

Mirage J Series

User Manual

020-100708-01

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1: Introduction

1.1 Projector Overview 1-1

2: Operation

2.1 3D 2-1

A: Menu Tree

A.1 Mirage J Series Menu Tree A-1

B: GPIO

B.1 GPIO Port B-1

1 Introduction

Every effort has been made to ensure the information in this document is accurate and reliable; however, due to constant research the information in this document is subject to change without notice.

1.1 Projector Overview

The Mirage J Series projectors provide a powerful combination of high resolution video/graphics, 3 chip 1080p HD, SXGA+, and WUXGA resolutions, high brightness and high contrast ratios to produce flawless, realistic three-dimensional images for simulation, virtual reality and other stereographic related applications.

This document applies to the following projector models:

Table 1.1 Mirage J Series Projectors

Model Name	Part Number
MIRAGE DS+8K-J	132-004127-XX
MIRAGE HD7K-J	132-005128-XX
MIRAGE WU7K-J	132-006129-XX
MIRAGE S+14K-J	132-010124-XX
MIRAGE HD14K-J	132-011125-XX
MIRAGE WU14K-J	132-012126-XX
MIRAGE S+18K-J	132-013127-XX
MIRAGE HD16K-J	132-014128-XX
MIRAGE S+22K-J	132-016120-XX
MIRAGE HD20K-J	132-017121-XX
MIRAGE WU20K-J	132-018122-XX

2 Operation

2.1 3D

The Mirage J Series projector is capable of displaying stereoscopic 3D video sources. The Mirage J Series relies on additional hardware; such as stereo emitters and glasses to complete the display system.

Images generated from a stereo 3D-video source consist of a series of images (*frames*) that alternate quickly between two slightly different view points, corresponding to your left and right eye. When these frames are displayed fast enough and viewed with special stereo glasses synchronized to the left/right (L/R) changes, the resulting image appears with the same depth and perspective that is sensed in the real world.

NOTE: *The type of special glasses can be active stereo or passive stereo glasses depending on the type of stereo controllers and screen used.*

2.1.1 Requirements

Stereo 3D applications require a stereo 3D-capable source, special hardware/software setups (described below), the *3D Settings* menu option to control the projector processing, synchronizing and displaying of your stereoscopic 3D source material.

Hardware:

- Christie 3D version of Mirage *J Series* projector.
- Christie 3D Stereo Sync Cable (required for 3D Mirage J Series models; ensures minimum frame delay). This General Purpose Input Output (GPIO) cable is standard with all Mirage J Series projectors. **NOTE:** See [Appendix B: GPIO](#).
- A source, usually a computer with a stereo 3D graphics card capable of displaying progressive scan (alternating frames) of OpenGL quad buffered stereo 3D applications (suggested cards include ATI or NVIDIA), and running under *Windows, Linux, IRIX, HPUX, OSX* or *Solaris* operating systems.
- Emitter for controlling active shutter glasses.
- An appropriate qualified device that mounts in front of the lens of the projector that will process the light from the lens into a passive polarized light. Contact your Immersive dealer for more information.

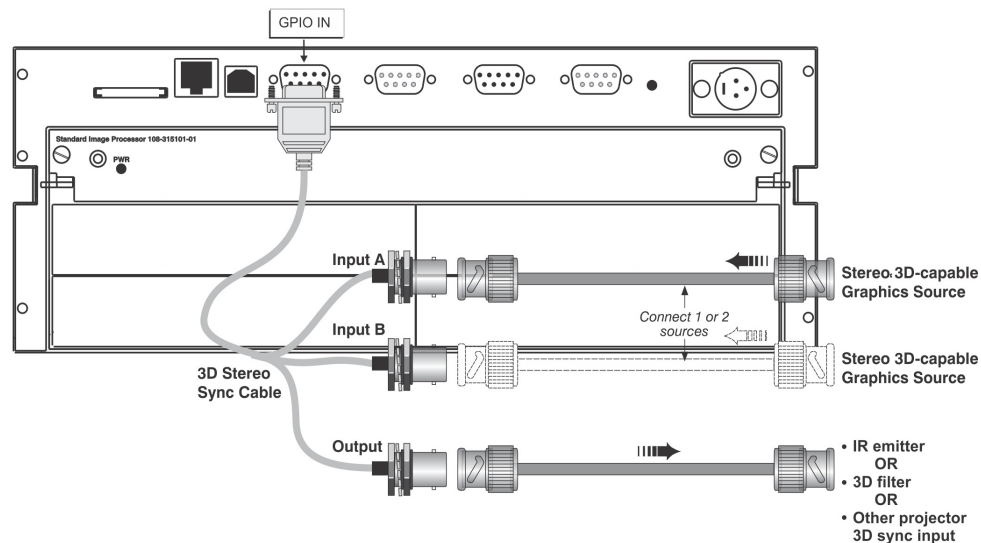
Software or content:

- Any 3D computer software that supports active or sequential 3D stereo on a supported computer/graphic card.
- A video stream from video source that has been prepared to be sequential content. Supports stereo signals prepared on either a compatible Dual and Single link HDSDI format.
- Compatible passive dual channel sources, providing each signal type is frame locked and the input connections are identical.

CONNECTING THE 3D STEREO SYNC CABLE

This GPIO cable provides the means for synchronizing the various components in your 3D system. Your source, projector display output, and emitters or 3D passive filter system can then operate together with precision to minimize cross-talk and color artifacts. Connect as shown below.

NOTE: For Mirage J Series models, inputs A and B are not required, but recommended to ensure that stereo is configured correctly, especially for multiple projector setups.



Connecting Two Stereo 3D Sync Inputs (Recommended for multiple sources). Connect your video card's stereo 3D sync cable to either Input A or either Input B on the 3D Stereo Sync Cable. These inputs are provided to allow you to connect two different Stereo 3D sources and conveniently switch the display back-and-forth between them.

Connecting One Stereo 3D Sync Output Connect the 3D Stereo Sync Cable output to your stereo 3D sync emitter or 3D passive filter system, PZE device. The L/R switching of the device can then be synchronized according to the controlling signal of choice—either the source input signal or the internally generated signal—as set in the 3D Settings menu.

2.1.2 Active and Passive Stereo 3D Configurations

Typical hardware configurations for active and passive Stereo 3D systems are shown in *Figure 1 - Mirage J Series - Typical Stereo 3D Configuration: With Active Glasses* and *Figure 2 - Mirage J Series - Typical Stereo 3D Configuration: With Passive Glasses*.

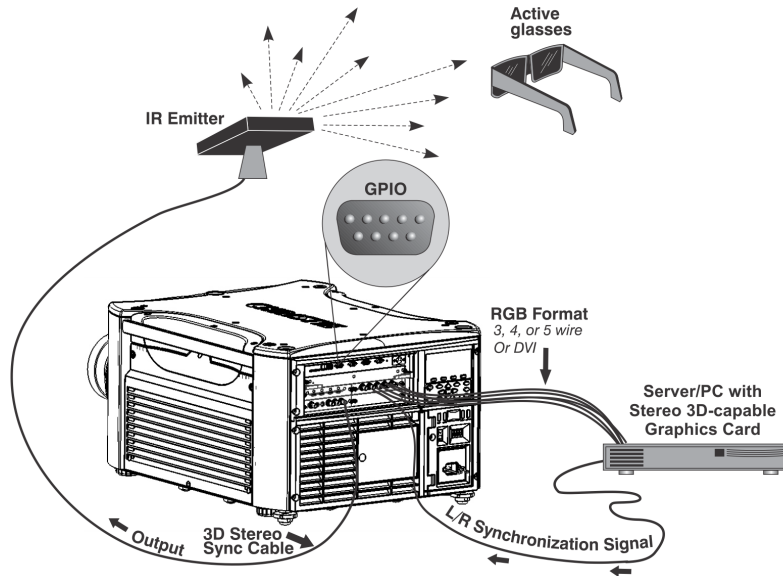


Figure 1 - Mirage J Series - Typical Stereo 3D Configuration: With Active Glasses

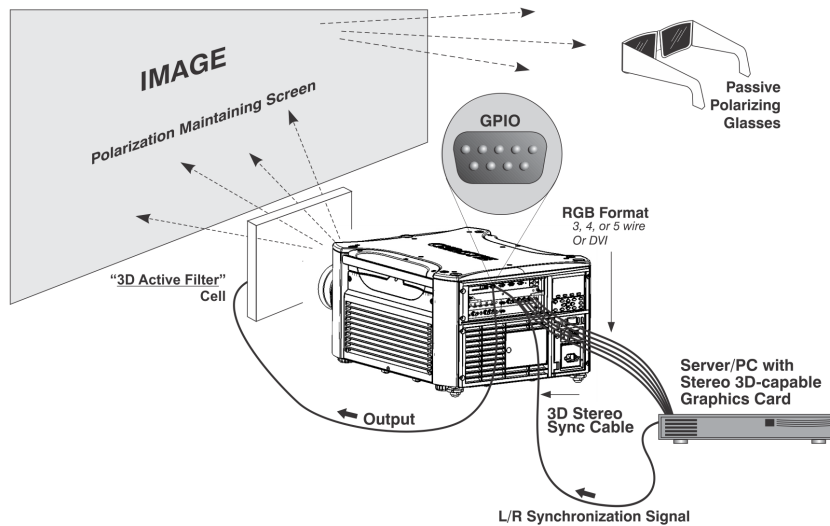


Figure 2 - Mirage J Series - Typical Stereo 3D Configuration: With Passive Glasses

Appropriate Stereo 3D Source: Use stereo 3D application software with your 3D video source (usually a workstation or PC). The source must provide a separate stereo 3D synchronization signal that precisely controls when the left/right fields are visible through the glasses of the viewer. This separate signal is usually provided using a VESA 3 pin stereo port.

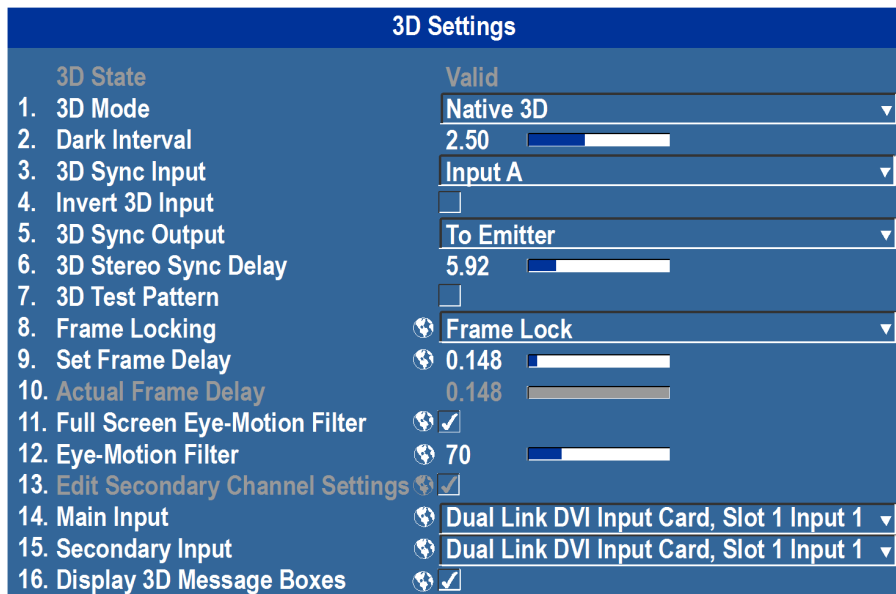
IR Emitter/3D Passive Filter System: In response to an incoming sync signal, the emitter emits L/R infrared signals to a receiver in active 3D shutter glasses, causing the L/R shutters to alternately open and close for active stereo 3D applications. Likewise, a 3D passive filter system placed in front of the lens responds to an incoming sync signal and alternately polarizes the L/R frames viewed with passive glasses for active stereo 3D applications. Connecting one of the 3D Stereo Sync Cable outputs to an emitter/3D passive filter system allows you to synchronize your stereo 3D display with the glasses.

Glasses (Active/Passive): Active glasses differ in speed and performance. Consult the documentation for your glasses and keep their specifications in mind when configuring your source signal. The input signal must be optimized for the available shutter speed to prevent obvious “ghosting” of image content (known as cross-talk in stereo 3D applications) and other more subtle color artifacts. Such problems indicate that the eyes are detecting portions of the opposing frame due to an “out-of-sync” system, and can occur in either active or passive stereo 3D configurations. Adjust the Dark Interval setting to reduce ghosting.

In the 3D Settings menu, the correct “3D Stereo Sync Delay” setting should help to synchronize glasses with the displayed images. **NOTE:** *In a passive system, where glasses do not have shutters and instead depend on the speed and accuracy of the 3D passive filter system, the signal must be synchronized to the projector via the 3D Stereo Sync Cable.*

4.2 3D SETTINGS

Use the options in the 3D Settings menu to make the timing adjustments necessary for realistic simulation and 3D images.



3D State: Informs you what state the projector is in: Off, Missing Secondary Signal, Not Frame Locked, Secondary Frequency Mismatch, High Bandwidth Not Supported, Stereo Sync Not Detected, Stereo Sync Invalid, and Invalid Frequency. **NOTE:** *This is read only.*

3D Mode: Select the mode of your 3D operation.

Off: 3D operation is disabled.

Auto 3D: Attempts to automatically determine which 3D mode to use based on auxiliary video data, e.g. HDMI info frame.

Native 3D: All content is shown at a native frame rate of 96 - 120 Hz input and output.

Frame Doubled 3D: 3D Content from a single 48-60Hz signal (24/30Hz per eye) is displayed twice to provide a 3D content to be viewed at 96-120Hz.

Dual Input 3D: Content from two independent 48-60Hz ‘passive’ frame locked sources are interleaved into a native 96-120Hz native frame rate. This requires an optional input module and both signals must be from the same signal type.

Side-by-Side 3D: Content is transmitted with each eye beside each other in a single frame, and is extracted and scaled appropriately to show in an alternate-frame sequence. Typically used for broadcast 3D-TV.

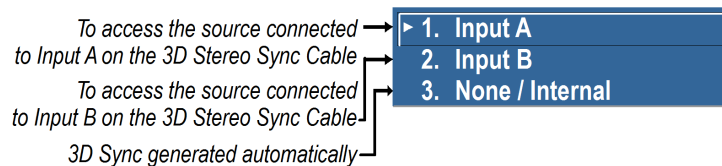
Top-and-Bottom 3D: Content is transmitted with each eye above one another in a single frame at half resolution, and is extracted and scaled to show in an alternate-frame sequence.

Frame Packed 3D: Content is transmitted with each eye at full resolution in a double-sized frame, and is extracted to show in an alternate-frame sequence. Typically used for Blu-ray 3D movies and 3D video gaming.

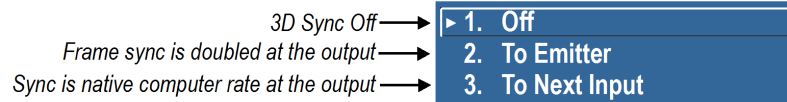
Triple-Flash 3D: 3D Content from a single 48Hz signal (24Hz per eye) is displayed three times to provide you a 3D image to be viewed at 144Hz.

Dark Interval: Artificially increases the amount of dark time between displayed frames for stereoscopic 3D images. Higher settings provide more time for shutters in 3D glasses to open and close, ensuring that each eye sees the full display intended for it. Symptoms of cross talk or color artifacts can indicate the need for adjustment. The Dark Interval range of adjustment depends on the vertical frequency of your source-the higher the frequency, the smaller the range. Default setting is 2.3ms.

3D Sync Input: The 3D sync signal is generated by the 3D source to insure left/right eye content is synchronized to the projector and you. The projector has the ability to physically connect to two different sources. Ensure that the correct 3D sync input is selected (either Input A or Input B) with each 3D signal source. If none/internal is selected the projector will generate the sync internally and content will be displayed; however, there is a 50% chance that the content will be displayed with the left/right eyes swapped (from the remote, press FUNC 6-9 to swap the eyes). **NOTE:** *This function is not used in Interleaved 3D mode. Each eye receives a selected input and no 3D sync input is required.*



3D Sync Output: This option defines whether the 3D Sync is output and controls how it is processed. It is only valid when an optional cable is used to connect stereo 3D signals to the projector via the GPIO port. When there is no 3D signal, Sync Output should be 'Off'. Typically only the last projector in the 3D Stereo cable chain is connected to the emitter and should specify 'To Emitter'. All other projectors should select 'To Next Input' if other projectors are used in the chain.



3D Stereo Sync Delay: Adjust the output 3D emitter delay (in milliseconds) to match the active glasses to the L/R frames of the projector. Proper adjustment of this delay will eliminate cross talk and odd colors caused by timing differences between the glasses and the projected image. Your specified delay is added after sync locking.

3D Test Pattern: Enables a 3D test pattern for diagnostics. The scrolling diagonal lines indicate how well left and right are synchronized. If ghosting is occurring the input may have to be switched or inverted. Adjustments to the emitter delay can also help correct the synchronization. To verify that your 3D is setup correctly, a small set of “L”s will be visible when you close your right eye and a small set of “R”s will be visible when you close your left eye.

Frame Locking: Enable or disable Frame Lock. When set to Frame Lock, if possible output image frames are locked to the input. When Locked, the output is always locked to the primary input and never the secondary image, when using Dual input 3D. Free Run sets the output to close to 60Hz for all sources. This control must be set to locked if a 3D-Stereo signal is used.



Set Frame Delay: Delays the output signal timing relative to the input signal timing by a fraction of a frame, and up to several frames. The minimum latency can vary based on the amount of scaling applied to the image. When using keystone or warping, an additional latency is required, depending on the amount of warp. The control is only available when the input signal is frame locked. In free run mode, or in cases where the signal cannot be frame locked, the minimum latency defined by the scaling and keystone/warp is applied to the signal.

Actual Frame Delay: Displays the actual frame delay reading.

Full Screen Eye-Motion Filter: Check this control to apply the Eye-Motion Filter to the entire screen, rather than applying just to the edge blending regions. Helps with posterization effects, sometimes seen in color ramps when viewing stereoscopic images.

Eye-Motion Filter: Adjust this filter to reduce saccadic eye-motion artifacts, sometimes noticeable in edge blending regions. Too much filtering may result in loss of detail. For best results, adjust this setting while positioned at the nominal screen-viewing distance.

Edit Secondary Channel Settings: When using Dual Input 3D, this allows you the option to independently control primary and secondary channel settings, or to use the same setting for both links. By default, this control is unchecked, meaning any settings applied to the primary input will also be applied to the secondary input. In this case, the secondary channel settings cannot be set. When checked, the secondary channel settings become editable.

Main Input: Select an input from the drop-down list.

Secondary Input: Select an input to be used as secondary input in a Dual Input 3D setup.

Display 3D Message Boxes: Enable/Disable message boxes that are triggered by 3D setup. **NOTE:** No message box is shown in “Off” and “Valid” state.

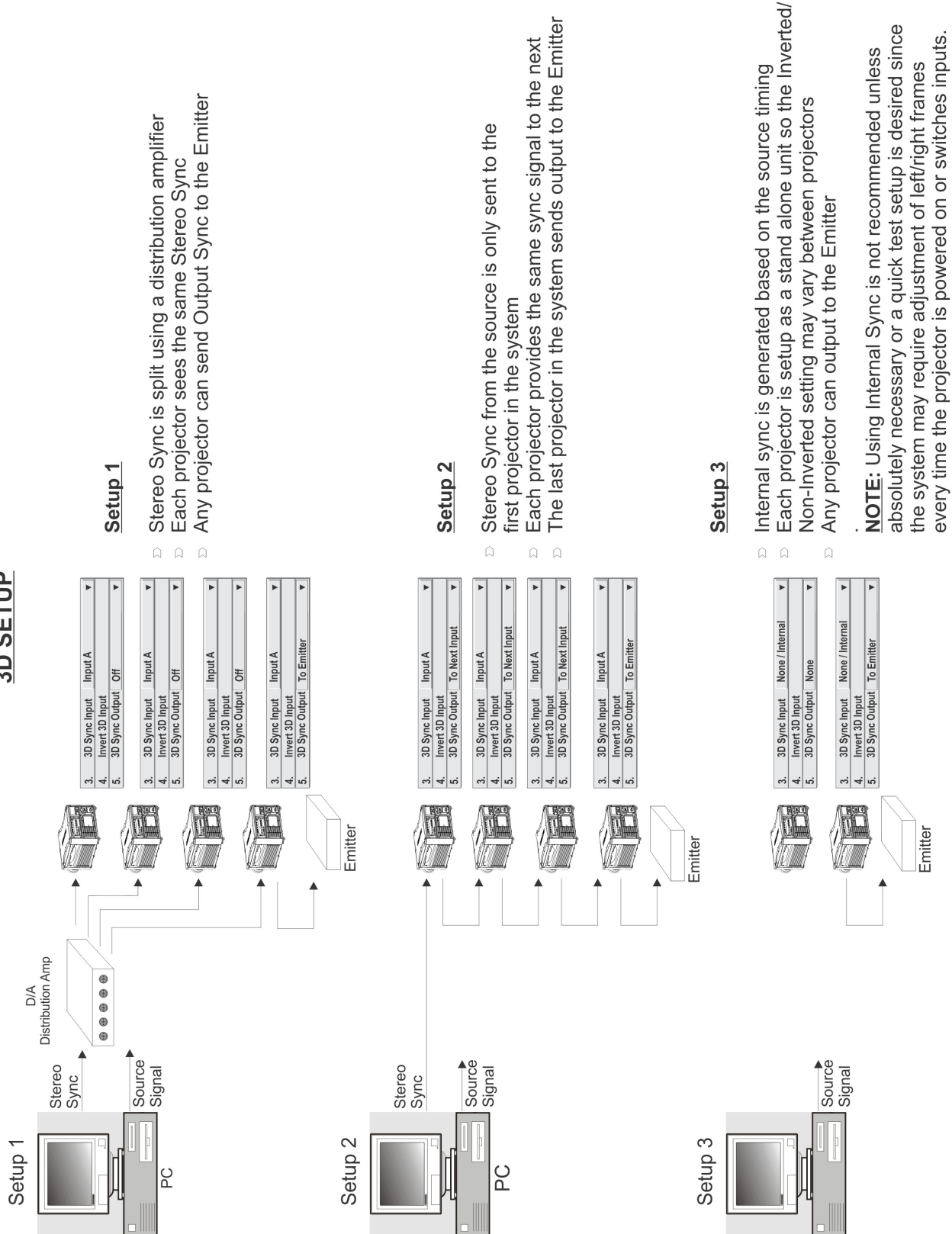
2.1.3 Example of 3D Multiple Display Setup

The following instructions is an example of a multiple display setup or refer to Figure 2-3 Example of 3D Multiple Display Setup.

1. Setup the warp and blends for the projector.
2. If necessary, shift or scale your image to fit the display.
3. Set all projectors to the largest minimum Frame Delay value that the worst case projector in the array can achieve.
4. Enable 3D mode on all projectors. Using the remote >**Main Menu**>**Image Settings**>**Advanced Image Settings**>**3D Settings**
5. Set all projectors 3D Sync Output to “**Next Projector**” with the exception of the last projector; select “**To Emitter.**”
6. Connect the PC emitter sync to either **Input A** (or B) on the 3D dongle.
7. Connect the output from the 3D dongle in the first projector to **Input A** (or B) on the next projector in the array.
8. Repeat the same procedure to all projectors except the last projector in the array. Route the Sync output from the 3D dongle to the emitter. **NOTE:** *For the last projector, route the sync input.*
9. If your emitter has a reverse setting ensure it is set to the Off position.
10. Set all projectors to **3D Sync Input A** (or B) depending on your selection in Step 6 & 7.
11. Apply the 3D test pattern to all projectors.
12. Put on your 3D glasses.
13. When 3D is setup correctly, a small set of the letter L is visible by closing your right eye and a small set of the letter R is visible when closing your left eye.
14. If necessary, adjust the dark interval settings until the test pattern sees the least amount of ghosting for each projector.
15. Adjust the 3D Sync Delay on the last projector in your array to match the optimal sampling point for the glasses being used. **NOTE:** *The default auto setup value is typically good for all glasses.*
16. Turn off the 3D test pattern on each projector. Your 3D content should look optimal.

FIGURE 2-3 EXAMPLE OF 3D MULTIPLE DISPLAY SETUP

3D SETUP



Setup 1

- ▷ Stereo Sync is split using a distribution amplifier
- ▷ Each projector sees the same Stereo Sync
- ▷ Any projector can send Output Sync to the Emmitter

Setup 2

- ▷ Stereo Sync from the source is only sent to the first projector in the system
- ▷ Each projector provides the same sync signal to the next
- ▷ The last projector in the system sends output to the Emmitter

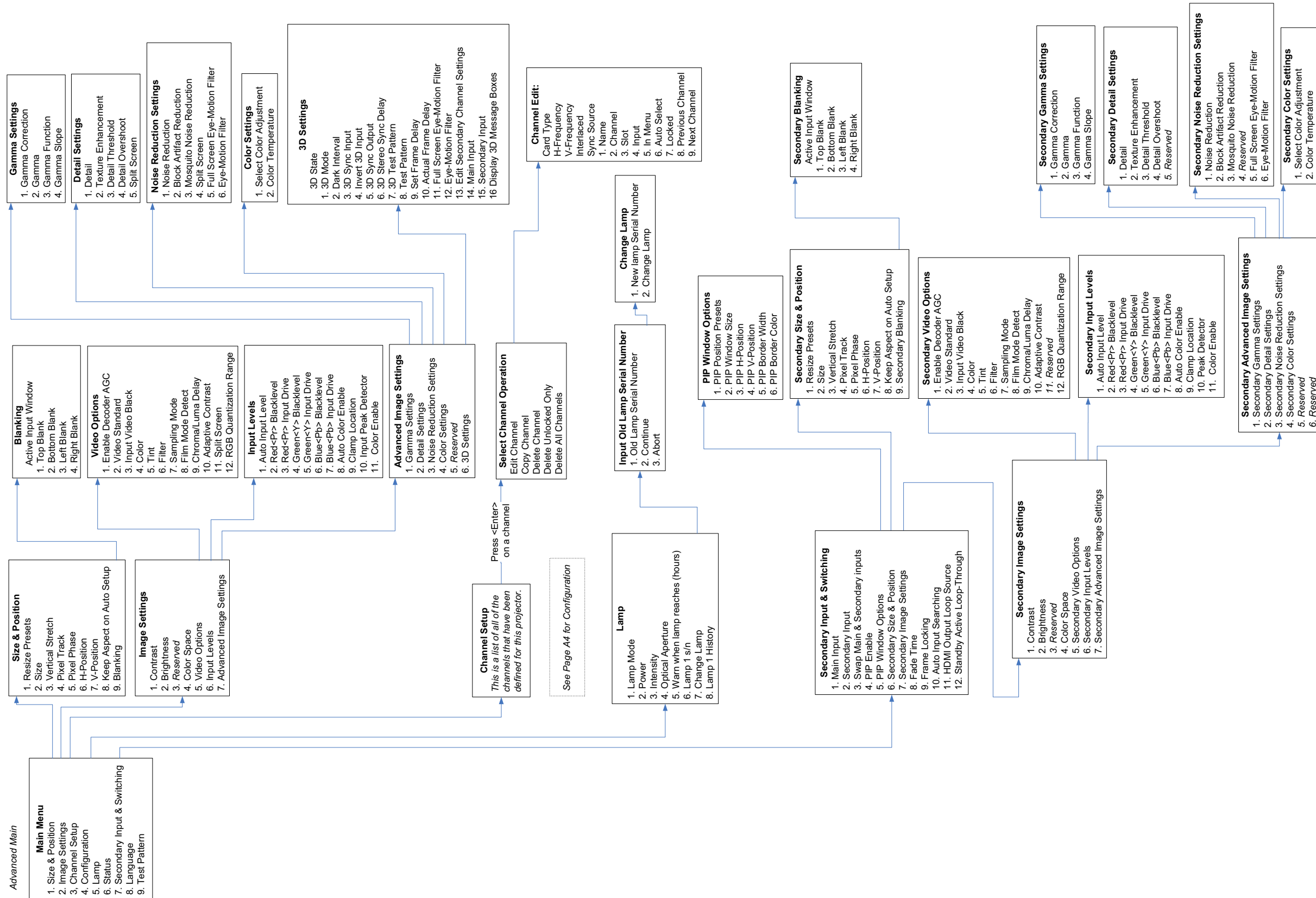
Setup 3

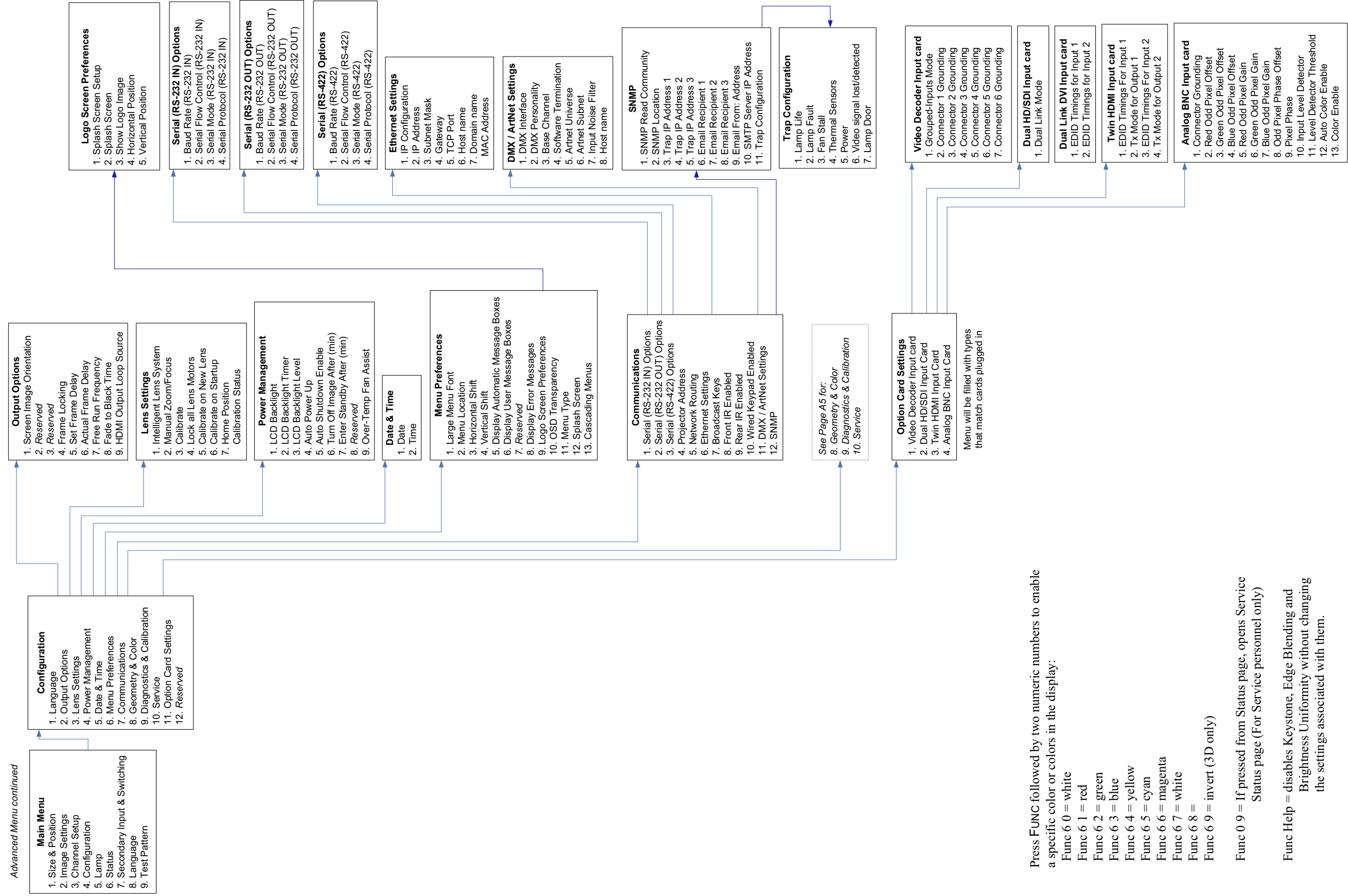
- ▷ Internal sync is generated based on the source timing
- ▷ Each projector is setup as a stand alone unit so the Inverted/ Non-Inverted setting may vary between projectors
- ▷ Any projector can output to the Emmitter

NOTE: Using Internal Sync is not recommended unless absolutely necessary or a quick test setup is desired since the system may require adjustment of left/right frames every time the projector is powered on or switches inputs.

Appendix A: Menu Tree

A.1 Mirage J Series Menu Tree





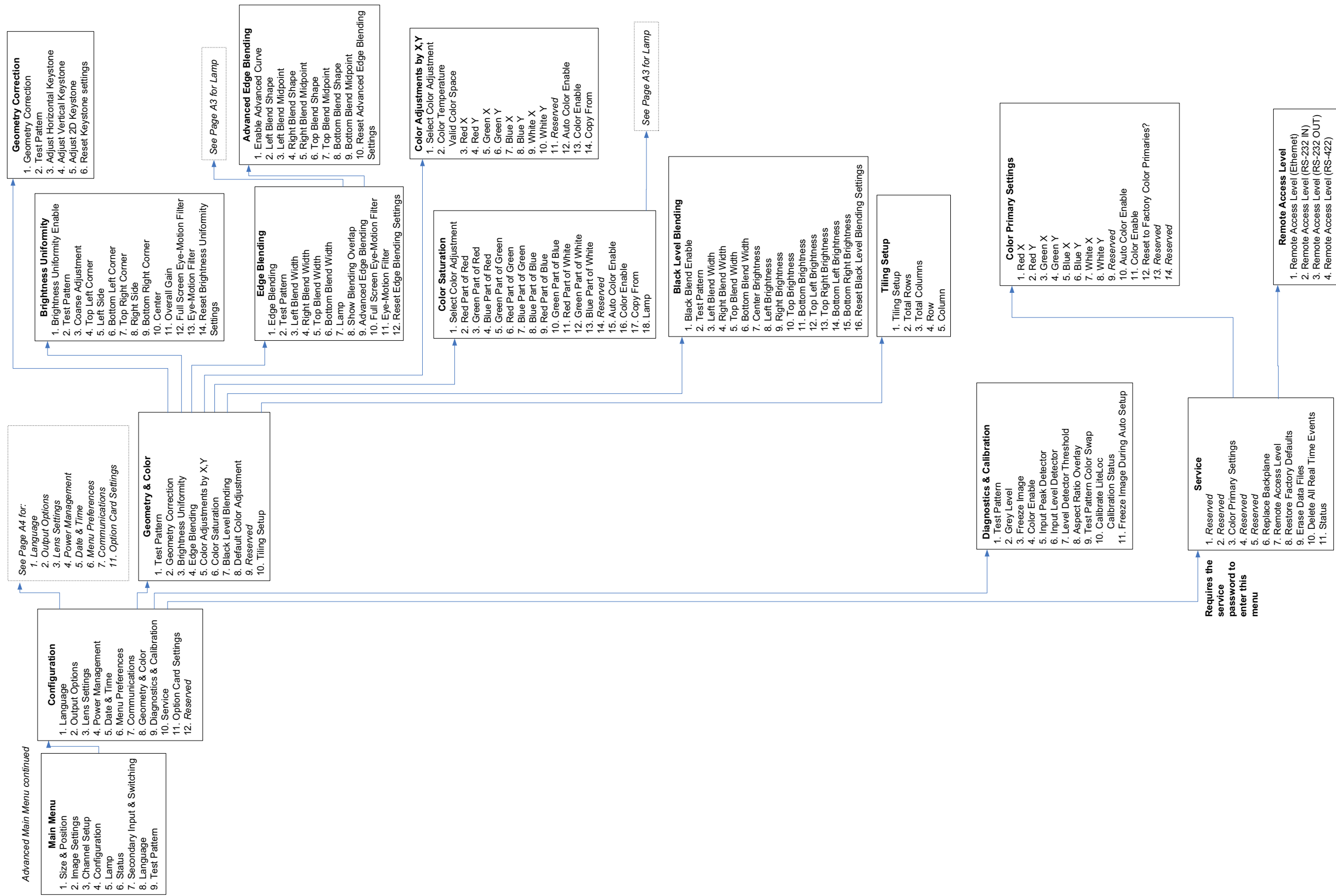
Advanced Menu continued

Press FUNC followed by two numeric numbers to enable a specific color or colors in the display:

- Func 6 0 = white
- Func 6 1 = red
- Func 6 2 = green
- Func 6 3 = blue
- Func 6 4 = yellow
- Func 6 5 = cyan
- Func 6 6 = magenta
- Func 6 7 = white
- Func 6 8 =
- Func 6 9 = invert (3D only)

Func 0 9 = If pressed from Status page, opens Service Status page (For Service personnel only)

Func Help = disables Keystone, Edge Blending and Brightness Uniformity without changing the settings associated with them.



Appendix B: GPIO

This section explains how to use a GPIO link from the projector to external equipment, such as devices for 3D synchronizing.

B.1 GPIO Port

The GPIO connector located on the input panel provides a flexible method of interfacing a wide range of external I/O devices to the projector. There are 7 GPIO pins available on the 9pin D-Sub GPIO connector, which are configurable via RS-232 commands. The other two pins are reserved for ground and power - see table below for pin identification.

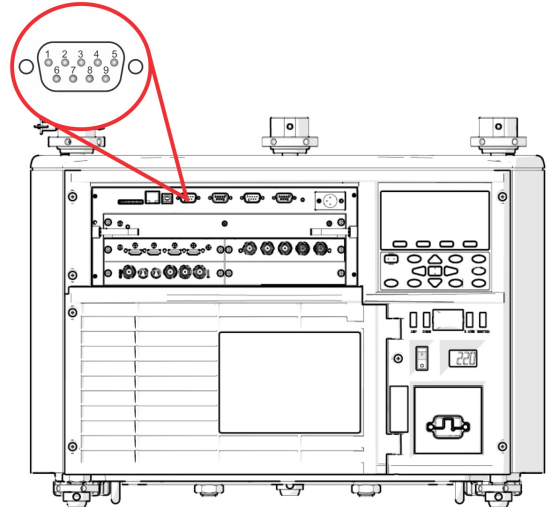


Table B.1 GPIO Pin

GPIO PINS	
PIN #	SIGNAL
Pin 1	+ 12V (200mA)
Pin 2	GPIO 2
Pin 3	GPIO 4
Pin 4	GPIO 6
Pin 5	Ground
Pin 6	GPIO 1
Pin 7	GPIO 3
Pin 8	GPIO 5
Pin 9	GPIO 7

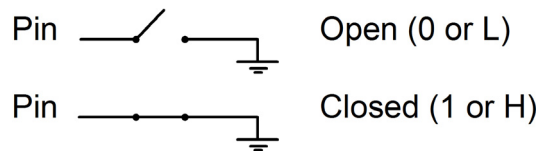
The serial cable required for connecting the external device to the GPIO connector of the projector, must be compatible with the external device.

Configuring the GPIO

The GPIO connector can be configured to automate any number of events using the serial command code **GIO**. Each Pin is defined as either an **input** or **output** depending on the desired outcome. Configure the pin as an input if you want the projector to respond to something the device does and as an output if you want the external device to respond to an action taken by the projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is turned on.

By using the GIO command, you can also set the state of each output pin as **high** or **low**. By default, the state of each pin is **high**. The voltage applied to pins in the high state is +3.3V.

A low state (or value of 0) will be read on an input pin if the circuit attached to the pin is open. A high state (or value of 1) will be read on an input pin if the circuit attached to the pin is shorted to ground. This corresponds to a switch closing event.



Example 1. Turn room lighting on when the projector is turned off. (Assumes a control/automation unit is configured to turn the lights on when pin 2 of its input goes high.)

<i>(GIO+CNFG "OOOIII")</i>	<i>Set pin #2, 3 & 4 configuration to output and pin 6, 7, 8 & 9 to input</i>
<i>(GIO+STAT "HLXXXX")</i>	<i>Set pin #2 to high, pin 3 to low and the state of all other pins unchanged</i>

Query Command

<i>(GIO+STAT)</i>	<i>Request the state of all pins</i>
<i>(GIO+STAT "HLLHLLH")</i>	<i>Reply of pin states - H means pin is high, L means pin is low</i>
<i>(GIO+CNFG)</i>	<i>Request the configuration of all pins</i>
<i>(GIO+CNFG "IIIIOOOO")</i>	<i>Reply of pin configurations - pins 2, 3 & 4 are Inputs, pins 6, 7, 8 & 9 are Outputs</i>

NOTE: The strings in the commands refer to pins 2, 3, 4, 6, 7, 8, 9 in order from left to right.

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