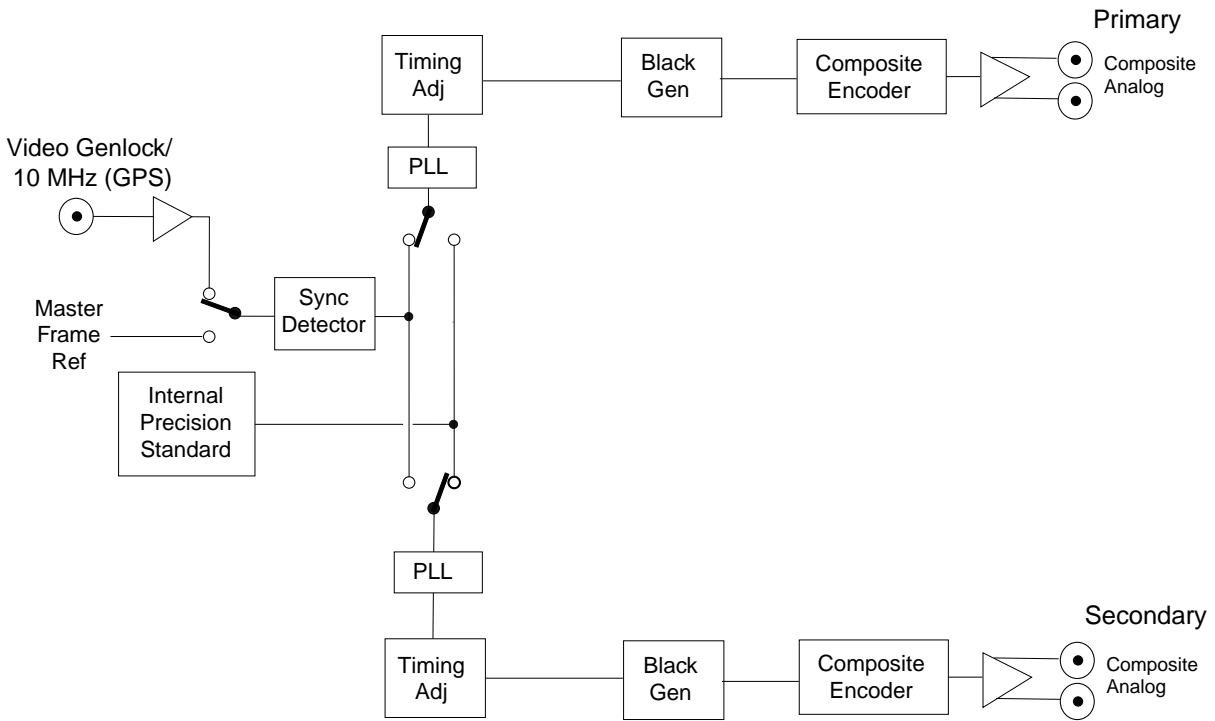
As shown in the block diagram on the following page, the time base reference is selected from either the Master or external reference. The selected reference passes through a precision sync separator to derive the required sync components. The separated sync signal provides the timing reference for the PLLs.

These primary timing signals then pass through timing adjustment and burst detection circuitry to determine color field sequence. They are then used to generate black signals in their respective generators. The signals enter composite encoders to provide the Primary and Secondary composite analog outputs.

Power is derived from the ± 12 volt frame power. It is regulated to the required +5 volts for the module by on-board regulator. The module is fused with a resettable fuse device. If the fuse opens due to an overcurrent condition, the module will lose power. After pulling the module, the fuse will reset automatically requiring no replacement fuse.

The on-board CPU can monitor and report module ID information (slot location, software version and board revision), and power status to the optional frame System Control module. This information can be accessed by the user or set to register an alarm if desired using the remote control options available.

Module control and monitoring is accessed through the Avenue Touch Screen Panel, Avenue PC, or through a web browser.

Video Genlock/
10 MHz (GPS)

Master
Frame
Ref

Sync
Detector

Internal
Precision
Standard

PLL

Timing
Adj

Black
Gen

Composite
Encoder

Primary

Composite

Analog

PLL

Timing
Adj

Black
Gen

Composite
Encoder

Secondary

Composite

Analog

5405 Dual Analog Sync Generator

APPLICATIONS

Simultaneous References

As shown in the application below, the 5405 module can provide simultaneous NTSC/525 and PAL/625 reference outputs derived from the same time base, from the same module. These outputs are independently timeable. The dual outputs from each generator are then fed to a 5150 Analog Distribution Amplifier for reference distribution to multiple destinations in the facility.
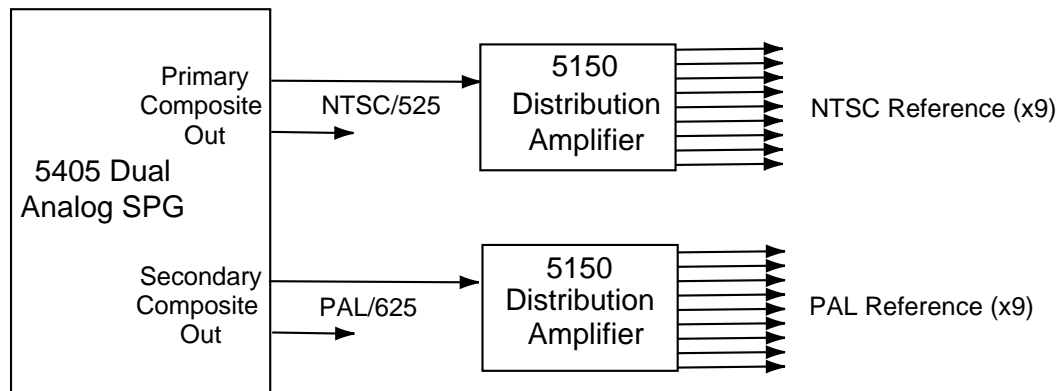
5405 Providing Simultaneous Reference Outputs

Analog Composite References

Another application for the 5405 is to combine it with the 5400, a Dual Sync and Test Signal Generator, to provide additional timeable reference outputs with the 5400 module acting as the Master Reference Generator. As shown below, the 5400 Primary and Secondary analog composite outputs feed Master Control destinations and the 5405 which is then sent to other facility locations.
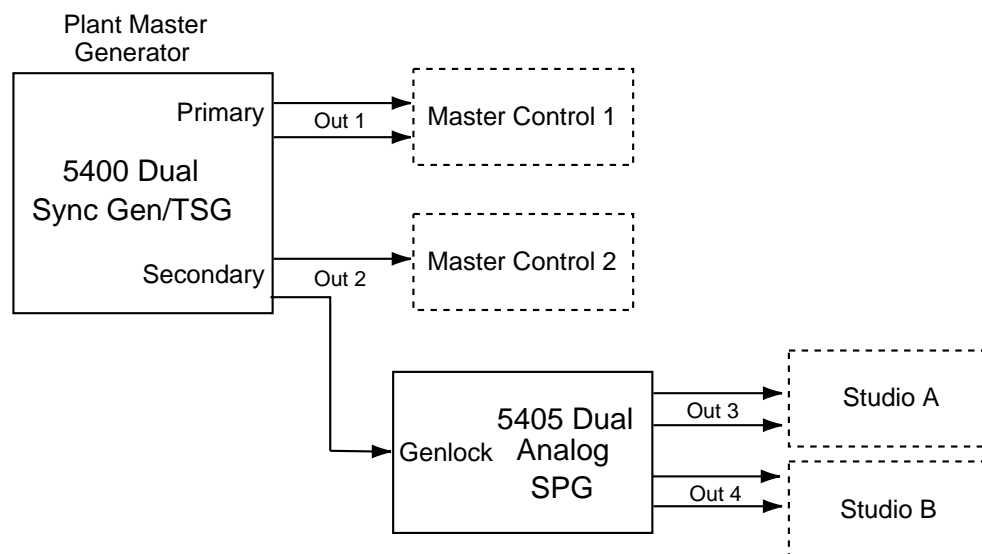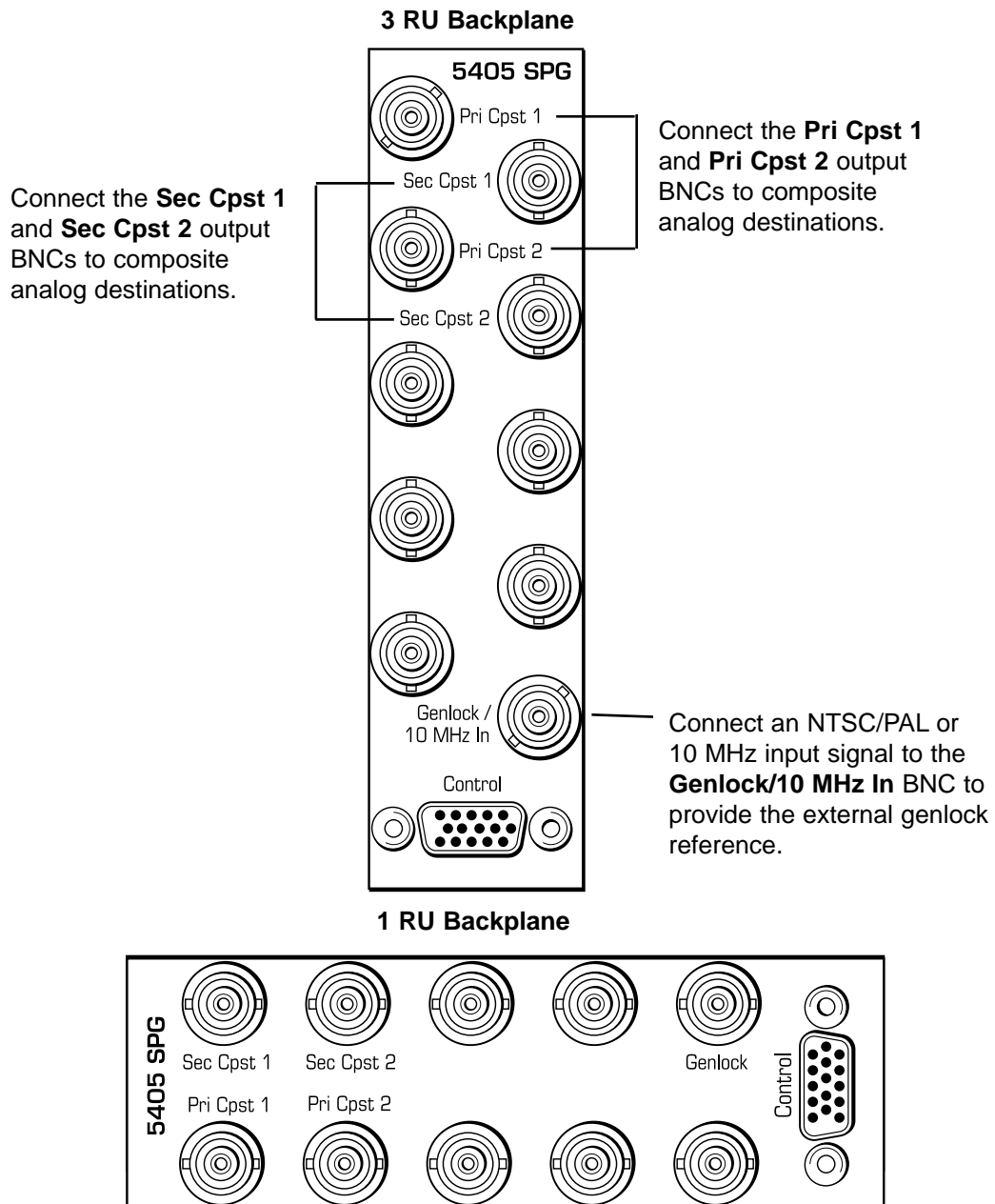
5405 With 5400 Providing Composite Reference Outputs

INSTALLATION

Plug the 5405 module into any one of the slots in the 3 RU frame and any slot except Slot 3 in the 1 RU frame. Install the plastic overlay provided onto the corresponding group of rear BNC connectors associated with the module. Note that the plastic overlay has an optional adhesive backing for securing it to the frame. Use of the adhesive backing is only necessary if you would like the location to be permanent and is not recommended if you need to change module locations. This module may be hot-swapped (inserted or removed) without powering down or disturbing performance of the other modules in the system.

CABLING

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

3 RU Backplane

Connect the **Sec Cpst 1** and **Sec Cpst 2** output BNCs to composite analog destinations.

Connect the **Pri Cpst 1** and **Pri Cpst 2** output BNCs to composite analog destinations.

Connect an NTSC/PAL or 10 MHz input signal to the **Genlock/10 MHz In** BNC to provide the external genlock reference.

1 RU Backplane

MODULE CONFIGURATION AND CONTROL

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

The configuration parameter choices for the module will differ between **Remote** and **Local** modes. In **Remote** mode, the choices are made through software and allow more selections. The **5405 Parameter Table** on the following page summarizes and compares the various configuration parameters that can be set remotely or locally and the default/factory settings. It also provides the default User Levels for each control. These levels can be changed using the Avenue PC application.

If you are not using a remote control option, the module parameters must be configured from the front panel switches. Parameters that have no front panel control will be set to a default value. The **Local** switches are illustrated in the **Front Panel Controls and Indicators** section following the **5405 Parameter Table**.

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

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

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

Making Reference Choices

Each generator can be independently set to operate either as a Master Sync Generator (using an internal precision frequency reference), or genlocked to an external reference source of either composite video or a 10 MHz sine or square wave. In addition, the secondary generator can be set to lock to the primary generator in tracking mode. These choices are made using the **Pri** and **Sec Source** controls in the **Primary** and **Secondary** menus. Refer to the block diagram below.

When a generator is set to be genlocked (by selecting **Config Ref** in the **Pri** or **Sec Source** menu), a further selection must be made to configure the module to use either its external genlock BNC (labeled **Genlock/10 Mhz In** on the module backplane) or the Master Frame Reference which is distributed through the Avenue frame backplane. This choice is made in the **Config** menu and provides the configured reference for both generators. The module will accept analog composite NTSC (525) or PAL (625), or a 10 MHz sine or square wave as an external genlock signal.

In order to provide the ultimate in flexibility, the television line standard output for each generator can then be set to either 525/60 Hz or 625/50 Hz. These output choices are possible even when the generators are locked to a genlock input in a different standard.
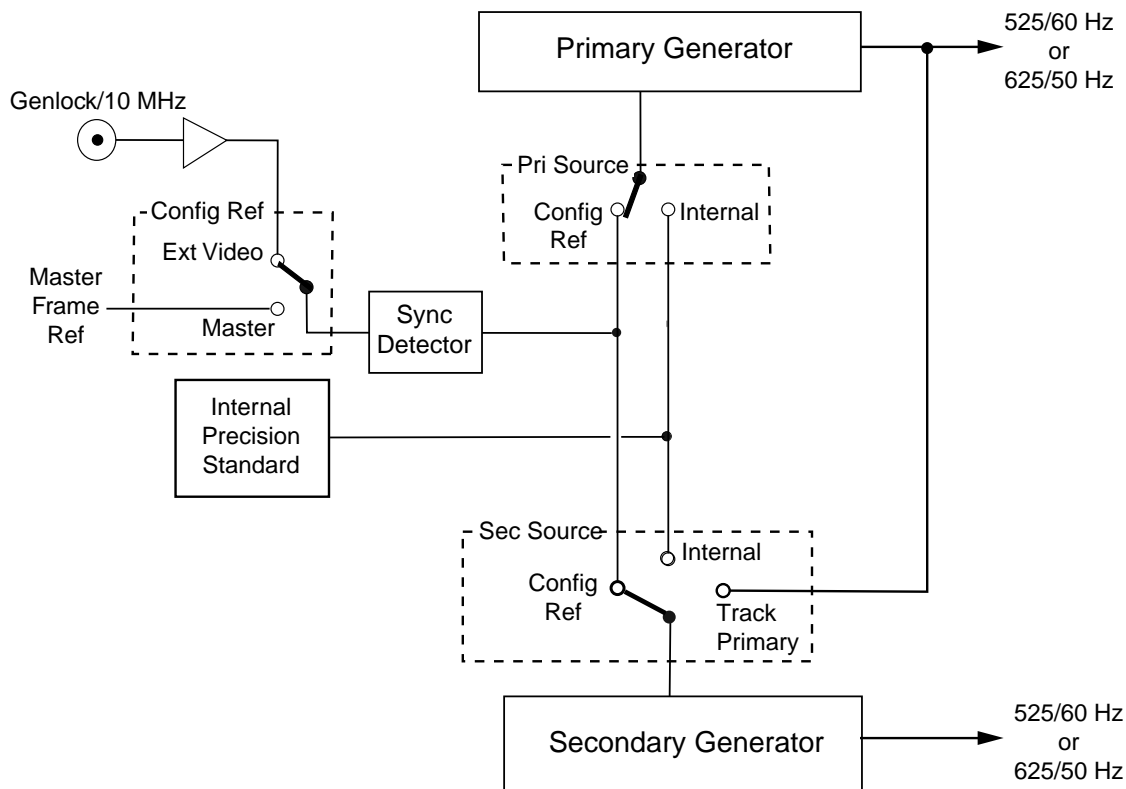
Primary and Secondary Reference Choices

5405 Parameter Table

CONTROL	LOCAL	REMOTE	DEFAULT	DEFAULT USER LEVEL
Primary Source	Switch 1: Internal GL	Internal Config Ref	Config Ref	Admin
Primary Standard	Switch 2: 525 625	525 – 60 Hz 625 – 50 Hz	525 – 60 Hz	Admin
Primary Setup	N/A	On Off	On	User 2
Secondary Source	N/A	Internal Config Ref Track Primary	Config Ref	Admin
Secondary Standard	Switch 4: 525 625	525 – 60 Hz 625 – 50 Hz	525 – 60 Hz	Admin
Secondary Setup	N/A	On Off	On	User 2
Pri Vert Timing	N/A	± 525 lines	0 lines	User 2
Pri Horiz Timing	N/A	± 1716 clocks	0 clocks	User 2
Pri Fine Phase	N/A	± 35 nsec	0 nsec	User 2
Pri Color Frame	N/A	Normal Field 3 Field 5 Field 7	Normal	User 2
Sec Vert Timing	N/A	± 525 lines	0 lines	User 2
Sec Horiz Timing	N/A	± 1716 clocks	0 clocks	User 2
Sec Fine Phase	N/A	± 35 nsec	0 nsec	User 2
Sec Color Frame	N/A	Normal Field 3 Field 5 Field 7	Normal	User 2
Config Ref	N/A	Ext Video Master Ref	Ext Video	User 2

Front Panel Controls and Indicators

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

Ref 525, 625 and 10 MHz green LEDs:
One LED will light to indicate which reference rate is currently being detected.
OFF when rate is not detected.

Pri 525/625 green LEDs:
One LED will light to indicate the Primary output line standard and that it is locked to its timing source.
If no LED is lit, the Primary generator is not locked to its timing source.

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

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

Pwr green LED:
Indicates the presence (**ON**) or absence (**OFF**) of power (+5V).
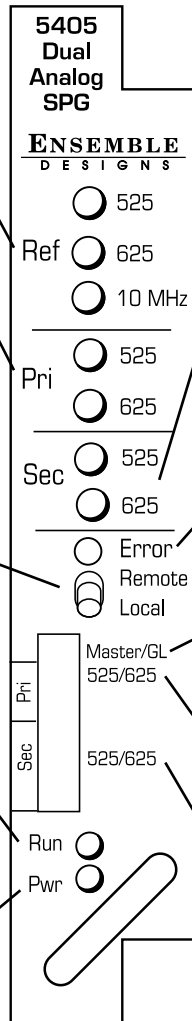
Sec 525/625 green LEDs:
One LED will light to indicate the Secondary output line standard and that it is locked to its timing source.
If no LED is lit, the Secondary generator is not locked to its timing source.

Error red LED:
Indicates a genlock or synchronization problem.

Master/GL switch:
Set the reference source to **Master** (left) or **GL**, Genlock, (right). In Genlock mode, module uses the external reference input as its timing source.
Pri (Primary Generator) 525/625 switch:
Set the Primary output line rate to **525** (left) or **625** (right).
Sec (Secondary Generator) 525/625 switch:
Set the Secondary generator output line rate to **525** (left) or **625** (right).

Diagram panel labels:
```
5405
Dual
Analog
SPG

ENSEMBLE
D E S I G N S

          525
Ref       625
          10 MHz

          525
Pri
          625

          525
Sec
          625

          Error
          Remote
          Local

          Master/GL
Pri       525/625

Sec       525/625

Run
Pwr
```

Avenue PC Remote Configuration

The Avenue PC remote control status menu for this module is illustrated and explained below. Refer to the **5405 Parameter Table** 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.

5405 Avenue PC Menus

The **Primary** menu screen shown below allows you to set the following parameters for the Primary generator output:

- **Pri Source** – select the Primary generator reference source from either **Config Ref** (defined in the **Config** menu) or **Internal**.

- **Standard** – select the desired line standard output from **525–60 Hz** or **625–50 Hz**.

- **Setup** – sets setup to **On** or **Off** for 525–60 Hz line output signals.

The **Sync Lock** window shows what standard the module is locked to or **No Lock**.

The **Secondary** menu screen shown below allows you to set the following parameters for the Secondary generator output:
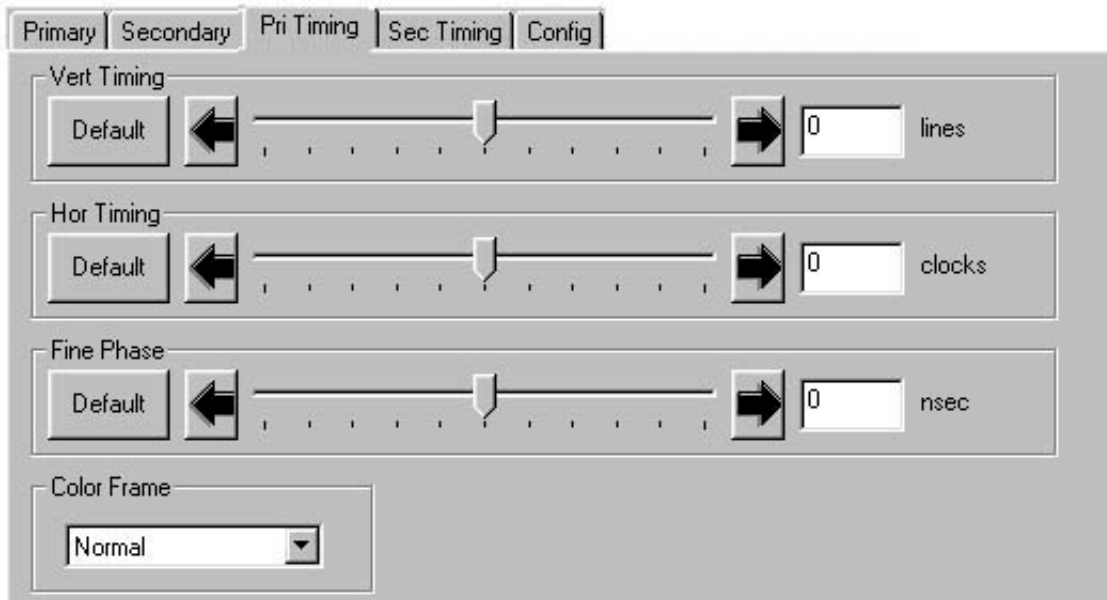
- **Sec Source** – select the Secondary generator reference source from either **Config Ref** (defined in the **Config** menu), **Internal** or the choice to **Track Primary**.
- **Standard** – select the desired line standard output from **525–60 Hz** or **625–50 Hz**.
- **Setup** – sets setup to **On** or **Off** for 525–60 Hz line output signals.

The **Sync Lock** window shows what standard the module is locked to or **No Lock**.The

The **Pri Timing** menu shown below allows you to set the timing of the Primary composite output in relation to the reference with the following controls. For numerical choices, use the slider control to select a value or enter a value into the number field at right and press the **Enter** key on your PC.

- **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.
- **Color Frame** – set the color framing for the Primary output signal.

The **Sec Timing** menu shown below allows you to set the timing of the Secondary composite output in relation to the reference or the Primary Source with the following controls. For numerical choices, use the slider control to select a value or enter a value into the number field at right and press the **Enter** key on your PC.

- **Vert Timing** – set the vertical timing in lines.
- **Hor Timing** – set the horizontal timing in clocks.
- **Fine Phase** – set the fine phase of the Secondary output.
- **Color Frame** – set the color framing for the Secondary output signal.

The **Config** menu shown below allows you to configure the reference from the external input (525, 625 or 10 MHz sine wave) or the Master Frame Reference:

- **Config Ref** – select the desired module reference from **Ext Video** (**Genlock/10 MHz In** BNC) or **Master** (Avenue Frame Reference).

Avenue Touch Screen Remote Configuration

The Avenue Touch Screen remote control status menu for this module is illustrated and explained below. Refer to the **5405 Parameter Table** for a summary of available parameters that can be set remotely through the menus illustrated. For more information on using Avenue Touch Screen, refer to the Avenue Touch Screen data pack that came with the option.

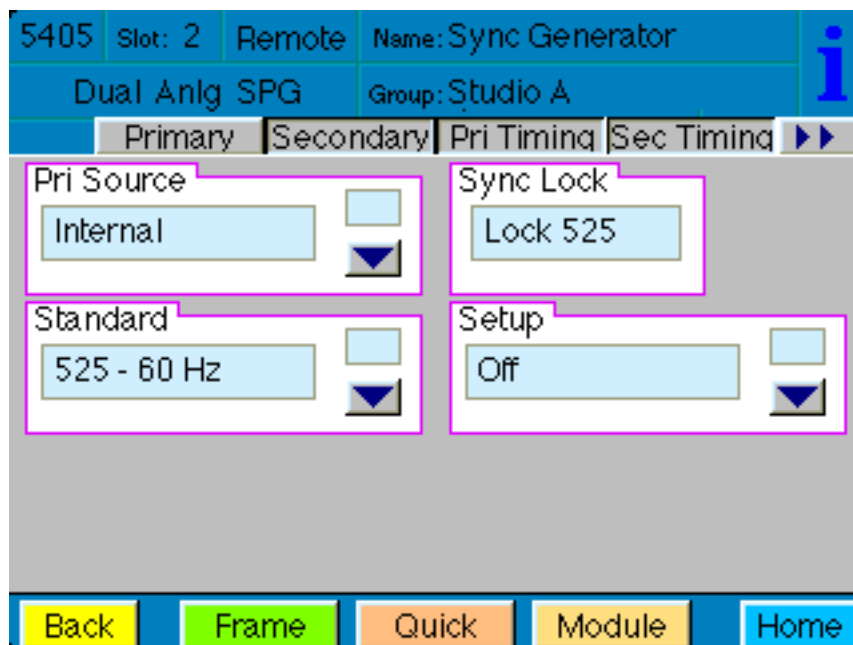Parameter fields that are grayed out can indicate one of the following conditions:

- 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.

5405 Avenue Touch Screen Menus

The **Primary** menu screen shown below allows you to set the following parameters for the Primary generator output:

- **Pri Source** – select the Primary generator reference source from either **Config Ref** (defined in the **Config** menu) or **Internal**.

- **Standard** – select the desired line standard output from **525–60 Hz** or **625–50 Hz**.

- **Setup** – sets setup to **On** or **Off** for 525–60 Hz line output signals.

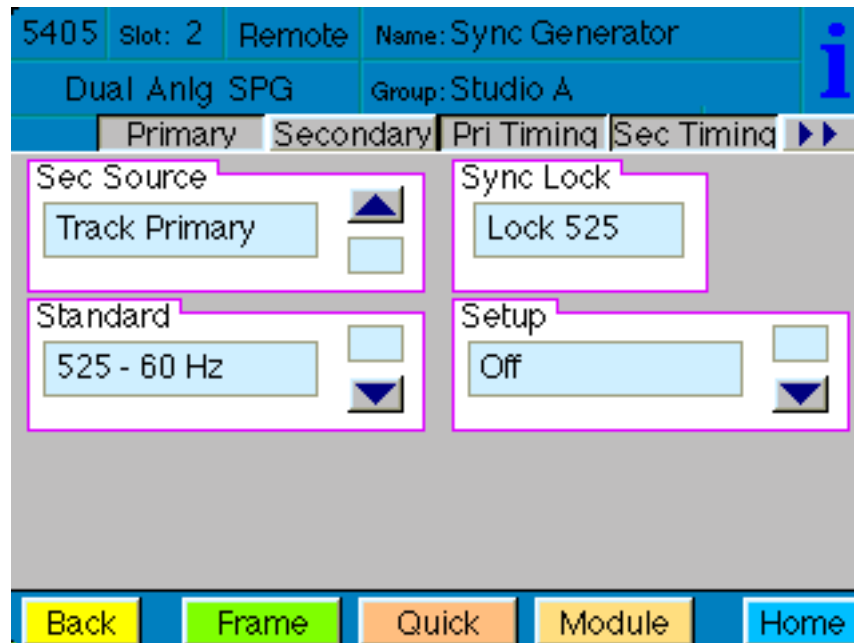The **Sync Lock** window shows what standard the module is locked to or **No Lock**.

The **Secondary** menu screen shown below allows you to set the following parameters for the Secondary generator output:

- **Sec Source** – select the Secondary generator reference source from either **Config Ref** (defined in the **Config** menu), **Internal** or the choice to **Track Primary**.
- **Standard** – select the desired line standard output from **525–60 Hz** or **625–50 Hz**.
- **Setup** – sets setup to **On** or **Off** for 525–60 Hz line output signals.

The **Sync Lock** window shows what standard the module is locked to or **No Lock**.The
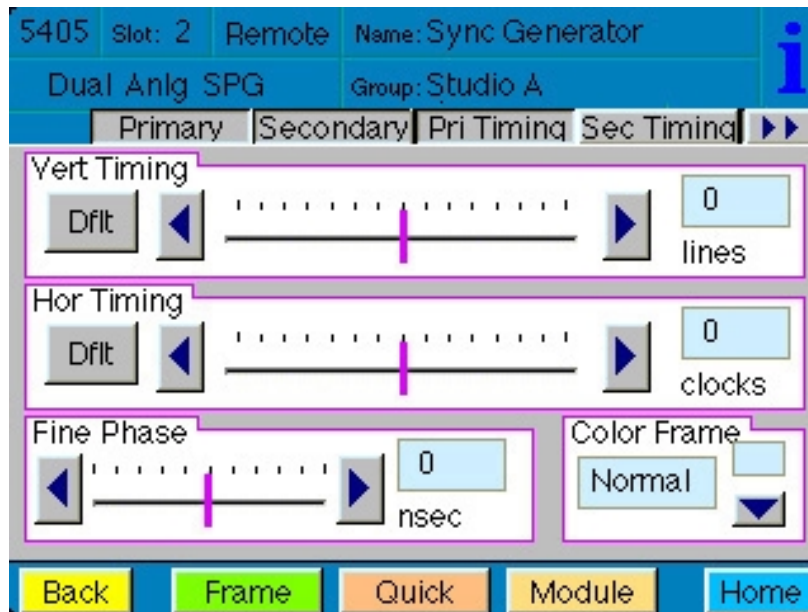
The **Pri Timing** menu screen shown below allows you to set the timing of the Primary composite output in relation to the reference with the following controls. For numerical choices, use the slider control to select a value or touch the number field at right to bring up a pop-up keypad. Enter a value and press the **Enter** key.

- **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.
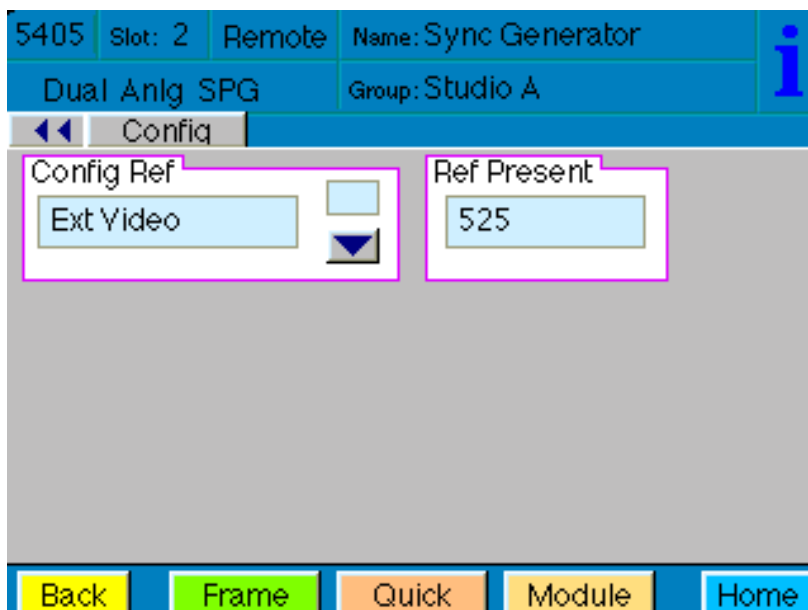- **Color Frame** – set the color framing for the Primary output signal.
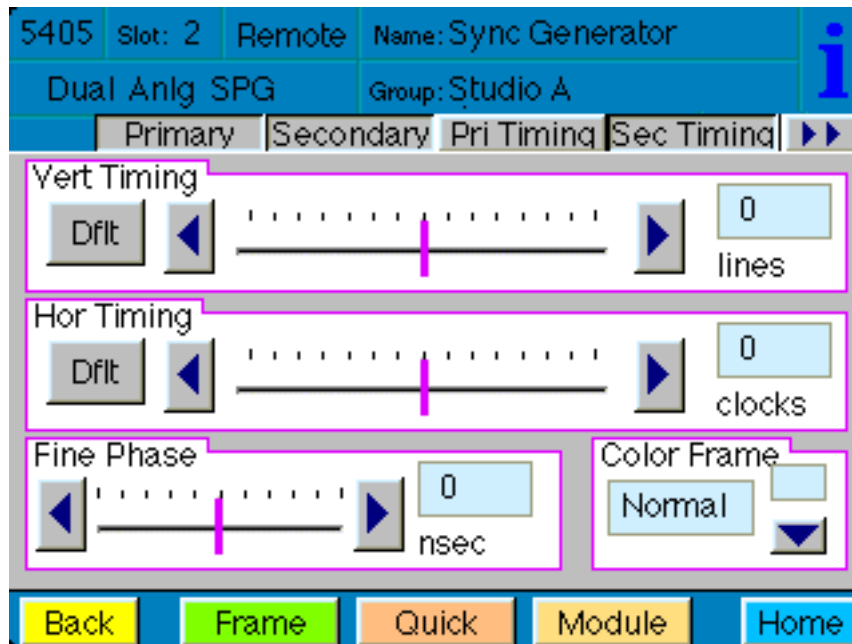
The **Sec Timing** menu shown below allows you to set the timing of the Secondary output in relation to the external reference or the Primary Source with the following controls. For numerical choices, use the slider control to select a value or touch the number field at right to bring up a pop-up keypad. Enter a value and press the **Enter** key.

- **Vert Timing** – set the vertical timing in lines.
- **Hor Timing** – set the horizontal timing in clocks.
- **Fine Phase** – set the fine phase of the Secondary output.
- **Color Frame** – set the color framing for the Secondary output signal.

The **Config** menu shown below allows you to configure the reference from the external input (525, 625 or 10 MHz sine wave) or the Master Frame Reference:

- **Config Ref** – select the desired module reference from **Ext Video** (**Genlock/10 MHz In** BNC) or **Master** (Avenue Frame Reference).

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 **5405** module:

Error light is lit on front panel:

- Module is not locking to a selected reference. At least one of the **Ref** LEDs should be lit to indicate presence and status of reference input

No Pri or Sec LED indication:

- Module is not locking to 525 or 625. At least one of the **Pri** or **Sec** LEDs LEDs should be lit to indicate locking status.

Can't control module:

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

Module controls are grayed out:

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

No signal out of module:

- Check status of **Ref** green LEDs. One should be lit. 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@endes.com

http://www.ensembledesigns.com

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

SPECIFICATIONS

5405 Dual Analog Sync Generator

Reference Input Signal:

Number:	Two: External or Frame Master Reference
Signal Type:	1 V p-p NTSC, PAL or 10 MHz
Return Loss:	>40 dB

Composite Outputs:

Number:	Two Primary, Two Secondary
Signal Type:	NTSC/PAL
Impedance:	75 ohm
Return Loss:	> 40 dB
Frequency Response:	±0.1 dB 10 KHz to 5.0 MHz
Output DC:	< ± 50 mV
K Factors:	< 1.0% signal type
Differential Phase:	< 1.0 degree
SCH Phase:	± 2 degrees
Delay:	Adjustable over a full frame in subdegree steps
Color Framing:	Tracks reference, user-selectable

Timing Stability:

Internal TCXO:	± 1 Hz of F_{SC}
External Ref:	Follows reference
Timebase Error:	< 1 ns

General Specifications:

Power Consumption:	< 10 Watts
Temperature Range:	0 to 40 degrees C ambient (all specs met)
Relative Humidity:	0 to 95% noncondensing
Altitude:	0 to 10,000 ft
Fusing:	1.5 Amp PTC resettable fuse

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