

User Manual

020-000916-01

Spyder X20



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- Material Concentration Values Table
有毒有害物质含量表

Part Name	部件名称	Material Concentration (有毒有害物质或元素)					
		铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr 6+)	多溴联苯 (PBB)	多溴二联苯醚 (PBDE)
Low voltage power supply	低压电源	X	O	O	O	O	O
Standby LVPS	备用低压电源	X	O	O	O	O	O
Switch	开关	X	O	O	O	O	O
Ballast	镇流器	X	O	O	O	O	O
Line filter	滤波器	X	O	O	O	O	O
Ignitor	点火器	X	O	O	O	O	O
Harness/cable	连接电线/缆	X	O	O	O	O	O
Integrated Cinema Processor	集成处理板	X	O	O	O	O	O
Projector Intelligence Board	智能板	X	O	O	O	O	O
Backplane	底板	X	O	X	O	O	O
Internal Motor Control Board	内部电机控制板	X	O	O	O	O	O
Touch Panel Controller	触摸控制屏	X	O	O	O	O	O
Blower/fan	吹风机/风扇	O	O	O	O	O	O
Sensor	传感器	O	O	O	O	O	O
Illumination optics system	照明光学系统	X	O	X	O	O	O
Projection lens	投影镜头	X	O	X	O	O	O
Mechanical enclosure*	机械附件	X	O	O	O	O	O
Lamp	灯泡	X	O	O	O	O	O
Motorized intelligent lens mount (optional)	智能电动镜头架 (备选件)	X	O	O	O	O	O

Note:

O: indicates that the concentration value of the particular hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C, is below the stipulated levels in China SJ/T11363-2006.

表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006规定的限量要求以下。

X: indicates that the concentration value of the particular hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C, may be above the stipulated levels in China SJ/T11363-2006.

表示该有毒有害物质至少在该部件的某一均质材料中的含量可能超出SJ/T11363-2006规定的限量要求。

* This part uses metallic alloys, which may contain Lead.

- 因该部件使用金属合金材料，故可能含有铅。

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Overview

This manual covers the Vista Advanced control application for the Spyder windowing processor. The Vista Advanced user interface contains a myriad of features and usability enhancements over previous Vista control solutions.

To understand the software control environment for Spyder, some understanding of the Spyder windowing processor itself is required. Where applicable, this manual will provide conceptual and operational information on the Spyder windowing processor.

Components of the Spyder System

The individual components of the Spyder windowing system vary depending on the Spyder installation environment. Spyder systems are generally composed from one or more of the following base components:

1. **Spyder processor:** This is the hardware-based video processor core of the system. The *Spyder* processor is a modular system composed of the *Spyder* boxes / frames. Adding boxes expands the system and allows more video inputs / windows to be managed.
2. **Vista Advanced:** Regardless of the Spyder installation environment, this application is used to perform initial configuration of the system, and provides an elaborate, user friendly interface to view and manipulate any section of the Spyder system. This PC based software application provides online and offline editing capabilities for the Spyder processor.
3. **Montage II:** For the most demanding live switching applications, this hardware control surface provides immediate access to pre-built and live controls within the Spyder processor. Individual button segments on the Montage II console can be user defined to perform one of several operations including source selection, window transitions, presets, keying, script running, and more.
4. **Custom External Control Systems:** Spyder provides an elaborate external control protocol, enabling integrators and ISV customers to develop customized control systems and user interfaces. Typical applications include, but are not limited to, integration AMX or Crestron systems. These control systems are generally found in installations where Spyder is only one of several disparate systems combined to form a larger system.

Spyder System Introduction

Spyder's unique architecture allows for a resolution and video format independent environment. Users are no longer restricted to the resolution of a single source, or a single display. Multiple displays can be combined to generate a massive resolution of what the audience sees to exceed what any single display can handle. By using Spyder to drive multiple displays you can achieve greater brightness, image quality and resolution than previously possible.

Spyder Terms And Concepts

Throughout this manual and the Advanced software application, certain terms will be used to describe Spyder functions and operations. To effectively use Advanced, it is important to understand a few terms:

SOURCE: A source refers to a device providing a video input to the Spyder system, such as a computer or DVD player. Each source is defined by the user, and contains an input configuration, a user definable name, and either a router input or hard patched layer.

LAYER: Also referred to interchangeably as a window, a layer is a defined as a single input displayed on the Spyder VI, displaying either a live video input or a still image. Each layer is generated by one of the Spyder input modules, and therefore a 1-to-1 relationship exists between the number of layers in a Spyder system and the number of physical input cards contained within that system.

KEYFRAME: Visual attributes applied to a layer such as size, position, borders, shadows, or clone modes are known as KeyFrame attributes.

PRIORITY: As it applies to Spyder layers, priority refers to the natural Z-order of multiple layers stacked on top of each other. The Spyder is designed with a physically fixed priority; layer one will always be shown below layer two, layer two will always be shown below layer three, and so on.

BACKGROUND: Spyder provides two background layers that can contain user-defined still images, provided in any standard image format (JPG, BMP, TIFF, PNG, GIF, Etc.) that are loaded into individual PixelSpaces. Backgrounds are displayed behind all Spyder layers.

PIXELSPACE: A Pixel Space is a clipping rectangle, used to segment a section of the Spyder VI for the purpose of defining a screen area.

VISUAL IMAGE (VI): Internally, Spyder generates a massively high resolution display, which can be thought of as a video canvas. This canvas within Spyder is referred to as the Visual Image or VI for short. The VI is segmented into one or more partitions, known as PixelSpaces, which define overall screen sizes to be output by Spyder.

Figure 1 depicts two defined PixelSpaces that exist within the VI, the first of which has a resolution of 3,496 x 1,050 pixels. Although this image is using only a portion of the available video space within Spyder, the

resolution is considerably larger than a single output device such as a monitor or projector can accept. Figure 2 shows the division of four (4) outputs which each display their respective section of the virtual image within Spyder.



Figure 1: Spyder's internal Visual Image (VI)

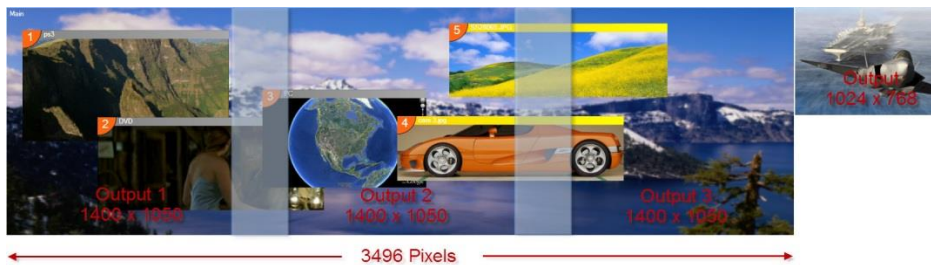


Figure 2: Multiple outputs used to display the image within Spyder

The VI within any single Spyder box has a fixed maximum number of available pixels that can be allocated into individual PixelSpaces. The number of actual available pixels varies according to several factors; however the table below provides some general pixel counts based on user definable VI refresh rates.

Frame Rate (Hz)	Pixels Available
23.97	16,500,000
25	15,800,000
29.97	13,200,000
48	8,200,000
50	7,900,000
59.94	6,600,000

Figure 3: Spyder VI size at various frame rates (200/300 Series)

Frame Rate (Hz)	Pixels Available
NTSC	20,000,000
PAL	20,000,000
23.98	20,000,000
24	20,000,000
25	20,000,000
29.97	20,000,000
30	20,000,000

Frame Rate (Hz)	Pixels Available
48	20,000,000
50	20,000,000
60	20,000,000

Figure 4: Spyder VI size at various frame rates (X20 Series)

Note: The physical input and output module count in Spyder has no effect on the internal VI size.

Installing Vista Advanced

Vista Advanced is a PC based software application that provides for initial system configuration, live control, and building data libraries such as treatment or preset lists. To get started, the Vista Advanced software must be installed on a PC meeting the minimum requirements listed below.

Computer Requirements

Below is a list of software and hardware requirements for Vista Advanced. The hardware specs listed should be considered as the minimum specifications for satisfactory operation.

Microsoft Windows Requirements

Microsoft's Windows platform provides a rating called the 'Windows Experience Index', which measures the capability of your computer's hardware and software configuration and expresses this measurement as a number called a *base score*. A higher base score generally means that your computer will perform better and faster than a computer with a lower base score, and makes it simple to purchase a PC with confidence that it will work properly with the Vista Advanced software interface.

REQUIREMENTS

- 'Windows Experience Index' of 4.0 or greater

Installing the Spyder Control Suite

The Vista Advanced software is provided as part of the 'Spyder Control Suite' software package, which is included with the shipment of the Spyder system on a disc drive. Software updates are released regularly, and can be obtained from the Christie web site. Contact Christie technical support at:

<http://www.christiedigital.com/en-us/product-support/support-offices/Pages/default.aspx>

Follow the procedure below to install the Vista Advanced software on your computer.

1. Turn off any other programs running on the computer.
2. First download Microsoft .Net Framework 1.1, along with any Service Packs for that version.
3. Install the Microsoft .NET Framework (version 4 or later) main program and then the Service Packs, in their proper order (Service Pack 1, then Service Pack 2, and so on).
4. Then install Vista Advanced.

Note: When installing and first starting Vista Advanced, watch for any messages about possible system problems (e.g. "missing Direct X"). You may need to download newer drivers for your video card, or replace your existing video card for a supported model.

Advanced Client Configuration

This section is intended for advanced users and systems administrators deploying the Vista Control Suite software. The Vista control suite software has specific permission requirements that may require manual configuration after installation to allow non-administrators to use the application effectively. Typically, these permissions are set automatically as part of the installation, and so no action will need to be taken. For more information on setting permissions on access control lists (ACLs), see your system administrator.

Special Requirements

Although the application does not require that it be installed on any particular disk drive, the data path for the application has been hard coded to 'C:\SPYDER'. This means that any machine running Vista Advanced must contain a writable C drive in their system.

Permission Requirements

The Vista Basic application will require that all application users have access to the following directories:

Folder	Permission Required
C:\Spyder	<Full Control>
<Installation Path>	<Full Control>

Spyder Network Basics

A correctly configured and trouble free network is essential for Vista Advanced. An incorrectly configured or unstable network can cause interruptions to the client/server communication. To ensure network performance, the following should be addressed:

1. It is recommended that Spyder and all clients be installed on a closed network.
 - Spyder communicates to its clients via broadcast traffic. This traffic can be intensive to an already active network.
 - It is recommended that any unnecessary device(s) that also generate large amounts of network traffic be placed on a separate network.
2. Client PC configurations
 - Configuring a network card with multiple IP address should be avoided when possible.
 - Enabling a secondary wired/wireless Ethernet connection is not recommended.
3. Network infrastructure

The use of complex routers and managed switching equipment is not recommended. Communication interruptions are possible if these devices are not configured properly.

4. Temporary disruptions in network connectivity may cause a loss of communication with Spyder.

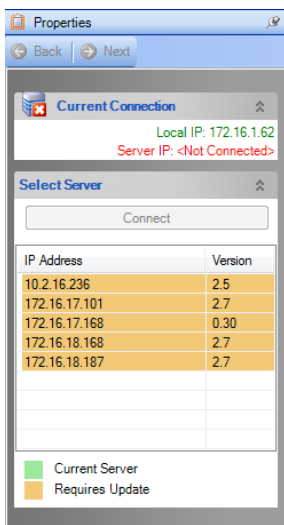
If the connection between Spyder and its client(s) are interrupted, it is possible for the communication socket to break. This would cause a temporary loss of communication until the socket is restored by restarting the client application.

Getting Started With Vista Advanced

This section describes the initial steps to get connected and working with the Spyder windowing processor.

Connecting to the Spyder System

When Vista Advanced starts, the server connection manager will be displayed in the properties panel along the right side of the application. The server connection manager displays all Spyder frames available on the network, their associated version numbers, and options for connecting, updating, and disconnecting from the frames.



TO CONNECT TO A REMOTE SERVER: Click its IP address in the list of available servers. Above the list, click the ‘Connect’ button to connect.

TO DISCONNECT FROM A REMOTE SERVER:

Select the currently connected server, and then click the ‘Disconnect’ button to disconnect.

Note: Spyder frames configured as expansion link slaves will not appear in the server connection dialog; they must first be configured as master or individual frames. Use the expansion link configuration panel (Tools > Configure Expansion Link) to reconfigure any slave frame(s).

The Vista Advanced version on the client PC must match the firmware version of the Spyder frame before a connection will be allowed. In cases where the software versions do not match, the ‘Connect’ button text reads ‘Update Now’, and a dialog appears when connecting to the frame requesting confirmation to update the Spyder frame firmware to match the client version. Figure 5 shows the firmware update confirmation dialog.

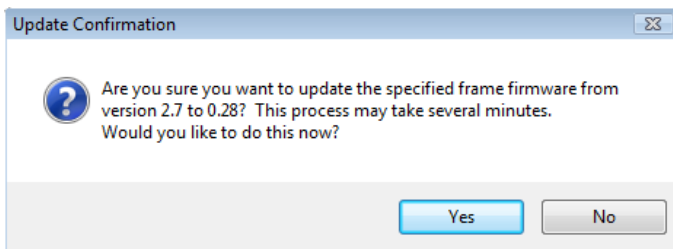


Figure 5: Firmware Update Confirmation

User Interface Introduction

The Vista Advanced user interface is comprised of a series of panels, each responsible for a specific portion of the overall functionality within the application. When starting Advanced for the first time, a default panel layout is loaded, which is shown in Figure 6.

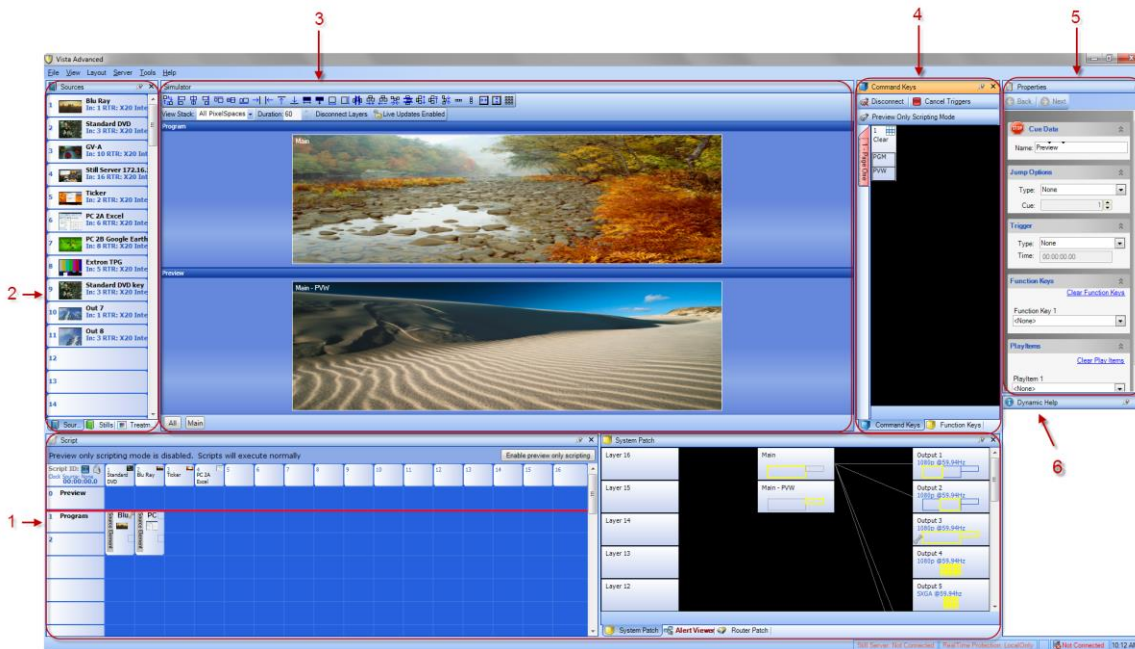


Figure 6: Default panel groups within Advanced

- **BOTTOM DOCKED PANEL GROUP**

- **Script:** Provides a viewing and editing environment for command key scripts.
- **System Layout:** Provides an advanced view of Spyder hardware allocations correlated with PixelSpace and frame group definitions. Useful for viewing parallel configuration details.
- **Alert Viewer:** Displays real-time diagnostic information for both the Advanced application and a connected Spyder server. Provides visibility into the Spyder system, and is useful for troubleshooting application or general system problems.
- **Devices:** The devices panel emulates the transition controller on a Montage II controller.
- **System Patch:** Provides a simplistic, real-time view of layer associations with PixelSpaces, and PixelSpace associations with outputs.

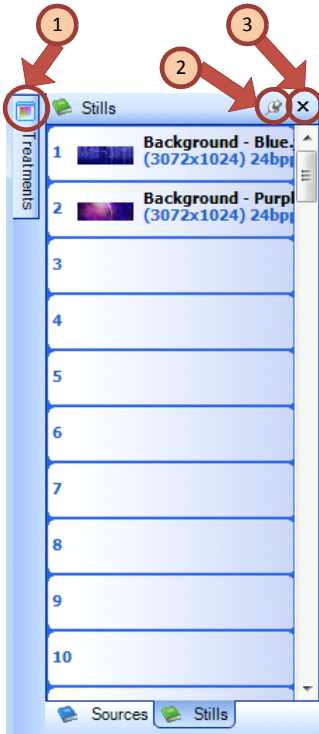
- **LEFT SIDE DOCKED PANEL GROUP**

- **Sources:** The source list contains all user-defined video inputs connected to Spyder. Users can click sources in the list to view source properties, or can drag individual sources to other panels to apply sources to layers or scripting elements.

- **Stills:** The still list displays all image files uploaded by the user. Users can add or remove still images using this panel, or can drag stills in the list to other panels to apply stills to layers or scripting elements.
- **Treatments:** This list contains user-defined KeyFrame ‘snippets’, which can be learned from an existing layer, applied to one or more layers, or removed from this panel.
- **CENTER PANEL (LEFT)**
 - **Display Simulator:** The display simulator is the core panel in the Vista Advanced application, and is the only panel that cannot be hidden or closed.
- **CENTER PANEL GROUP (RIGHT)**
 - **Command Keys:** Command keys combine the simple preset learn / recall concept found in traditional windowing systems with a powerful back-end scripting system. The number of command keys displayed in the panel is user definable, and up to 20 pages of command keys can be created.
 - **Function Keys:** Function keys provide simple, single step operations such as router salvo recalls. Function keys can be recalled manually, or can be linked to command key recalls, which adds additional flexibility to the scripting system.
- **RIGHT PANEL (TOP)**
 - **Properties:** The properties panel is used to view and edit properties for any object selected in the Advanced application. This panel is context sensitive, meaning that the entire contents of the panel will change depending on the current user selection within the application.
- **RIGHT PANEL (BOTTOM)**
 - **Dynamic Help:** Like the properties panel, the contents of the dynamic help panel change to provide in-context information for the current user selection. Dynamic help describes the object clicked on by a user, and provides additional tips and tricks to get the most from the Advanced interface.

Modifying the panel layout

The Vista Advanced panel layout system allows for extensive user interface customization. Users can change the application layout to better support their monitor resolution, span the application across multiple monitors, or simply close out unused panels. The panel operations below describe how to manipulate a panel layout.



COLLAPSED PANEL (1): An infrequently used panel can be ‘Collapsed’, reducing the amount of space it uses on the screen substantially. Resting the mouse over a collapsed panel will cause it to expand. When the mouse leaves the area of a collapsible panel, the panel will automatically return to the collapsed state.

AUTO-HIDE (2): The auto-hide pin icon controls the collapsible state of a panel. The pin icon is a toggle button, meaning each click of the mouse on this icon will change the enable or disable auto hide.

CLOSING A PANEL (3): An unused panel can be closed by clicking the ‘X’ button at the top right of a panel. When a panel is grouped with other panels to form a ‘tab’ group, clicking the ‘X’ will close only the panel within the currently selected tab.

OPENING A PANEL: Panels which have been previously closed can always be re-opened from the application ‘View’ menu. The view menu displays all closable panels within Advanced by name, and selecting any panel will toggle its closed state.

DOCKING / UNDOCKING PANELS: A docked panel is physically attached to the application window, and is the default mode for all panels in Advanced. An undocked panel works much like a standard dialog window, able to be moved or resized independently of the main application window. A docked panel can be undocked by double-clicking the title bar of the panel. Similarly, an undocked panel can be re-docked in its last docked location by double clicking its title bar.

CUSTOM PANEL DOCKING: When dragging a panel over the Advanced application, docking handles automatically will appear, allowing the user to dock the panel either in relation to either other panels or to the application window itself. When dragging a panel within the Advanced interface, releasing the mouse over one of the dock handles will complete the docking operation. Figure 7 below shows the various available docking handles. If the mouse is released while not over a dock handle, the panel will become undocked.

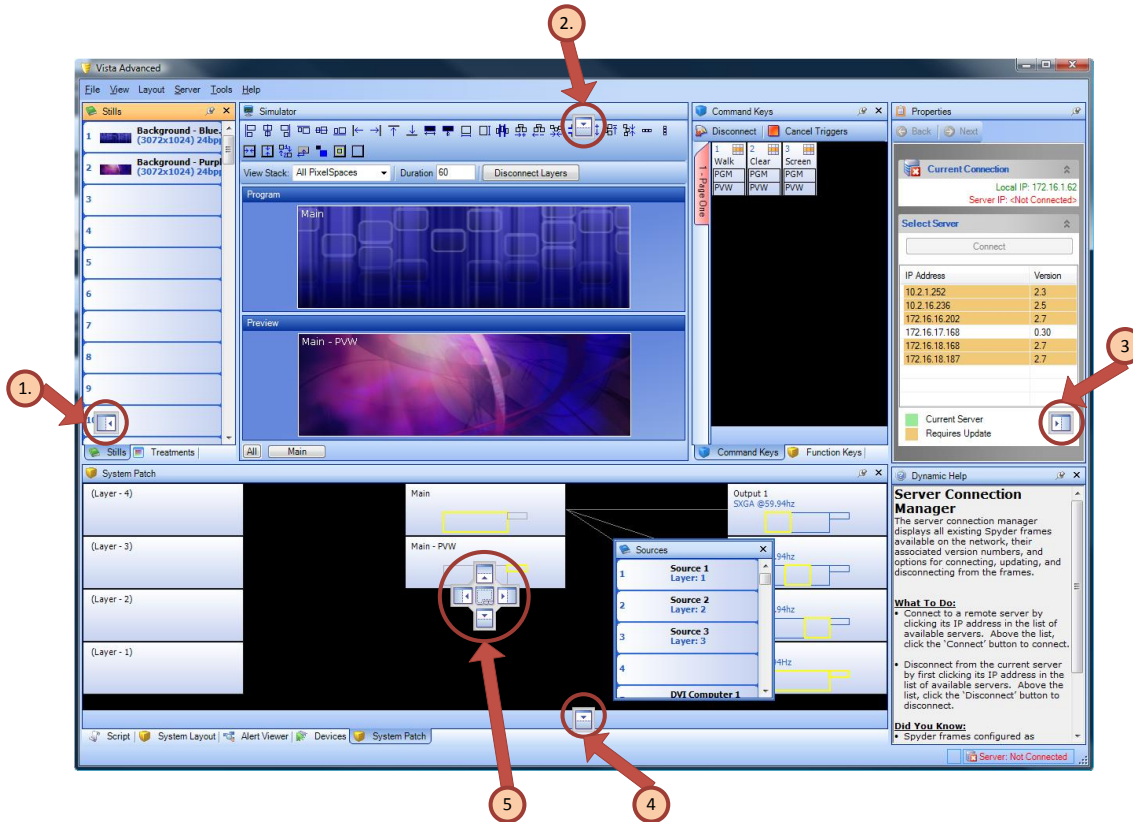


Figure 7: Docking Options

- **APPLICATION LEFT EDGE DOCK:** Panels dragged onto this docking handle will be docked to the left edge of the application window, completely spanning the edge of the Advanced application from top to bottom.
- **APPLICATION TOP EDGE DOCK:** Panels dragged onto the application top docking handle will be docked to the top edge of the application itself, and will run the entire width of the application window.
- **APPLICATION RIGHT EDGE DOCK:** Panels dragged onto the application right docking handle will be docked to the right edge of the application window, spanning the entire right edge of the Advanced application from top to bottom.
- **APPLICATION BOTTOM EDGE DOCK:** Panels dragged onto the application bottom docking handle will be docked to the bottom edge of the application, and will run the entire width of the application window.
- **PANEL DOCKING CONTROLS:** While a panel is dragged over the top of another panel, a series of docking controls will appear over the drop target panel. The four outside edges of the docking control allow the panel being dragged to be docked to any of the drop target’s four sides. The drop icon in the center of the control specifies a ‘tab’ dock, and is useful for putting several infrequently controls into the same space and tabbing between them as needed.

Saving and Recalling Panel Layouts

By default, the Vista default factory layout is loaded each time Advanced starts. The 'Layout' menu on the application main toolbar controls the layout that is loaded on startup, and additionally allows custom user layouts to be saved and recalled.

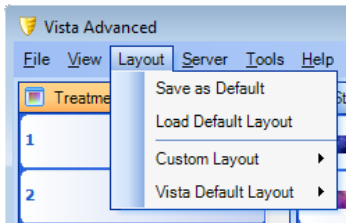


Figure 8: TCP/IP Properties Dialog

DEFAULT LAYOUT: The default layout refers to the layout that will be loaded by default when starting the Vista Advanced application. The 'Save as Default' option saves a snapshot of the current panel layout as the default. To get back to the default layout after making panel configuration edits, select 'Load Default Layout'.

Note: The default layout will only be loaded on startup if the 'AutoLoadLayout' user option is set to true. This value can be found in the user options property panel (Tools → Options).

CUSTOM LAYOUT: The custom layout menu expands, allowing one or more user-defined panel layouts to be stored and recalled at any time. To create a new custom layout, click 'Layout' → 'Custom Layout' → 'New Custom Layout'. A popup dialog will appear asking for a name for the new layout. Once saved, each custom layout will be listed by name under the 'Custom Layout' section of the 'Layout' menu for easy recall.

VISTA DEFAULT LAYOUT: This layout represents the factory default layout, which is the same layout seen when starting Advanced for the first time. This layout cannot be edited by the user, and can be used to restore the layout of the Advanced application to its factory default at any time.

Getting Started

Once the system has been connected together, and the video sources have been physically connected, Vista Advanced can be used to create a show / program. The first step is getting the initial system configured. That means configuring PixelSpaces, outputs, and sources.

Using the configuration UI

The process below walks through creating a new screen configuration using the Spyder Configuration Manager.

Building a new configuration

1. From the 'File' menu select 'New'. The Spyder Configuration Manager dialog opens. The links listed on the welcome screen enable you to choose one of the new configuration operations listed below:
 1. **START WITH NEW EMPTY CONFIGURATION:** This is the most commonly used option, which is used to build a new configuration from scratch.
 2. **LOAD LAST USED CONFIGURATION:** If a configuration has previously been built using Vista Advanced, this option will recall the selections made previously. This option is particularly useful when making minor changes to a previously built configuration.
 3. **LOAD CONFIGURATION FROM FILE:** A configuration previously created and saved within the configuration manager UI using the 'File' → 'Save' option can be recalled from disk using this option. Note that this option does not work with Vista Advanced Project (*.vap) files. For recalling project files, use the 'Restore' option from the 'File' main menu.



Figure 9: Spyder Configuration Manager welcome screen

2. The second page of the welcome screen displays a list of eight (8) frame selectors with associated IP addresses, as shown in Figure 10. The IP Address of every Spyder frame on the network will appear in

each of the IP address lists. Select the model of each Spyder frame in the order it will appear in the expansion chain, and select the frame’s corresponding IP Address in the adjacent dropdown control.

At the bottom of the frame rate selection screen, select the desired frame rate for the Spyder system before clicking ‘Next’.

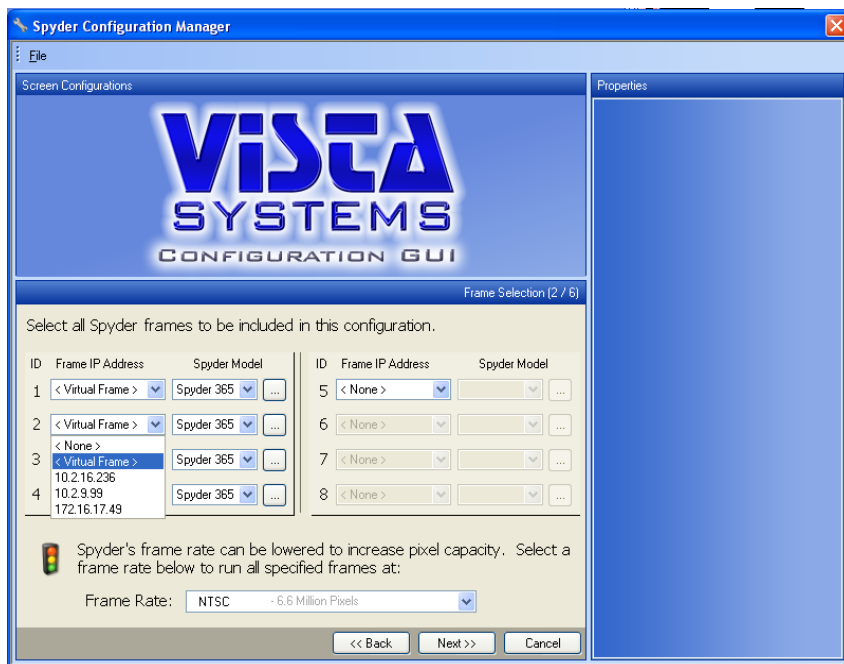


Figure 10: Configuration Manager frame selection

3. The Layout Template section of the Configuration Manager allows PixelSpaces (screens) to be defined individually or based on standard templates. Any combination of wide screen or individual screens can be added by selecting a PixelSpace definition from the 'Templates' tab, or from the 'Individual Screens' tab. Selected PixelSpace definitions appear above in the Screen Configurations window. Click any of the pixel spaces added to change the properties of each, such as the output count, format, connection and layers required for that pixel space. *Note that rotation is available only on Spyder systems utilizing one or more DX-4 output modules. In rotation mode, the output count will be limited to two of the four physical outputs.*

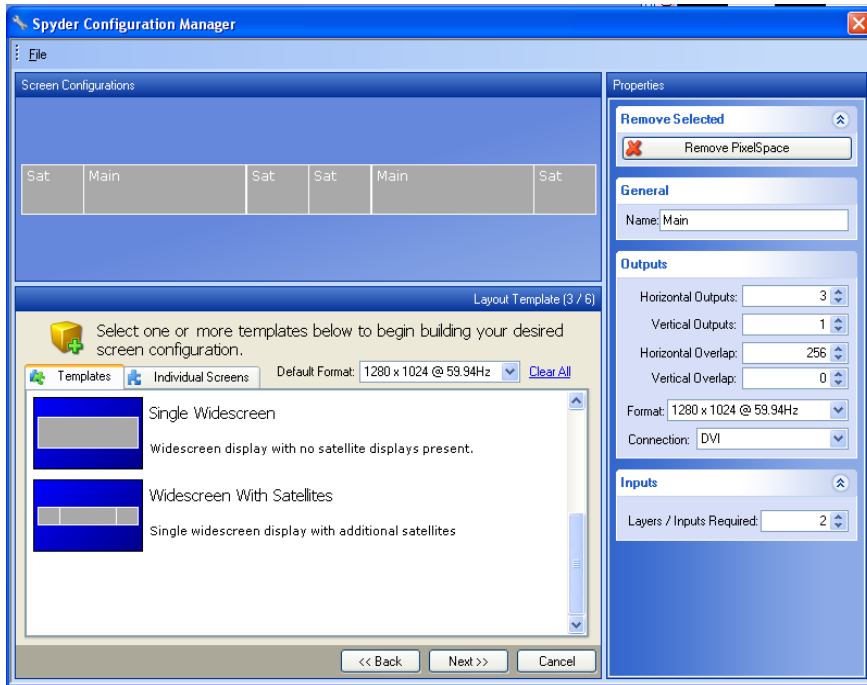


Figure 11: Server Manager

4. Click next. Based on your entered properties from above, a successful working configuration notice will appear. If a message reads *failed to find a working configuration* then go back and change the number of layers, outputs, or resolution of the pixel spaces, since you may be exceeding a pixel limit based on your hardware setup.
5. If a valid configuration has been created, one or more colored overlays appear over your configuration, indicating the automatically generated frame group associations. If an operation monitor (preview) is desired, simply select the desired resolution of this monitor. Note that an operator’s monitor can only be assigned on an unused universal output; DX4 output modules do not support operator monitor modes.

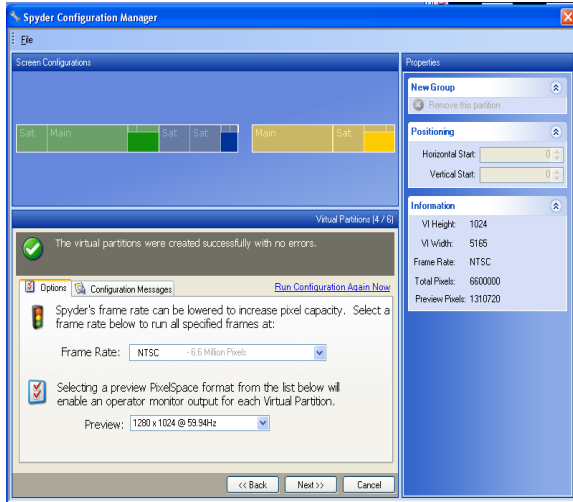


Figure 12: Configuration Manager virtual partitions

6. Click next and select the data types you would like to clear or keep. From here you can also add a default router. Additional routers may be added after a new configuration.
7. Click next and select apply to Spyder hardware now if connected to a Spyder system or select apply to virtual pc if not connected and working in virtual mode.
8. If all settings are as desired and a valid configuration has been found, click finish and all settings are applied to your Spyder system and any updates will occur. This may restart any Spydere in your expansion chain. If a restart occurs after work progress is finished, you must reconnect to the master Spyder.

Working With Sources

Vista Advanced offers a number of options for sources. Right clicking the mouse in the *Source* section will show the various options. In addition to adding a source, an existing source may be deleted, or a new source space may be inserted. You may also copy an existing source to allow the user to have multiple input configurations to the same source.

Working with the sources list

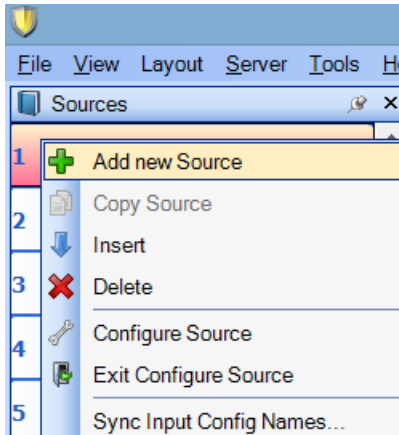


Figure 13: Layout Menu

The sources list contains Auto Configure, which is used to re-sort the existing list of sources.

Copy to New Source will copy the configuration settings to a new source. This can be a time saver if you have many similar sources.

Configure a Source allows the user to manually configure a selected source or to review the settings of a selected source.

Note: Make sure you have the right source selected before using any of these menu options. Click the source name/number on the right, and make sure the desired source is selected.

Note: A wrench symbol by a listed source indicates it is the current source in the input configuration mode. Right click the source and select 'Exit configure source' to exit configuration mode.

Source Properties Panel

When an existing source is selected from the source list, a context sensitive panel appears displaying properties specific to the selected source.

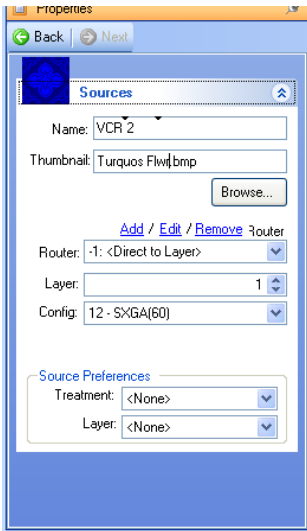


Figure 14: Configuration Manager templates

NAME: Displays the user-defined name for the source.

THUMBNAIL: Allows user to associate an image file to represent the source within the Advanced user interface.

ROUTER: If the source is being patched into Spyder using that is controlled by Spyder, select the router from the drop down list. The blue links above the router dropdown allow for additional routers to be added, or existing routers to be edited or removed.

LAYER / INPUT: If the router selection is set to '<Direct to Layer>', this control is used to specify the physical input number that the source is patched to. If a router is specified, this number specifies the router input providing the source.

PREFERRED TREATMENT: Optionally, specifies a treatment to automatically be applied to a layer when the source is selected.

PREFERRED LAYER: Optionally, specifies a layer to be used when opening the source in a new layer. If the requested layer is in use when the source is recalled, the first available layer will be used instead.

Configuring a New Source

A source within Spyder is defined as an input configuration, which stores format specific information such as connector type and resolution, and an associated router or layer assignment.

TO CONFIGURE A NEW SOURCE:

1. Make sure the system is physically connected with power to all sources.

Note: Always double check connections and ensure that each source is on the correct input; and that the source is powered on and outputting a video signal. This can save a lot of unnecessary troubleshooting.

2. Right click in the Sources section and select "Add new source". (see screenshot below)

Fill out information under the *Properties* section (see screen shot below). Enter the source name, the Input Type (HD15, DVI, and so on). In the Router section provide a name for the router and the input number for this source. [If no router is used, use the Router selection combo box to select "Direct to Layer" or select the Remove link to remove the router].

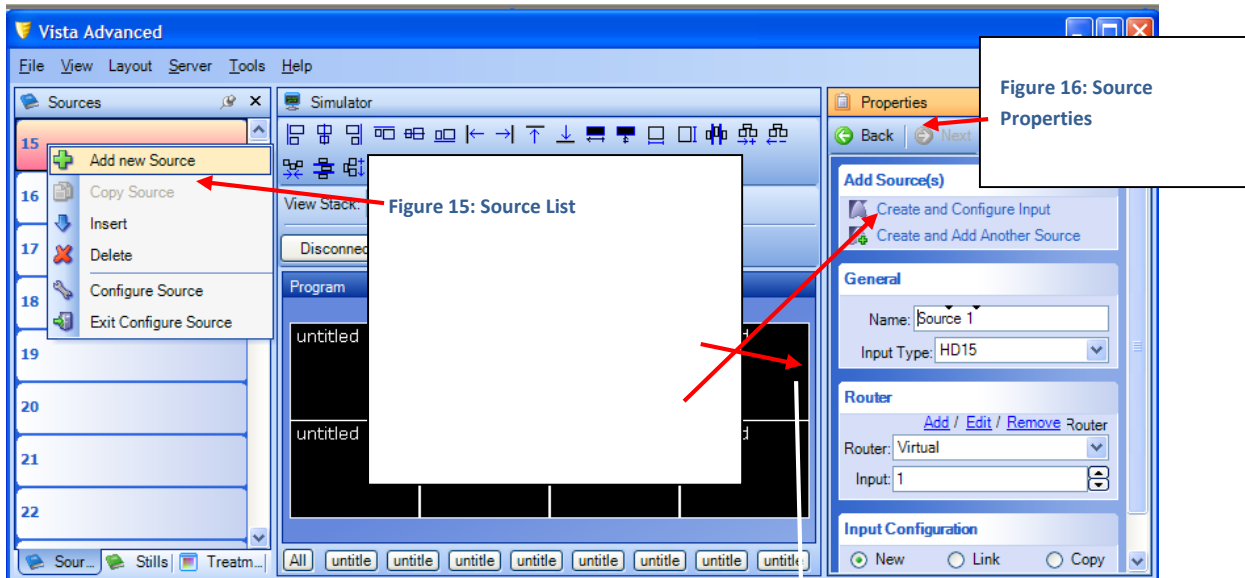


Figure 17: Areas of new source configuration

3. Select the router that the source is connected to from the drop down list. If the connected router is not yet defined, you can click the *Add* link above the router combo box and enter the Router type and size, the connector type (on the router). While in the router configuration panel you can optionally adjust the patch configuration with the *Spyder* system (the patch of a router is the way each router outputs are connected to the *Spyder* inputs).

Note: Remember, the arrows at the top of the Properties section can be used to go back to previous menus – or forward.

4. Select whether the input configuration is: *New*, *Link*, *Copy*. *New* creates a completely new configuration, *Copy* creates a configuration from an existing configuration, and *Link* associates the new source to an existing input configuration.
5. Once the first panel is complete, click Configure Source under *Add new Source* (top right corner of panel – see previous screenshot above<<provide figure number>>).
6. Fill in the input configuration information (part will already be auto filled). [Use the Autosync button to automatically detect the type and properties of the video source.]

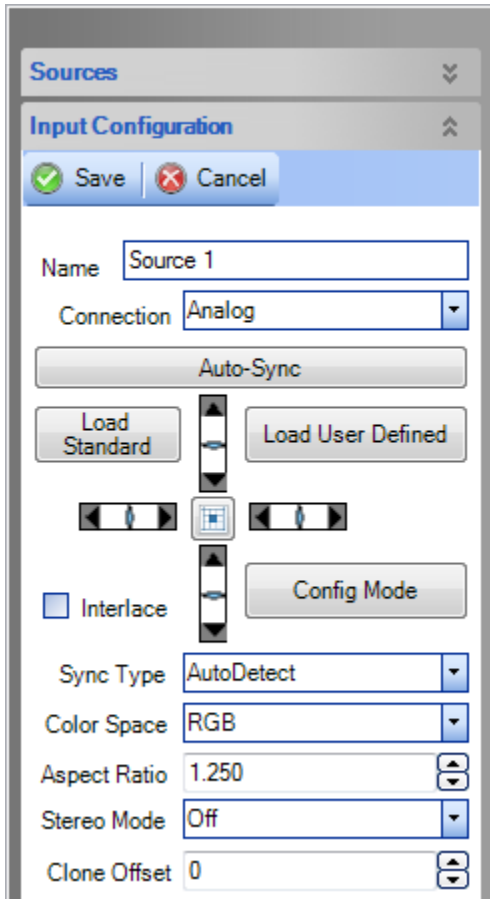


Figure 18: Input Configuration

1. To add a new source, right click on the Source section and select “Add”.
2. Fill in information under the properties panel.
3. Create and Configure Input opens more source panel inputs.

7. Scroll down menu in properties section until you see the section show below. Adjust the brightness, contrast, hue, and saturation as needed. Return to the initial settings by clicking on the default button.

Input Keyer Modes

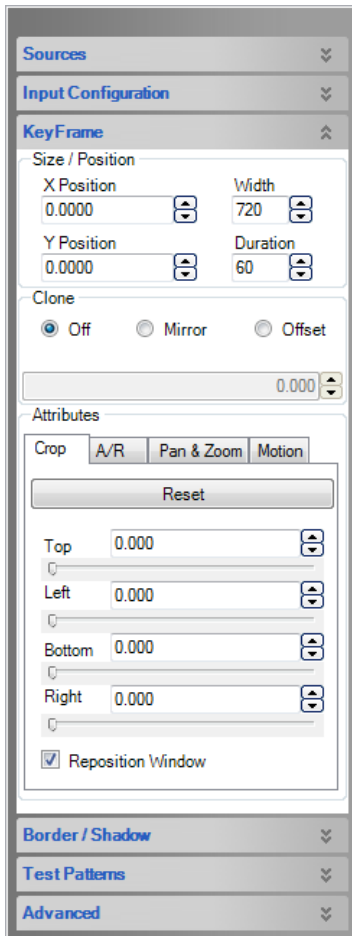
Spyder supports multiple types of key modes, which provide a way to cut user-defined portions of a live video input signal away, allowing for visual effects such as non-rectangular windows and titling. The various key modes supported by Spyder are listed below.

1. **LUMA KEY:** Clips pixels away from source image that are below a user-defined darkness threshold.
2. **COLOR KEY:** Clips pixels within a user specified threshold from a specific color from the source.
3. **LINEAR KEY:** A linear key is comprised of two video sources, known as a cut signal and a fill signal. The fill signal represents the source video material intended to be shown on screen, and the luminance (green) channel of the cut signal is used as a real-time video mask. Like the luminance and color key, the linear key allows for non-rectangular shapes to be created, however a greater deal of control is provided with the linear key since the video input used to generate the cut is a completely different video signal.

Key modes can be selected from the input configuration property panel. When using a linear key, which requires the use of two **adjacent** Spyder layers, the cut signal must be provided on the lowest of the two layers.

KeyFrame Manipulation

Following the *Source* and *Input Configuration* panels is the *Key Frame* panel. The *Key Frame* panel is used to set various attributes for a source / window – such as window border attributes, window size and position attributes, and so on.



LAYER POSITIONING is represented as a decimal value using a relative coordinate system, measured from the center of the layer in relation to the PixelSpace in which the layer was last applied. In relative coordinates, the left and top edges of a PixelSpace are considered to be -1.0, and the bottom and right edges are considered to be 1.0. A layer with an X and Y position of 0.0 will be seen directly in the center of its containing PixelSpace.

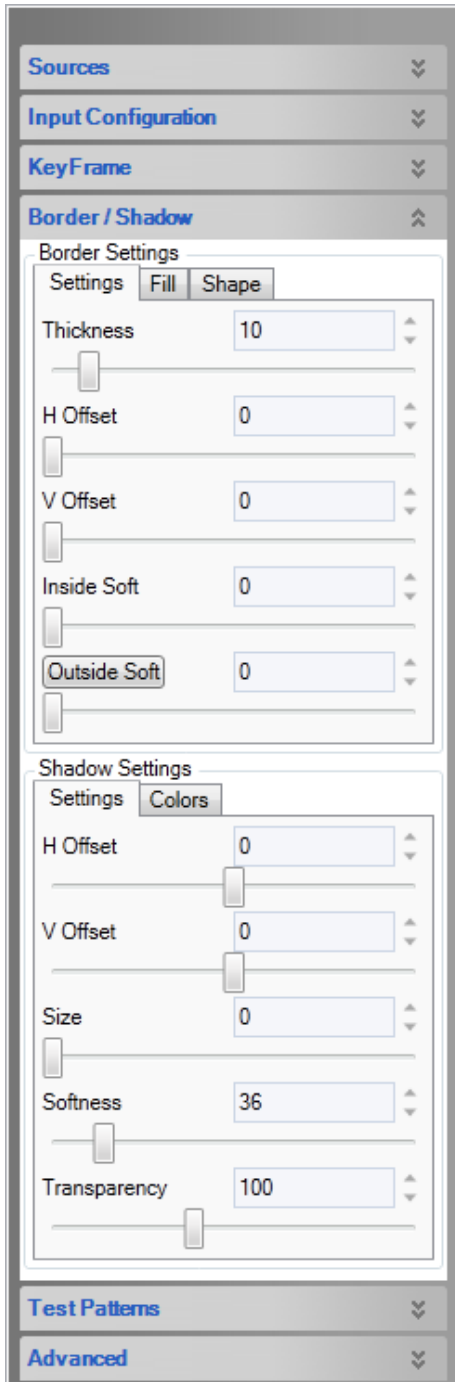
THE KEYFRAME WIDTH value represents the horizontal size of the layer, in pixels, as shown on screen. The height of the layer is calculated based on the aspect ratio of the source, and so a height value is not provided within the KeyFrame properties.

DURATION is used in conjunction with scripting to control the amount of time, in frames, a layer will take to transition from one KeyFrame to another.

Borders

A border provides a natural three-dimensional look to a window and allows the presenter to draw attention to a particular window. The *Border* section allows the user to place borders around each layer / source-window to accent them or differentiate them. A specific color can be selected by setting color percentage (at the top of the *Border* section) or by using the *Custom* button to select and create custom colors.

BORDER PROPERTIES:



1. **COLOR:** A user defined RGB color assigned to the border.
2. **THICKNESS:** Defines the thickness of the border around the window.
3. **VERTICAL / HORIZONTAL OFFSET:** This refers to *lighting* offset. It duplicates the appearance of an angled lighting effect.
4. **INSIDE SOFTNESS:** The degree to which the border will soften / blend with the inside video. As a border is softened it becomes less defined on the outside edges.
5. **OUTSIDE SOFTNESS:** The degree to which a border softens / blends with the outside.

Shadows

Just below the *Border* adjustments within the KeyFrame panel, the Shadow section allows the user to control shadow properties on the layer, providing an immersive, more 3D look to an otherwise flat layer.

SHADOW PROPERTIES:

1. **Vertical / Horizontal Offset:** Allows shadow distance and direction from layer to be adjusted, allowing the shadow to be positioned anywhere (360 degrees) around the layer.
2. **Size:** Controls the width of the shadow. A larger shadow gives the visual effect of the layer appearing further away from the background content.
3. **Softness:** Allows adjustment to soften the edges of the shadow, providing a harder or more subdued shadow effect.
4. **Transparency:** Controls the overall darkness of the shadow. The adjustment range is from 0 (black) to 255 (transparent).

Clones

A *Clone* is a 'free' duplicate copy of a layer. As the name suggests, a clone will share all KeyFrame properties with the original layer such as

size, border, and shadow settings, with the exception of the horizontal position. The clone can exist anywhere on a horizontal offset from the original layer, however the clone cannot be positioned at a vertical offset. This is particularly useful for widescreen applications where the same video source must be repeated on each side of the screen.

A clone can be selected to operate in *Mirror* or *Offset* mode. In *Mirror* mode the clone will move in a mirror image to the original window. If the original Window is moved towards the clone window, the clone window will move in the opposite direction (towards the original window). If the original window is moved away from the clone window, the clone window will move away from the original window. This will occur only on the horizontal. The windows will always stay at equal height, in respect to each other, vertically.

If a clone is created in *Offset* mode the clone will always stay the same distance (offset) from the original on the horizontal plane. If the original window is moved towards the right, the clone will move the same distance to the right. Again, this only occurs on the horizontal plane. The windows will move together and stay at the same height on the vertical.

Cropping

Any layer can also be cropped on any and every edge. Tabbed with the A/R offset and Pan/Zoom controls, the bottom of the KeyFrame panel contains cropping controls. Four sliders marked *Top*, *Left*, *Bottom*, and *Right* allow each edge of the selected layer to be used to crop part of the image out. Crop adjustments are represented in decimal format, with values between 0.0 (no crop) and 1.0 (Full crop).

The 'Reset Crop' button, located immediately above the crop slider controls, will remove any cropping by setting each edge to a crop value of 0.0.

Aspect Ratio Offset

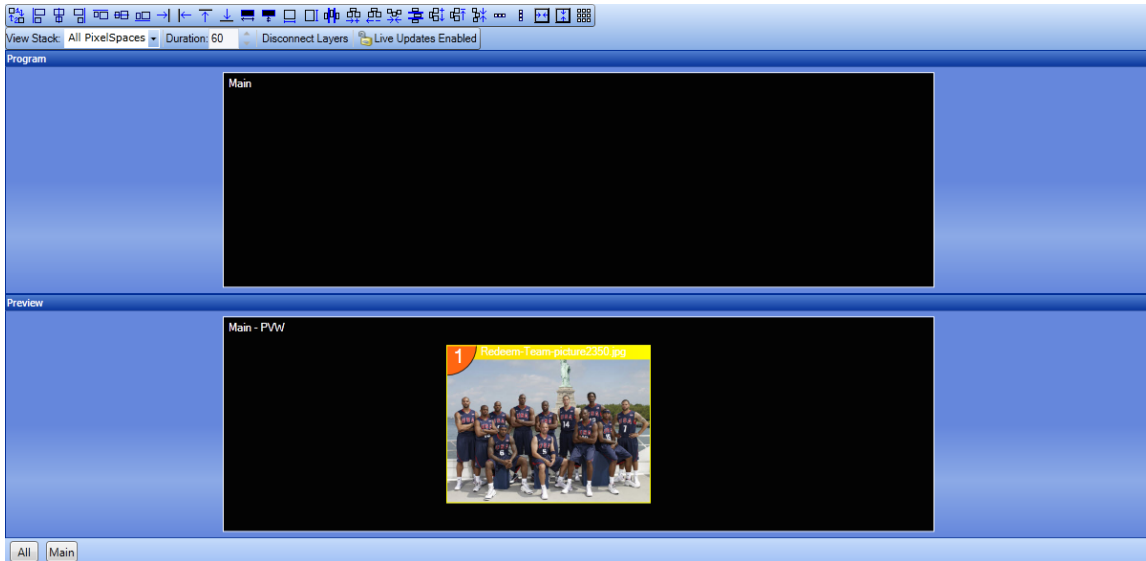
Aspect ratio offsetting allows the aspect ratio defined in the source input configuration to be adjusted, up or down, to effectively override the aspect ratio of the layer.

Pan and Zoom

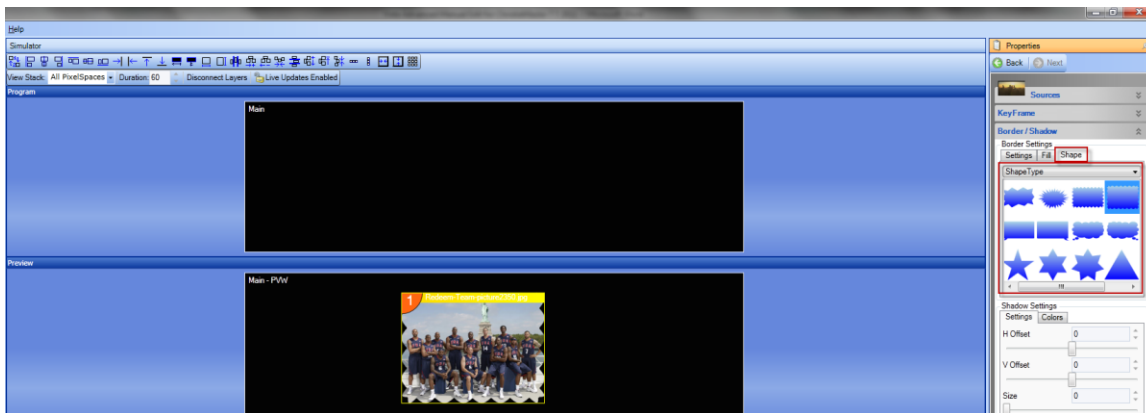
Any area of a Spyder input module can be zoomed in on to enhance a specific area of an input. Once a layer has been zoomed in on, horizontal and vertical pan controls allow the area of interest to be moved around within the input.

Standard and Custom Shapes

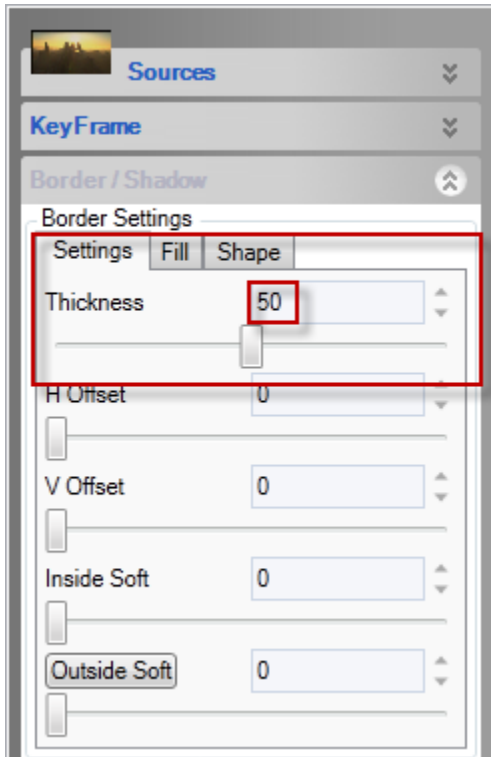
A custom shape can be added to a source or a still.



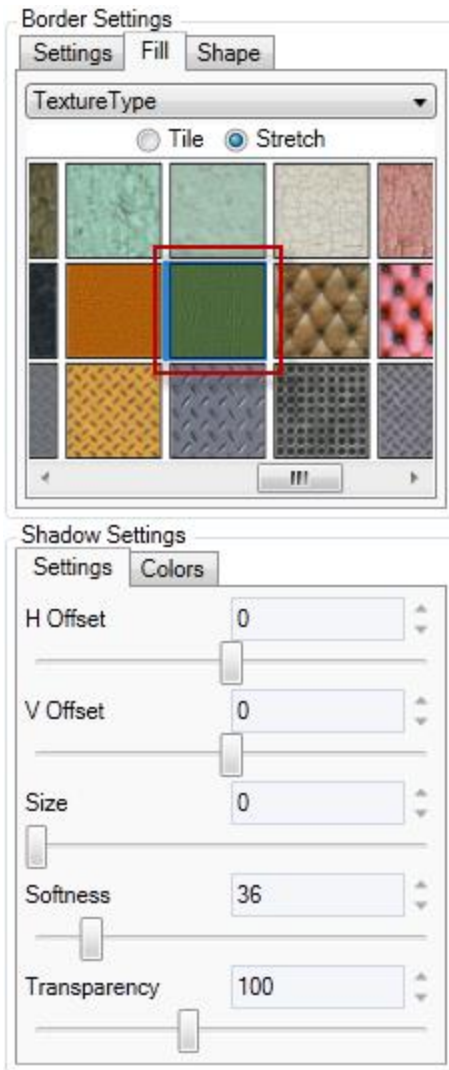
Start by bringing a source into preview.



Select "Shape" from the Border/Shadow menu. Click on each shape to see a live preview of how it will look on the screen.



Change the border thickness to 50 or higher.



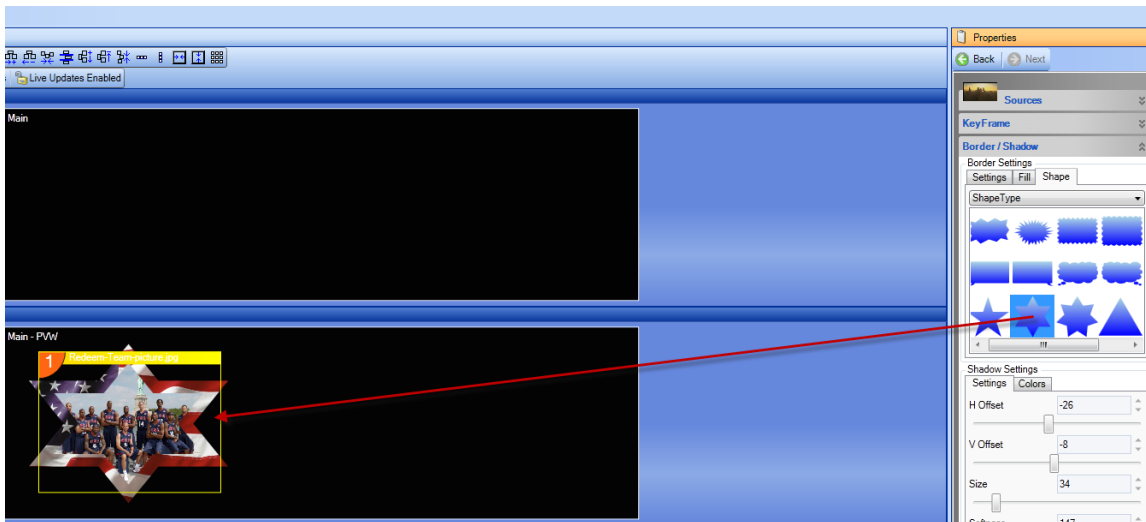
Select a texture type.

The textures appear real time as they are selected. The selected textures may not be a fit for the desired “look” so a custom texture can be applied.





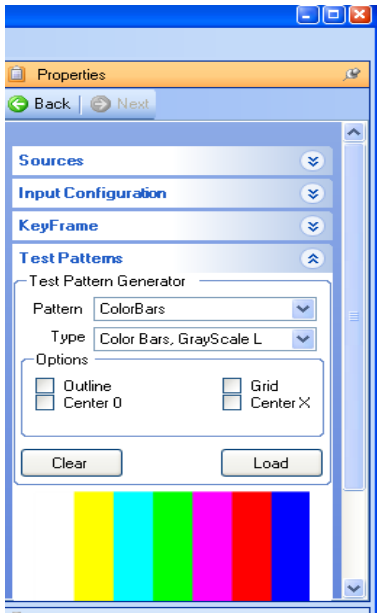
For this look, the American flag was selected as the shape type.



Click on each shape to see which shape is most appropriate for the look you would like.

Layer Test Patterns

Layer test patterns are useful for troubleshooting purposes, and the test pattern section of the layer properties panel allows a user to specify a test pattern type as well as additional options such as grids and alignment circles.



PATTERN: selects the type of test pattern. It provides a pull down menu with a choice of *Color Bars*, *Grid*, *Gray*, *Grill*, and *Sweep* patterns.

TYPE: Displays available test patterns available for the selected pattern. For instance, if *Grid* is selected as the pattern, then the *Type* menu will offer the type of *Grid*: 32 x 32, 64 x 64, etc.

OPTIONS: Additional pattern overlay options are available for any test pattern type loaded. The various pattern options are listed below:

- **OUTLINE:** Draws a 1-pixel white outline around pattern
- **CENTER O:** Draws a 1-pixel circle filling the pattern raster.
- **GRID:** Loads a white grid over the selected pattern.
- **CENTER X:** Draws an 'x' from corner to corner of image.

Once the desired pattern is selected, click *Load* to assign that pattern to the source. Otherwise click *Clear* to return to the Source Configuration and start

over.

Load Standard/Load User Defined: Loads resolution rates to associate with the source.

Use raster control to set the edges of a corresponding video input.

If AutoDetect doesn't work for "Sync Type," manually enter sync type.

Working with Still Images

The *Stills* section describes how standard image files can be uploaded to a Spyder server and used to provide background imagery and/or images within layers. Spyder works with most standard image formats, including png, jpg, gif, jpeg, tiff, tga, dds, dib, or bmp files. Alpha stills must be in a supported image format that contains an alpha channel, such as png or tiff files.

By default, the ‘Stills’ list is tabbed with the sources and treatment panels along the left side of the application window. The list below describes the options available on the still list context menu.

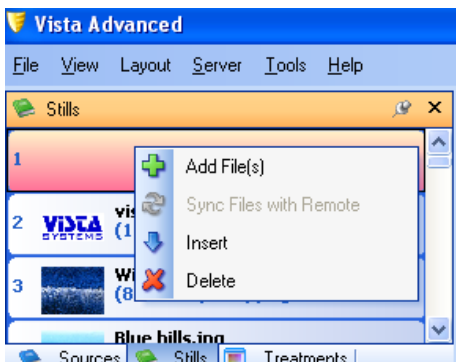


Figure 19: KeyFrame Panel (Partial)

ADD FILE(S): This option opens an ‘Open File’ dialog, allowing the user to browse for one or more still images to be added to the stills list.

SYNC FILES WITH REMOTE: Compares the image cache between client PC and Spyder, uploading and downloading any files out of sync between the client and server.

INSERT: Injects an empty space at the selected still location, moving all subsequent still list items down the list.

DELETE: Removes the still entry from the still list, and deletes the file from the Spyder image cache.

Once a still is added it can be handled much like a source. It can be dragged to a layer to have a specific treatment applied or it may be dragged to the simulator and handled as a window, transitioned into a program, etc.

Note: stills should be added / loaded in advance of a show, as adding a still may take significant amount of time.

Note: Dragging a still or source onto an existing layer causes the source or still to be loaded to the layer directly. Dropping a source or still on a PixelSpace will cause an unused layer to be displayed and loaded with the specified source or still. Each of these will take time to load the still. When using a preview PixelSpace, loading a still into the preview PixelSpace and then transitioning to program is recommended.

Treatments

At the bottom of the top left section of the *Vista Advanced* panel is a tab called *Treatments*. A treatment is a collection of key frame information that can be applied to one or more layers in the system at any time.

Treatments offer a considerable speed increase over manually adjusting the key frame for a layer, and make it easy to provide a consistent look between windows. A default treatment can even be selected, extending the consistent look of multiple layers by automatically applying a treatment to all layers before they are displayed on screen.

TO CREATE A TREATMENT:

- Select a layer using the display simulator containing the KeyFrame properties to be converted to a treatment.
- Right click in an unused list location within the 'Treatment' panel to display the treatment context menu.
- Select 'Add New Treatment' from the popup context menu. A popup dialog appears containing placement for the treatment name, as well as a series of checkboxes used to select the specific KeyFrame properties to be applied as part of the treatment recall.

TO APPLY A TREATMENT TO A LAYER:

1. A treatment can be applied to a single layer by either dragging the desired treatment from the treatment list onto a layer in the simulator or patch control.
2. A treatment can be applied to multiple layers simultaneously by first selecting the layers from within the display simulator, and then double-clicking the desired treatment. When applying a treatment to multiple layers, a dialog may appear requesting confirmation.
3. Apply treatments to script elements by dragging a desired treatment from the treatment list onto a script element at the desired cue location. If a KeyFrame is already defined at the selected element cue, the treatment will be applied to the existing element KeyFrame properties. If no KeyFrame already exists at the specified location, a new KeyFrame will automatically be added to the element.

Using the Display Simulator

The simulator is an intuitive, easy to use control for users familiar with working in Microsoft Windows based applications. Like most panels within Advanced, the simulator supports a drag-drop capability, allowing content such as sources or stills to be dropped onto PixelSpaces or layers within the simulator to manipulate the Spyder system. Layers and PixelSpaces are selected simply by clicking them, and layer sizing and adjustment can be performed by clicking and dragging layers or grabbing layer corners, respectively.

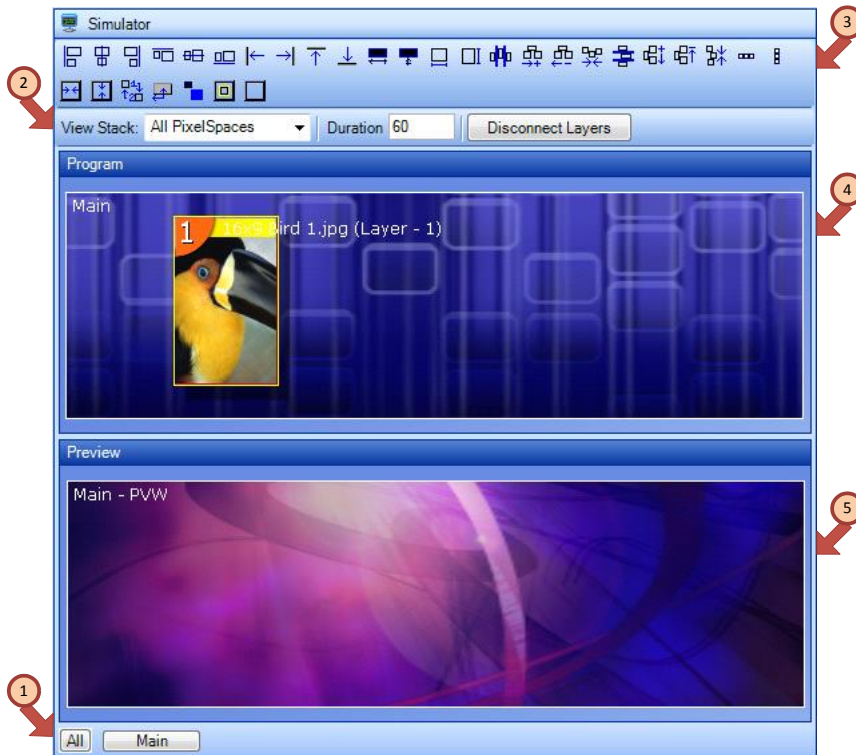


Figure 20: Display simulator control

SECTIONS OF DISPLAY SIMULATOR:

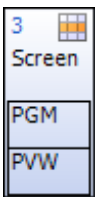
1. **PIXELSPACE SELECTION:** Provides a button for each PixelSpace currently displayed within the simulator control. Clicking a PixelSpace selection button causes the simulator to zoom in on the selected PixelSpace.
2. **SIMULATOR CONFIGURATION TOOLBAR:** Contains controls that manipulate the control operations provided by the display simulator.
 - a. **VIEW STACK:** Contains a list of various PixelSpace views available within the simulator control. A view stack is created every time multiple PixelSpaces occupy the same space, allowing a user to view a PixelSpace that might otherwise be obscured by another PixelSpace.
 - b. **DURATION:** Sets the duration of the transition (in frames) for live layer transition operations such as mixing a layer on or off screen.

- c. **DISCONNECT LAYERS:** Command key scripts support a live-editing mode, in which any KeyFrame changes made manually on a layer after recalling a script cue will be saved back to the script automatically. To prevent accidentally editing script data, users can press the 'Disconnect Layers' button to ensure that layer changes made will not be persisted.
3. **LAYER ALIGNMENT TOOLBAR:** Provides simple, yet powerful alignment and sizing capabilities for one or more layers selected within the simulator. Hovering the mouse over any of the alignment icons displays a tooltip, providing a brief description of the icon's functionality.
4. **PROGRAM PIXELSPACE(S):** This area displays all program PixelSpaces included in the current view stack.
5. **PREVIEW PIXELSPACE(S):** If the Spyder system was configured to use preview PixelSpaces as part of initial configuration, a preview section of the simulator will appear, allowing for off-screen editing.

Command Keys

A command key works like a preset. Every command key, however, is based upon an extensive scripting engine, which allows for user extensibility simply not possible in a preset. When a command key is activated, a default cue is being executed in the background to process the command key data.

This section will focus on command key usage in its most basic form, providing traditional preset-style learning and recalling of user-defined screen looks. These screen looks contain source and KeyFrame information for one or more layers.



A Command Key appears as a button on a PC running Vista Advanced, with 'PVW' and 'PGM' buttons which execute the command key contents into the preview or program PixelSpace, respectively. The 'PVW' section of the command key will glow yellow when recalled to preview, and the 'PGM' section of the key will glow red when recalled to program.

TO CREATE A COMMAND KEY

1. Right Click in the *Command Key* Section (shown below)
2. Select either 'Create from Preview', 'Create from Program', 'Create from Screens', or 'Create Empty', as desired.
3. A popup dialog will prompt you for the name of the new Command Key. Enter the name and then click OK.

A Command Key will be in edit mode after selected until either the disconnect button is pressed in the Command Key window, or until another command key is recalled that takes control of all layers in the original command key. If a command key shows red in program or yellow in preview, the Command Key is in edit mode and any changes to layers will be saved in that command key.

Relative and Absolute Modes

Absolute and relative command key modes differ in the handling of layers not defined specifically as part of the command key.

- **ABSOLUTE:** When recalled, any layers not specifically defined within the command key will be mixed off screen as part of the absolute command key recall.
- **RELATIVE:** A relative command key affects only layers defined within the command key, and does not remove or otherwise modify any other layers on screen.

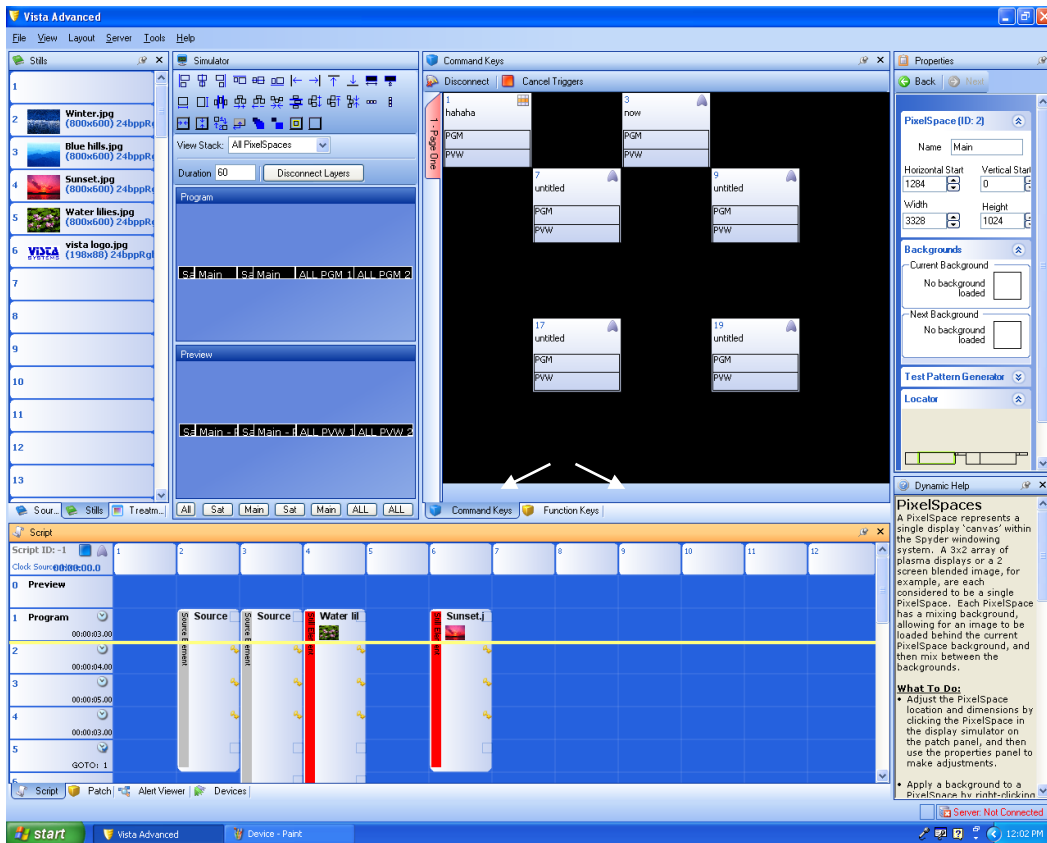


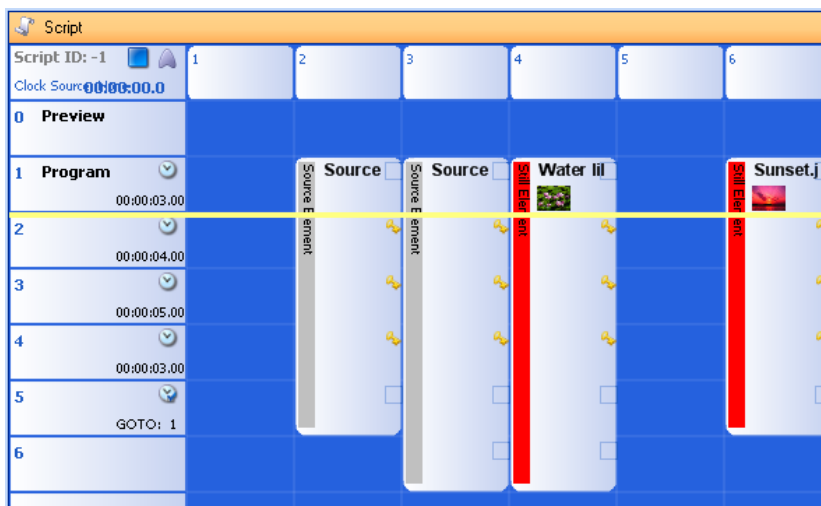
Figure 21: Layer Pattern Generator

Scripting

Every command key is based on a script file, and a *Script* consists of displays various sources or stills, referred to as elements, which span a period of time in the form of cues. Shown below is the Script panel and the Script timeline.

Script Panel

A script *element* represents one or more layers of the system, spanning two or more cues. Element types encapsulate sources, stills, and mixers; enhancing their definitions by optionally adding KeyFrames by right clicking the element at each cue, and specifying mix on / off or effect durations for the respective on / off or effect cues.



1. Add an element to the script by dragging a source or still from a content panel onto the script. The element will automatically be added at the location of the drop cue, starting on the drop layer
2. Drag the bottom edge of the element to adjust its cue length.
3. Click on the element to open the properties for the element in the properties panel. The element properties panel will adjust the element name, associated thumbnail, as well as the entrance / exit durations.
4. By default, an element only contains one KeyFrame. This KeyFrame defines the initial location of the element on screen. As the script advances, each element uses the last defined KeyFrame. This is known as the 'driving KeyFrame'. To add KeyFrames to an element, right click the element at a cue location, and select 'Add KeyFrame'. When editing the KeyFrame of a layer defined as a script element, the 'driving KeyFrame' is automatically modified.

Note: You can change the duration of the element on individual KeyFrames allowing you to adjust transition durations within the script.

1. You can create looks on screen and ‘snapshot’ them to the script. After creating a look using the display simulator, right-click in the command key area and select ‘Create from Screens’ from the context menu presented.
2. You can create a *Mixer* out of a script element by right clicking on that element and ‘convert to mixer’. By dropping multiple sources into the same element at different cues, allows you to mix sources in one window using the script.
3. You can create an *input array* out of a script element by right clicking on that element and ‘convert to input array’. This will allow you to display two sources simultaneously. If one source is not ready, the other source will wait until that source is ready to be displayed. *This is very useful when using a high-def dual-head background source.*
4. Add an *off element* to a script by right clicking in a cue and layer cross box and select add off element. An *off element* becomes useful when working with *relative command keys*.

Cue Triggers

A cue trigger can be used to automate the execution of a script cue. It can be based on the Spyder’s internal clock, or it can be controlled from an external time source. The following trigger types are available within Spyder:

WAIT TRIGGER: Causes the script processor to count down a specified number of frames and then execute the next script cue. When the wait Trigger cue is executed, the countdown timer begins automatically, allowing multiple wait triggers to be created on subsequent cues to automate multi-step scripting operations.

WAITX TRIGGER: The wait ‘X’ trigger is an unresolved time trigger. The first time a script cue using a wait ‘X’ trigger is executed, the scripting engine will begin counting the number of frames until the next cue is manually executed. The script engine will then automatically record the elapsed time and change the cue trigger’s type from WaitX to Wait. Subsequent executions of the script cue will function as a standard wait trigger.

TIME TRIGGER: Allows an external clock source to provide a time code that will be monitored for a user-defined timecode, which will cause the next cue to be executed by the scripting engine. The external clock source must be provided from a device connected to the SourceMaster deck controller, and therefore must support a standard playback machine protocol such as BVW75 or Odetics. Refer to Required Hardware (page 67).

To add a Trigger to a script cue, click on the cue within the script panel, and select a trigger type and Trigger length value on the properties panel.

Function Keys

A Function Key provides one of several user-definable functions. Unlike the extensible scripting architecture used with Command Keys, Function keys are fixed purpose and can generally be thought of as shortcut keys. Typical Functions include:

1. **LAYER OFFSET:** Defines horizontal and vertical offsets that can be applied to one or more windows. Typically used to create 'Fly Off' effects.
2. **LOAD A SOURCE ON LAYER:** Used to load a defined source onto one or more layers.
3. **LOAD A STILL ON LAYER:** Used to load a still on a layer.
4. **SWITCH ROUTER SALVO:** Used to switch outputs on a router not directly connected to *Spyder*.
5. **EXTERNAL COMMAND KEY RECALL:** Recalls a Command Key on a remote *Spyder*.
6. **BACKGROUND MIX:** Used to mix backgrounds between programs and preview then with the click of a Function Key.
7. **NETWORK COMMAND:** Sends a single UDP or TCP string in ASCII format to a user-specified port at a user-specified IP address.
8. **Note:** Special values can be entered into the ASCII command string of the network command function key to send carriage return, new line, and hex characters by using the following escape codes:
 - a. **\r:** Sends a carriage return character
 - b. **\n:** Sends a newline character
 - c. **\X00:** Sends a hex character, where the '00' represents a hex encoded value.

When right-clicking an unused area of the function key grid, the list of function key types (listed above) can be added.

TO ADD A FUNCTION KEY

1. Right Click in the Function Key section (make sure the Function Key tab is selected).
2. Select the desired Function Key type **off** from the contextual menu that appears.
3. Select the Function Key icon and enter the required information in the *Properties* section.

System Layout Grid

<<add screenshot>>The System Layout (bottom tab of lower left section) shows how the system is physically and logically connected within the Spyder system. This view is particularly useful for viewing systems utilizing parallel expansion. Clicking layers, PixelSpaces, or outputs from this grid causes the associated property panel to appear, allowing for viewing and adjusting configuration as required.

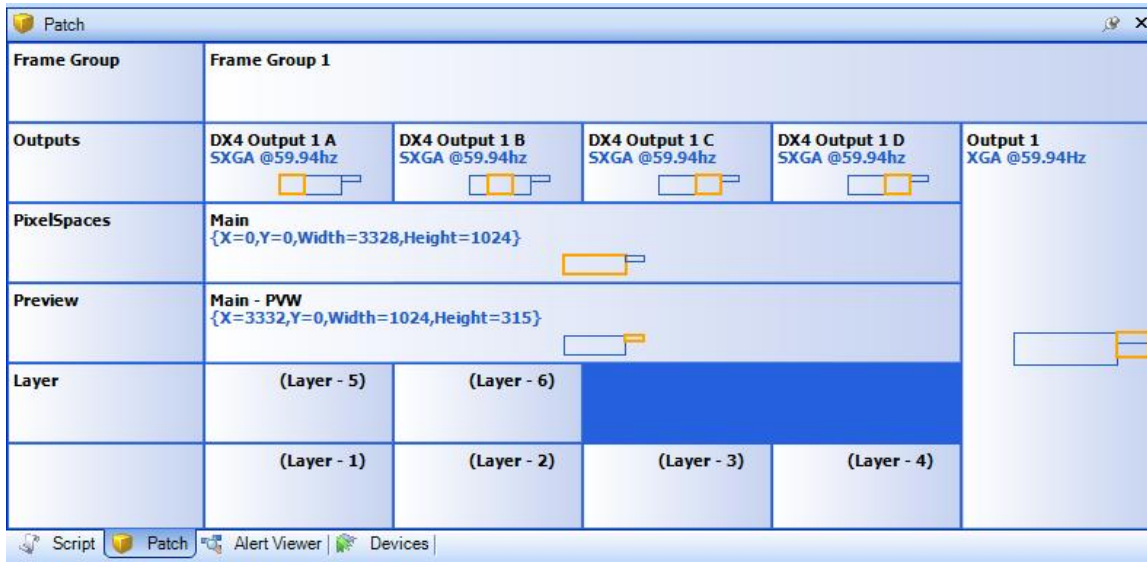


Figure 22: System Layout Grid

OUTPUT TIPS AND TRICKS

- If using DVI or SDI as an output, click on the output to show its properties and check the associated box found in the general options of that output’s properties. In the general options you can also change output format and horizontal and vertical start.
- Blend adjustments and test patterns are found in the properties of an output. Sending a test pattern to an output will check your connection with that output; and a test pattern over a pixel space may help you align projectors on a blended screen.
- You can configure outputs using standard drag-drop movements in the patch panel. These operations are listed in the bullet points below.
- To scale an output to view a single PixelSpace, drag the output from the patch grid to the desired PixelSpace within the patch grid. This will give you a scaled PixelSpace as an output for record.
- To set an output as an Operator’s Monitor, drag the main or all program pixel space to the desired output.
- Right click an output to set as (source) configuration output and Operator’s Monitor overlay output (the same output can be used for source configuration and Operator’s Monitor overlay). When Operator’s Monitor overlay is selected, layer indicators are shown on your Operator’s Monitor.

- When configuring a DX4 output, (output with 4 DVI ports), the four outputs must be set at the same resolution but can “look” at or display different portions of pixel spaces. This is very useful with blended screens and arrays.
- A DX4 output can be rotated. This rotation happens in the output and does not rotate a PixelSpace. This can be useful for tall and narrow displays such as LED walls.

Alert Viewer

The Alert Viewer tab shows a list of informational, warning, and error messages that occur in both the Vista Advanced application and a remotely connected Spyder frame. Anytime Vista Advanced performs a significant action, or any time a connected Spyder system encounters an error, an entry is logged in the Alert Viewer panel.

The Alert Viewer is typically used only for troubleshooting. For instance, if Vista Advanced performs incorrectly or doesn't carry out desired instructions, the user can view the Alert Viewer to see if there is a noted problem or pattern. The Alert View information can be saved or a screen shot of the panel can be made for Christie support staff to better identify the cause of problems.

Devices

The *Devices* tab is in the lower left of the Vista panel, just to the left of the Alert Viewer tab. A device is a way of manipulating layers, mixing layers, etc. A device can be a single layer device, a dual layer, or a mixer. The devices section is in the lower left of the Vista; panel, once the *Devices* tab has been selected. Devices will be shown as a box. A total of eight devices can be configured.

Configuring a New Device

To configure a new device, click on the device box in the devices section. In the properties section, an input panel will appear where device information can be entered. Here a device can be assigned to be a mixer, for layers 1 and 2, for instance. Check the *Morph* box if the Morph effect is desired, and so on.

The device boxes on the lower left work like the transition control on the Montage II control. Clicking on the device box allows the user to start manipulating the device – and the device function can be run also.

You can change the duration time of a mixer in the duration box in the upper left corner of the devices pane.

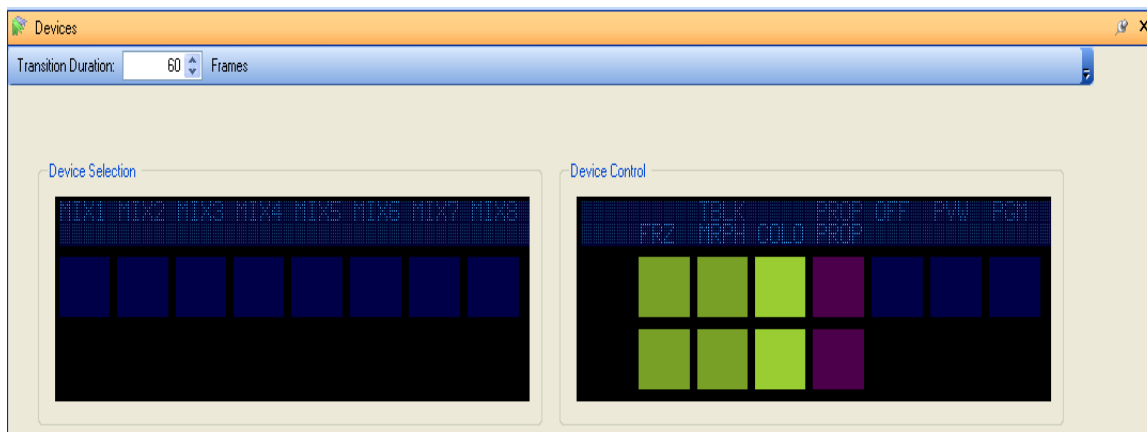


Figure 23: Devices Panel

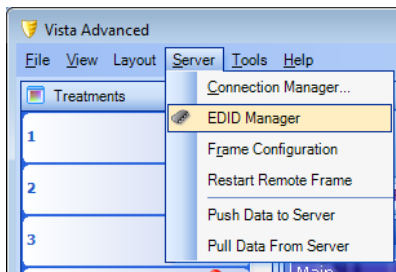
EDID Management

As required of all DVI display devices, Spyder DVI inputs conform to the **Extended display identification data** (EDID) standard, which is a data structure provided by a display device to describe its capabilities to a PC graphics card. This enables a modern personal computer to know what kind of monitor is connected. EDID is defined by a standard published by the Video Electronics Standards Association (VESA). The EDID includes information such as the manufacturer name and video timings supported by the display.

In certain cases it may be favorable to modify the EDID data stored within the Spyder inputs, enabling a PC graphics adapter to detect support for a custom video format or emulate an existing DVI display device. Vista Advanced provides an EDID Management Wizard that allows users to record EDID data from an existing display device, edit EDID data, and program custom EDID data into the Spyder inputs.

Accessing the EDID Manager

The EDID Management Wizard can be accessed from the ‘Server’ menu within the Vista Advanced application. The EDID manager does not work in offline editing mode, and requires an active connection to a Spyder frame.

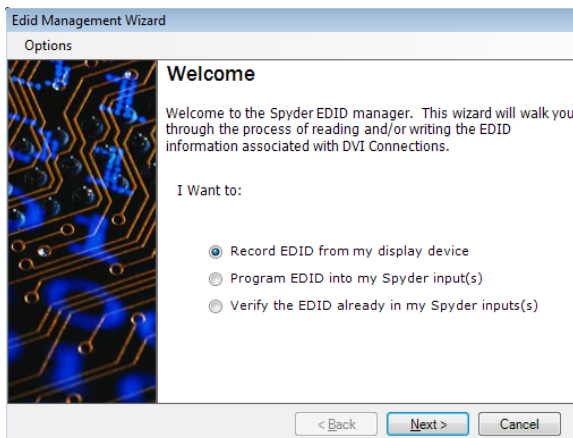


OPENING THE EDID MANAGER

1. Connect to a remote Spyder frame.
2. Select ‘EDID Manager’ from the ‘Server’ menu.
3. The EDID Management Wizard dialog appears.

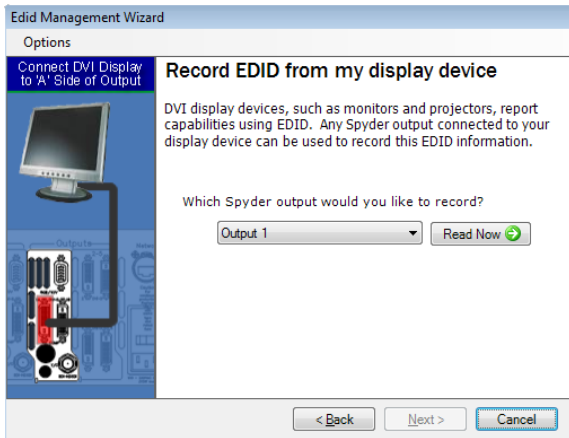
Figure 24: Still List

The welcome screen of the EDID management wizard allows a user to record EDID information from a display device, program EDID information into a Spyder input, or verify Spyder input EDID against a known EDID data source.



Each of the EDID manager operations are described in detail in the following sections.

Recording EDID Data from a Display Device

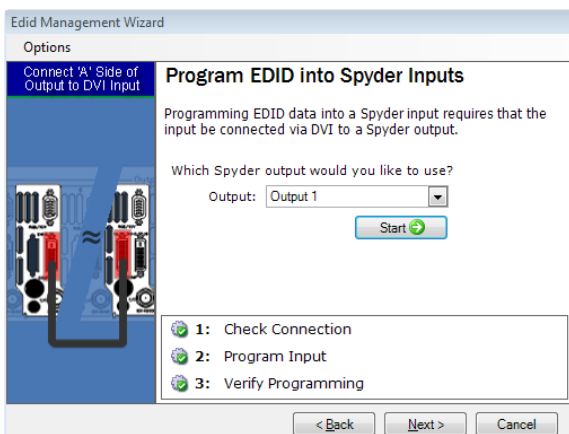


After selecting the ‘Record EDID from my display device’ option from the EDID Manager welcome screen and clicking ‘Next’, users are prompted to select a Spyder output connected to a display device over DVI. The series of steps below describe the process of recording EDID data from a display device.

TO RECORD EDID DATA

- Select an output from the drop down list of outputs. When recording EDID from a universal output module, verify the DVI cable is connected to the ‘A’ side of the output.
- Click ‘Read Now’. The Spyder will attempt to read EDID data from the display device connected to the specified output, and then a success or failure dialog will be displayed. If the EDID within the display device is loaded correctly, the ‘Next’ button is enabled.
- Click the ‘Next’ button to display the ‘Save EDID Information’ screen. This screen provides multiple options for using the recorded EDID data.
 - The recorded EDID data can be immediately used to program the Spyder DVI inputs. Refer to the ‘Programming Spyder input EDID’ section below for further instruction.
 - The EDID information can be saved to a file for later recall. If selecting this option, click the ‘Browse...’ button to specify a location and filename for the EDID file to be created, and then click ‘Next’. The ‘Finished’ screen will be displayed, and the EDID recording process will be complete.

Programming Spyder input EDID



The EDID data contained on the Spyder input module must be programmed by an external device, and as a result programming an EDID using the EDID Manager requires the use of a Spyder output, connected via DVI into a Spyder input.

The DVI channel on a selected output module works as a transmitter, loading EDID data onto the connected input module.

To prevent accidental overwriting the EDID data in a display device, the third descriptor block in the EDID packet is reserved to uniquely identify a Spyder input module. Before

Figure 25: EDID Manager welcome screen

programming occurs, a connection check reads the current EDID from the device connected to the selected output module, and ensures that the descriptor block matches the unique signature of a Spyder input.

After the connection check, the output module transmits the EDID data, overwriting the current EDID data stored on the input module. After programming completes, the EDID is read back from the input module and is compared to the EDID data written to ensure the operation completed successfully.

TO PROGRAM EDID INTO THE SPYDER INPUT

- From the ‘Load EDID Data’ screen, users are prompted to supply an EDID data source. Users can select either the original Vista factory EDID, EDID data to be obtained from a display device, or EDID information loaded from a file. If obtaining an EDID from a display device, the steps described in the previous section (Recording EDID Data from a Display Device), will be performed before continuing. Click ‘Next’ after loading EDID data to display the ‘Program EDID into Spyder Inputs’ screen.
- Select the output to be used to write EDID into the Spyder input(s) from the drop down list. When programming EDID using a universal output module, verify the DVI cable is connected to the ‘A’ side of the output.
- Click the ‘Start’ button. The EDID Management Wizard performs the steps mentioned above to complete the programming process. When completed, a popup dialog appears indicating the success or failure of the programming process.
- Repeat step 2 for each input to be programmed.
- Click ‘Next’ after all Spyder input modules have been programmed to display the ‘Finished’ screen.

Verifying Spyder Input EDID

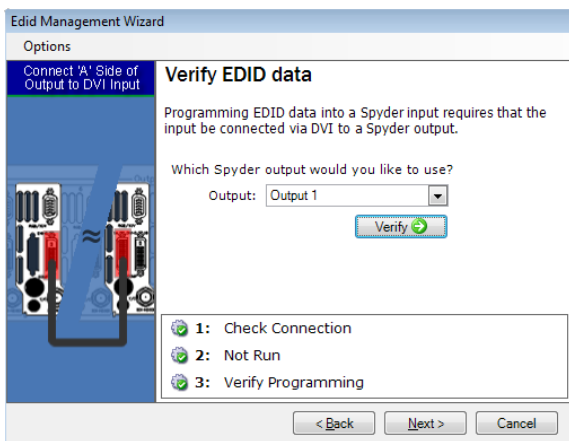


Figure 26: Recording EDID Data

Comparing the EDID data stored within the Spyder input is useful during EDID troubleshooting to ensure that the EDID data stored in a Spyder input matches an expected data source.

The verification process is very close to the EDID programming process; however the actual programming step is bypassed during the verification operation.

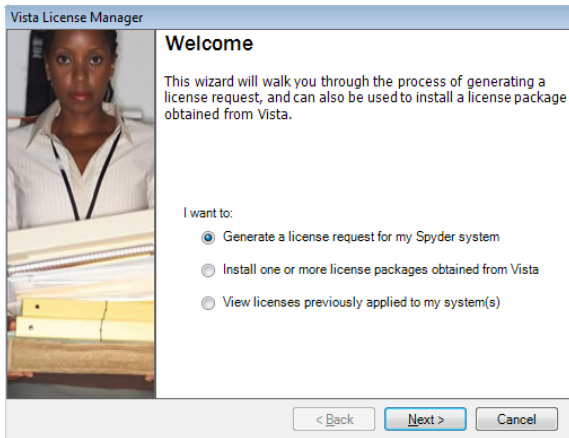
TO VERIFY THE SPYDER EDID AGAINST A KNOWN DATA SOURCE

- From the 'Load EDID Data' screen, users are prompted to supply an EDID data source. Users can select either the original Vista factory EDID, or EDID information loaded from a file. Click 'Next' after loading EDID data to display the 'Verify EDID data' screen.
- Select the output to be used to read EDID from the Spyder input from the drop down list. If selecting a universal output module, verify the DVI cable is connected to the 'A' side of the output.
- Click the 'Verify' button. The EDID Management Wizard verifies the connection to the Spyder input and then compares the loaded EDID data to the EDID read from the input. When completed, a popup dialog appears indicating the success or failure of the verification process.
- Click 'Next' after all Spyder input modules have been verified to display the 'Finished' screen.

License Management

The versatility and capability of the Spyder platform can be extended with licensed options purchased from Christie

License options are cumulative, meaning that when multiple frames are connected in an expansion chain, a licensed option must be licensed on every frame in the chain or the option will be disabled completely.



Available from the 'Help' menu, a utility within the Advanced application known as the **Vista License Manager**, can be used to generate license requests, apply license updates provided by Christie, or to view the current license status of your Spyder system.

The sections below describe the steps involved in the licensing process.

Requesting a License

The license request process generates a snapshot of one or more Spyder frames, which is used by Christie to generate a license file specifically for your Spyder system(s). The hardware snapshot is combined with customer information collected during the license request process to create a packaged license request file. This file must be emailed to techsupport-az@christiedigital.com for processing.

CREATING A LICENSE REQUEST

- From within Advanced, open the License Manager (Help → License Manager)
- From the Welcome screen, select the 'Generate a license request for my Spyder system', and then click 'Next'.
- In the Customer Information screen, enter the contact information for the user initiating the license request and then click 'Next'. A license administrator may use this contact to obtain any customer information required to complete the license generation process.
- The License Request Options screen allows a license request to be generated for a single Spyder, or for all Spyder systems detected on the same network as the client PC. After selecting one or more Spyder systems, select a folder to save the license request file to. Click 'Next' when finished.
- The license request generation process will begin automatically the first time the Generate License Request screen is displayed. This process combines the customer information collected in step 3

with one or more Spyder hardware snapshots, and writes a single file called 'License.req' upon completing successfully. Click 'Next' after the license request generation process completes.

- The Finished screen will display the full path to the generated license request file. This file must be manually emailed to techsupport-az@christiedigital.com to request a license file. Click 'Finish' to close the Vista License Manager.

Installing a license

Upon receiving a license request, a license administrator at Christie will generate an appropriate license file based on the provided hardware and customer information combined with relevant purchasing history for licensed options. This license file will be emailed to the customer email address supplied in the license request, which is then to be installed by the customer.

The Vista License Manager guides users through a short series of steps to apply license files obtained from Christie. The steps below outline the process of installing a license file on a Spyder frame.

INSTALLING A LICENSE FILE

1. Copy all license files obtained from Christie to a directory on the client PC hard drive. Do **NOT** rename or change the extension of the license files, or they will become invalid.
2. From within Advanced, open the License Manager (Help → License Manager).
3. From the Welcome screen, select the 'Install one or more license packages obtained from Vista', and then click 'Next'.
4. In the Browse for License Package screen, click the 'Browse...' button to select a folder on your local hard drive containing one or more license files. After selecting a directory, all license packages found in the specified directory will be listed at the bottom of the screen. Ensure at least one license file has been found, and then click 'Next'.
5. The first time the Apply License(s) to Server screen is displayed, a confirmation prompt will appear warning that applying a license file causes the Spyder frame to restart. Click yes to acknowledge the dialog and continue applying the license file(s). After license file application is complete, click 'Next' to continue.
6. Click 'Next' at the Finished screen to close the License Manager.

Viewing Current License Status

Viewing the current license status for a Spyder system displays the current status of all available license options within the Spyder system. Because licensed options are cumulative when frames are connected together over the expansion link, viewing license files on each frame can be particularly useful in troubleshooting licensing issues on expanded systems.

The Vista License Manager can be used to view license status on both master and slave Spyder frames. The steps below outline the process of viewing licensed options.

VIEWING CURRENT LICENSE OPTIONS

1. From within Advanced, open the License Manager (Help → License Manager).
2. From the Welcome screen, select the 'View licenses previously applied to my system(s)', and then click 'Next'.
3. The View Existing License screen contains a dropdown list, which lists each Spyder frame currently detected on the same network as the client PC. The license manager automatically downloads and displays the state of all license options from a remote Spyder system when an IP address is selected. Click 'Finish' to close the license manager after viewing any desired Spyder licenses.

Available Options for Spyder

The item(s) listed below provide a brief introduction to the various license protected features for Spyder. For more information on any of the items below, or for information on purchasing one or more of the licensed options, contact Christie technical support at:

<http://www.christiedigital.com/en-us/product-support/support-offices/Pages/default.aspx>

Maintenance Contract

In addition to providing extended hardware coverage and support services, maintenance contracts purchased for the Spyder system enable owners to access software updates containing new features and functionality. A license containing an active maintenance contract is required to update to new software versions at and above version 3.0.

Stereoscopic (SSO)

New and existing Spyder customers can extend the power of the Spyder hardware platform by incorporating stereoscopic input and output processing capabilities. The stereoscopic option for Spyder allows for any combination of 2D video inputs and 3D (active or passive) stereoscopic inputs to be displayed on the same screen simultaneously. Spyder outputs also support passive or active stereoscopic modes, allowing Spyder to natively run 3D display devices.

User Diagnostics

Spyder user diagnostics is a solid tool set that can be used to analyze and detect typical Spyder problems, and also can be used to proactively detect issues in real-time before they become serious problems.

Real-Time Protection

Spyder user diagnostics monitors the real-time state of the Spyder hardware, detecting events that occur while the system is running. Making the user aware of potential problems early can prevent serious problems from occurring in the future.

Real-Time Protection Alerts

The user alerting mechanism of Real-Time protection uses balloon dialogs appearing on the Windows taskbar. This allows warnings to be displayed in the event of the Advanced / Basic application being minimized, or otherwise not visible to the user.

When an alert popup is displayed, the user is given the option to open the user diagnostics form from Vista Advanced, or to close the warning dialog. If the user chooses to close (ignore) the alert popup, the popup will not be shown again for 15 minutes, or the next application startup. Additionally the user has the option of selecting a 'Don't show this again' checkbox, which will create an exception in the real-time protection configuration to prevent the message from being displayed again.

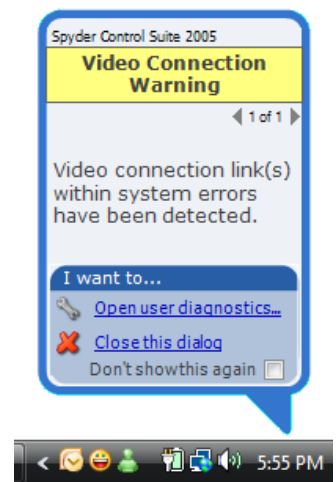


Figure 27: Programming Spyder Input EDID

Configuring Real-Time Protection

Real-Time protection is enabled by default. Users can manually disable real-time protection entirely, or individual types of warnings can be suppressed. The Real-Time protection configuration dialog is available from the 'Tools' menu within Vista Advanced and Vista Basic.

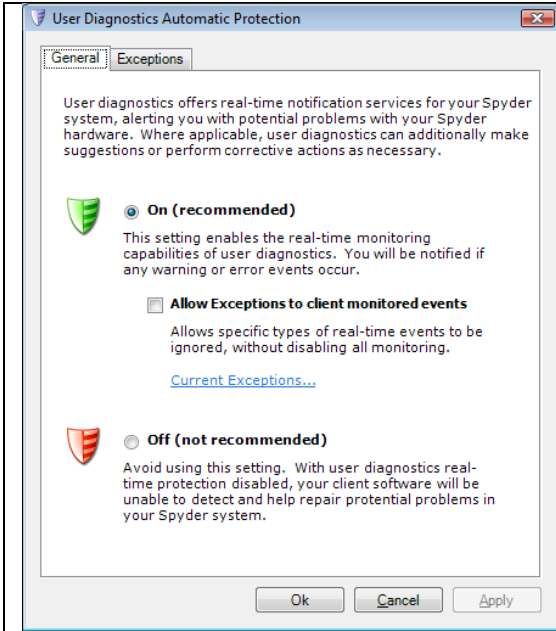


Figure 28: Automatic Protection General Options

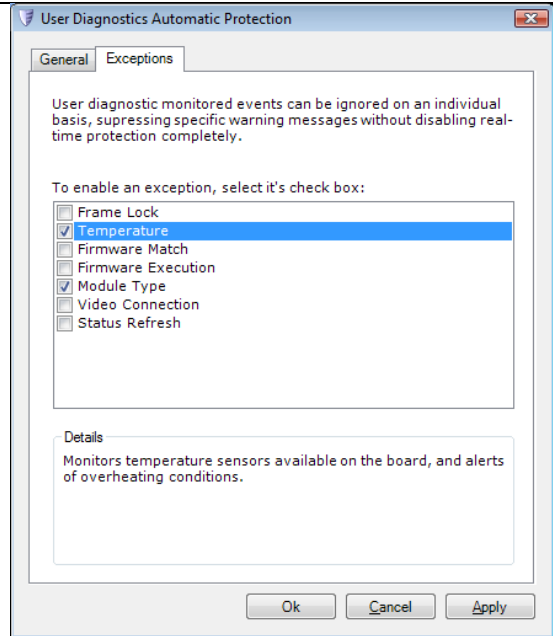


Figure 29: Automatic Protection Exceptions

User Diagnostics Viewer

The user diagnostics form (available from the ‘Tools’ menu) is the main dialog used to view collected data, run additional testing, and interact with the user diagnostics system. Details about detected problems, as well as printable reports, are available from this dialog.

The user diagnostics viewer provides an immediate high-level summary of the current system state, and additionally provides an advanced drill-down tree of advanced information on each module within the Spyder frame(s).

SECTIONS OF VIEWER

- **OVERALL STATUS:** Provides quick overview of overall system status.
- **INDIVIDUAL TEST STATUS:** Shows overview of individual tests run on all applicable modules.
- **PRINTABLE REPORTS:** Drop down list of report views available for diagnostic data.

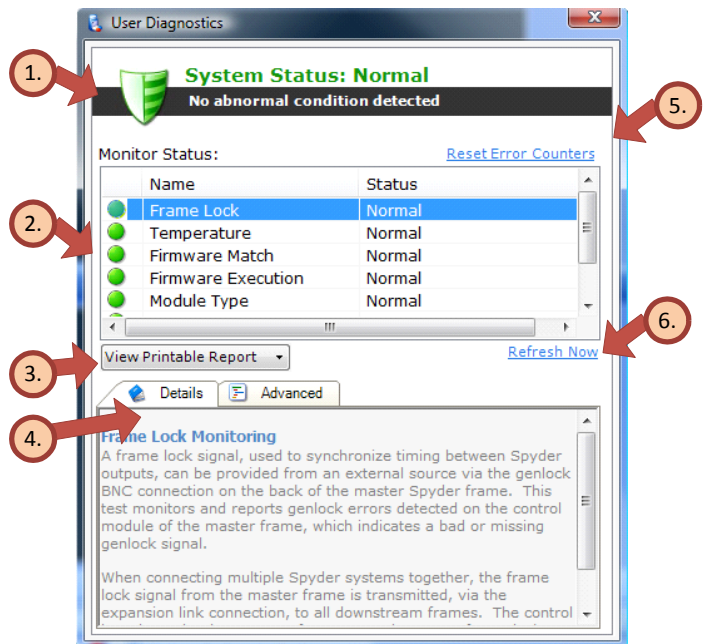


Figure 30: Verifying Spyder EDID

- **DETAIL TABS:** Shows description of the currently selected test and an advanced drill-down of all modules in the system. In cases where a test is in a warning or error state, a recommendations panel is displayed with suggestions on resolving the detected problem(s).
- **RESET ERROR COUNTERS:** Clears any previous test results, including any error counters.
- **REFRESH NOW:** Runs all tests on each module in the system and immediately refreshes the form to display the results.

Hot-Sync

The HotSync feature allows all data for one Spyder frame to be pushed to another Spyder frame for use as an immediate backup system should a primary Spyder system fail. Specifically, HotSync is a user-initiated synchronization system designed to be used frequently while programming Spyder content to ensure a backup system contains a constantly refreshed version of the live system data. This can be used in mission critical scenarios where multiple Spyder systems run in parallel to provide immediate disaster recovery should a system suddenly fail.

The function performed from the hot-sync dialog is essentially an abbreviated backup / restore procedure, and can be thought of as data being backed up on the currently connected server and being restored on a backup server.

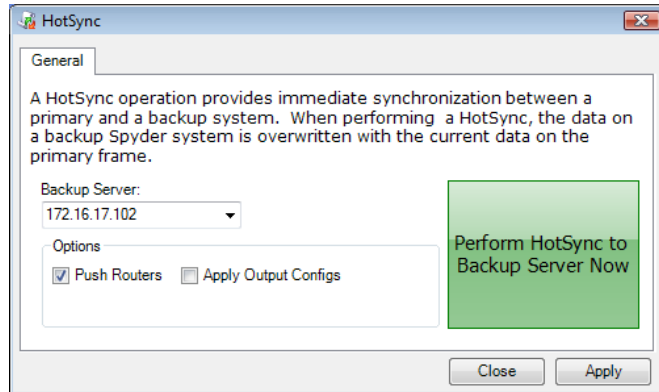


Figure 31: Real-Time Alert

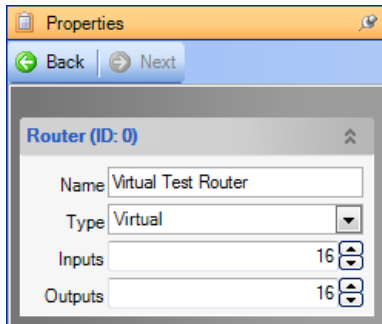
Note that the HotSync feature does not provide automatic fail-over; manual intervention is required to migrate to a backup system should a primary Spyder system fail. The manual fail-over is typically accomplished by routing the outputs of both the primary and backup Spyder frames through a downstream routing switcher before running into display devices, allowing fast switching between the Spyder frames.

Options for Hot-Sync

When running parallel Spyder systems, specific portions of configuration data may remain specific to each of the redundant systems. The HotSync feature provides options to exclude certain sections of configuration data when synchronizing, and these options are described below.

Push Routers

Depending on the level of redundancy required for a given configuration, multiple Spyder systems may share the same physical routing switcher. To accomplish this, the router patch definition on each Spyder system will differ to distinguish the physical router outputs that correlate to the Spyder frame inputs. When performing a HotSync in this configuration, it is not desirable to overwrite the router definitions specific to each backup system. In these scenarios the 'Push Routers' checkbox should be unchecked, preventing router definitions to be updated on the HotSync backup frame.



When excluding router definitions from the HotSync, it is important to ensure the router ID within all Spyder frame(s) match to ensure all source definitions using the router(s) will function correctly on the backup system(s).

The router ID can be found at the top of the router properties panel within Vista Advanced.

Figure 32: User Diagnostics Viewer

Apply Output Configurations

Output configurations can be pushed to a backup Spyder frame as part of the HotSync operation. This is useful when performing an initial HotSync between multiple Spyder systems, or when output configurations are changed on the primary system and need to be replicated to a backup system. Applying output configurations will cause outputs to flicker, making it an undesirable operation when performing several HotSync operations. Provided the output configurations have not changed on the primary system, it is typically not necessary to update the output configurations on the backup system(s) after initial configuration.

Video Playback

The rich feature set of Spyder can optionally be extended with VTR (Video Tape Recorder) and DDR (Digital Disk Recorder) playback device control. Up to eight (8) playback devices can be connected to Spyder simultaneously, and these devices can be controlled 'live' or as part of command key execution. Devices connected to Spyder can additionally operate as time-code source providers, allowing frame-accurate triggering of command key / script cues.

Note: In the following sections pertaining to machine control, the terms playback device, VTR, DDR, and deck may be used interchangeably when referring to a video playback device.

Required Hardware

Playback device integration requires the use of SourceMaster. SourceMaster is a 1-RU (rack unit) product manufactured by Christie as an accessory device which connects to Spyder via Ethernet, and in turn connects to up to four (4) RS-422/485 serial-based playback devices. A maximum of two SourceMaster units can be placed on a single Ethernet network to control a total of eight (8) devices from a single Spyder system.

Detailed information on the SourceMaster hardware platform, where not specifically related to Spyder, is outside of the scope of this manual. Contact Christie for additional information on SourceMaster.

Supported Playback Devices

The VTR/DDR playback device market is heavily standardized on a small number of control protocols, and as such control systems (including Spyder) can integrate with an overwhelming majority of these devices without the need for special drivers or custom software. Non-clip controlled devices supporting the Sony BVW75 protocol (also known as the Sony 9-pin protocol), or clip-based device supporting the Odetics protocol can be controlled from Spyder.

Note that some playback devices may require manual settings to enable control from external devices; refer to the manufacturer documentation for your specific device for detailed instructions. Regardless of device, the definitions for the previously mentioned protocols define the serial settings as 38400 baud, 8 data bits, odd parity, and one stop bit. As such, these values are set by default in Spyder and are not user definable.

Getting Started

Typical usage of a video playback device includes cueing and playing a collection of video segments. A segment may be a short 30 second video, or a video that spans several minutes or hours. Spyder uses the term *PlayItem* to refer to a pre-configured segment of video playback. The individual data elements of a PlayItem are described along with their associated user interface elements in the sections that follow.

The user interface for PlayItems is organized and managed by a register list that appears tabbed with the source and still lists. This list is hidden by default, and can be enabled from the 'View' menu on the main toolbar of Vista Advanced.

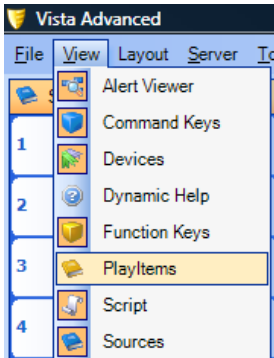


Figure 33: HotSync Dialog

Adding a New PlayItem

Adding a new PlayItem begins much like creating other types of data in Vista Advanced. Begin by right-clicking an unused register in the PlayItems list, and then select 'Add' from the popup context menu. A dialog will appear, asking for the name of the new PlayItem. Enter a name into this dialog, and then click OK. Upon clicking OK, a new PlayItem will be listed in the PlayItems list with the specified name, and the property panel for Advanced will change to show the relevant properties for the newly created PlayItem.

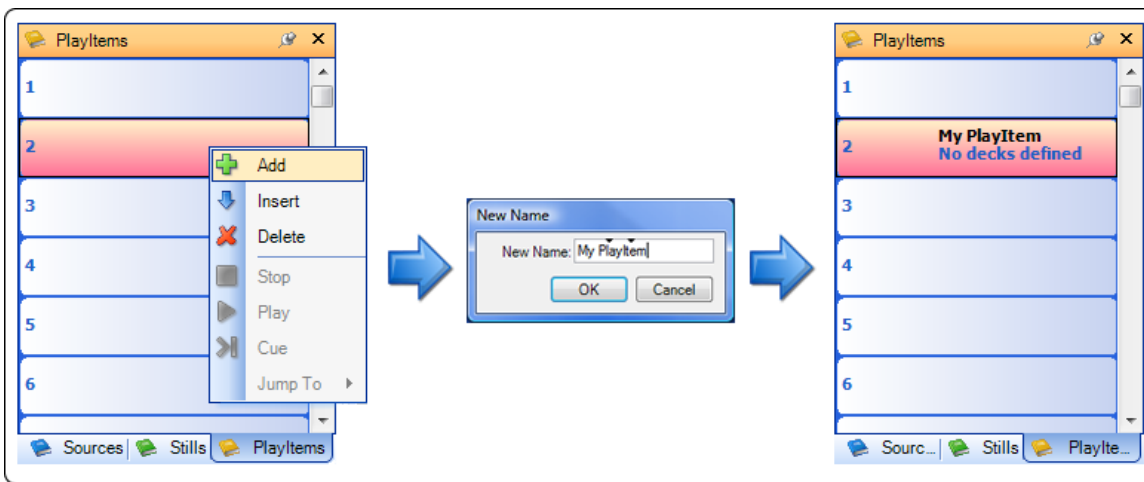
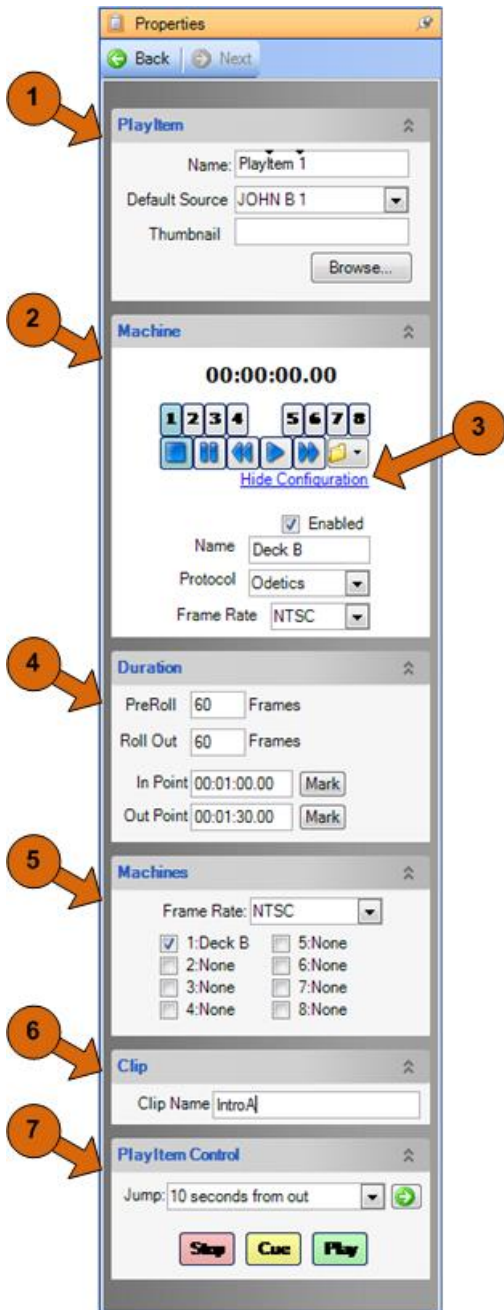


Figure 34: Adding a new PlayItem

PlayItem Property Panel

The PlayItem property panel is used to modify the definition of defined PlayItems, and additionally provides access to live deck control.



SECTIONS OF PLAYITEM PROPERTY PANEL

- **GENERAL PROPERTIES:** Allows for name, default source, and user thumbnail to be set.
- **MACHINE CONTROL:** Playback device configuration and live control is performed from this section.
 - **SHOW / HIDE CONFIGURATION LINK:** This link acts as a toggle; clicking this link will either expand or collapse the playback device configuration settings below the link.
 - **DURATION:** Defines the start and end point for the selected PlayItem, as well as lead-in and lead-out times.
 - **MACHINES:** Defines one or more machines to be controlled as part of the selected PlayItem. Multiple machine selections are typically used for sync-roll operations, where the content of multiple decks are combined to create large, high resolution video playback.
 - **CLIP:** Defines the clip name to be recalled when the selected PlayItem is cued. This section of the property panel is not used in cases where the deck(s) defined do not support clip control. If no clip is specified, no clip will be recalled when the PlayItem is cued.
 - **PLAYITEM CONTROL:** Allows for quick manual control of the PlayItem, including controls to cue to XX seconds from the PlayItem out point.

Figure 35: Router Property Panel

Configuring Video Playback Devices

Device configuration is performed from the Machine section of the PlayItem property panel. This can seem counter-intuitive, as it requires a PlayItem to be created before machine definitions can be viewed and/or edited.

Two groups of buttons, labeled 1-4 and 5-8, select a SourceMaster port*. All controls in the Machine section of the property panel (timecode, live controls, and configuration) follow the selected SourceMaster port. If the configuration (bottom) area is not visible as shown in the image to the right, click the blue 'Show Configuration' link to expand this area.

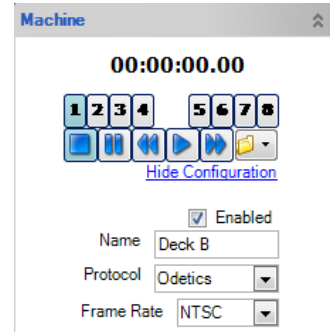


Figure 36: PlayItem menu

** Ports 1-4 refer to the four ports on a SourceMaster device configured as a master, and ports 5-8 refer to the four ports on a SourceMaster configured as a slave. The master / slave selection is set physically on the SourceMaster hardware; refer to the SourceMaster hardware documentation for additional information.*

The device configuration area allows a custom, or 'friendly', name to be set for the device, as well as the communication protocol and frame rate specific to the device hardware. Some playback devices may support multiple protocols, and the largest difference between the various protocols is clip control. From the supported protocols, BVW75 is the only protocol which does not support clip control. As a result, clip control specific operations will be unavailable for devices controlled from Spyder using this protocol. As a general rule, prefer the Odetics or the DoReMi protocol in cases where these protocols are supported by the device.

Once the device settings have been applied, verify basic device communication by pressing the play and stop buttons in the machine control panel to verify the device is being controlled, and to ensure that the correct timecode is being displayed. If device control is not working properly, check the following:

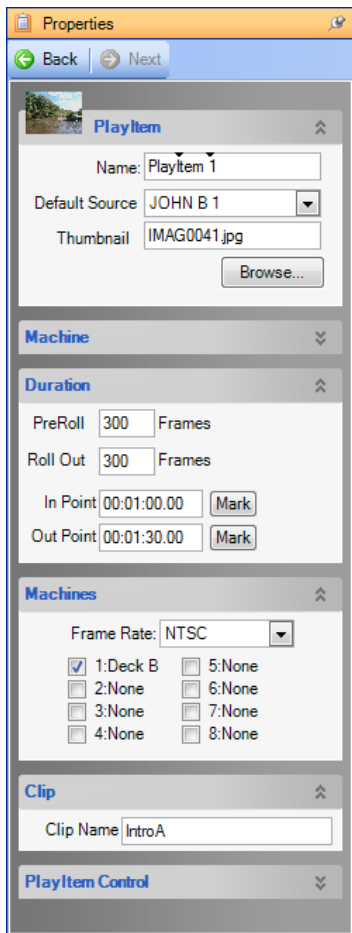
QUICK TROUBLESHOOTING

1. CLIP CONTROLLED?
 - a. Clip controlled devices may require a clip to be loaded before normal control operations will be accepted, and so it may be necessary to select a clip from the drop-down folder button in the machine control panel before using the other media control buttons.
2. NO COMMUNICATION?
 - a. Ensure the machine is physically connected to the correct SourceMaster port, and that the machine is set to remote control mode (if applicable). Also check the playback device configuration to ensure it is set to be controlled by the same protocol selected in the Spyder machine control properties.
3. CONTROL WORKING BUT TIMECODE NOT REFRESHING?
 - a. The most common cause of this problem is the RS-232 / RS-422 port on SourceMaster being switched to RS-232. Check this setting on the back of SourceMaster to ensure it is set to RS-422.

Configuring PlayItems

Core PlayItem properties include start and stop times for one or more connected playback devices, as well as some fine tuning options for lead-in and lead-out. For clip controlled devices, an additional clip name field may be required.

PLAYITEM SECTION



1. **NAME:** User defined name used to reference the PlayItem.
2. **DEFAULT SOURCE:** When dropping the PlayItem register onto the script, a new source element will be created with this source name.
3. **THUMBNAIL:** Image shown throughout the Vista Advanced UI to represent the PlayItem.

DURATION SECTION

1. **PREROLL:** Specifies the number of frames required to ‘ramp up’ to normal playback speed. Usually required for tape-based playback devices, but can also be useful as a lead-in time when mixing on a Spyder layer at the beginning of playback. The PlayItem will be cued to the specified In Point minus (-) the number of PreRoll frames.
2. **ROLLOUT:** Number of frames to run past the out point before actually stopping the device. Can be useful as a lead-out time when mixing off a Spyder layer at the end of playback.
3. **IN POINT:** Actual device timecode where PlayItem video should start playing. The ‘Mark’ button beside this field will paste the current timecode from the machine area of the panel into this field.
4. **OUT POINT:** Actual device timecode where PlayItem video should stop playing. The ‘Mark’ button beside this field will paste the current timecode from the machine area of the panel into this field.

Figure 37: PlayItem Property Panel

MACHINES SECTION

- **FRAME RATE:** Determines the overall frame rate for the PlayItem timecode countdown within Spyder. This field should almost always match the frame rate of the first selected deck in this panel section.
- **<MACHINE CHECKBOXES>:** Eight (8) checkboxes are provided, one for each SourceMaster port. Checked items indicate that the associated deck is to be controlled as part of the PlayItem. At least one port must be checked for the PlayItem to be considered valid, and multiple decks can be selected for sync-roll operations.

When multiple decks are selected in a single PlayItem, all decks will receive cue, stop, and play commands simultaneously from SourceMaster, enabling all operations to be triggered at the same time on all devices. In cases where long running sync-rolls are desired, clock skew between the decks may cause drifts in the time code between the decks. In these cases, timecode chase or genlock may be required between the decks. See the manufacturer documentation for further information on the specific options available for the device type being used.

CLIP SECTION

- **CLIP NAME:** When controlling clip-based playback devices, this field is used to specify the clip that should be loaded when recalling the PlayItem. If this field is not specified, or if the deck protocol used does not support clip control, no clip will be recalled when the PlayItem is cued.

Manual PlayItem Control

PlayItems can be controlled from either the PlayItem property panel or the PlayItem register list. While the controls in the PlayItem panel are useful and provided mostly for quick testing, the controls available in the PlayItem register list make live control very easy to use and monitor.

Property Panel Controls

The PlayItem control section located at the bottom of the PlayItem property panel allows for quick access to playing, stopping, and cueing the currently selected PlayItem. This is useful functionality when testing or tweaking PlayItem timing. The Jump selection allows the PlayItem to be cued to 10-120 seconds from the out point, allowing the clip out point to be adjusted without the requirement of viewing the entire length of the PlayItem.

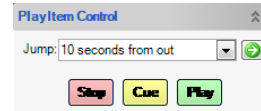


Figure 38: Machine Control

Register List Controls

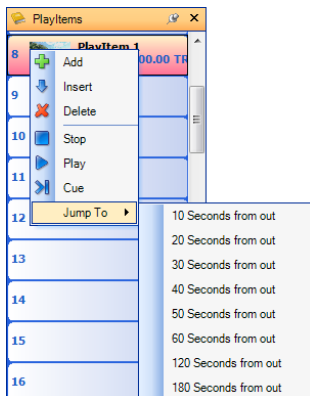


Figure 39: PlayItem Properties

Context menu items on the PlayItem register list allow for the same cue, jump, play, and stop control of all PlayItems as found in the PlayItem property panel, without the additional clicking and mouse movement required to jump between the register list and the property panel. The 'Jump To' menu items allow for cueing from the out point of the PlayItem in increments from 10-180 seconds.

The register list additionally displays current status information for all PlayItems simultaneously, providing a quick visual reference for PlayItem state. When a PlayItem is not currently running, the in-point and total running time (TRT) will be displayed in the PlayItem register. While the PlayItem is active, countdown

timecode information is displayed. Figure 41, shows an example of a PlayItem register display during the various active / running states.


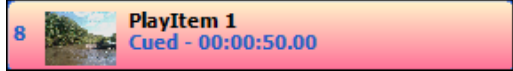
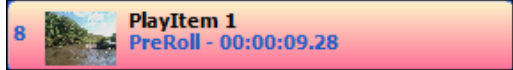
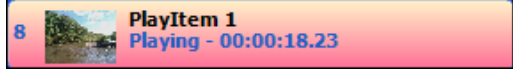
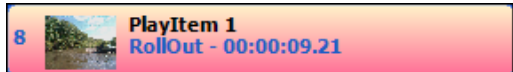
REGISTER DISPLAY FOR EACH PLAYITEM STATE	
<p>INACTIVE</p> 	<p>PlayItem is not currently running. In point and total running time (TRT) are displayed.</p>
<p>CUED</p> 	<p>PlayItem has been cued to the PlayItem in-point time code, minus the PreRoll frames (360 frames, or 10 seconds in this example).</p>
<p>PREROLL</p> 	<p>PlayItem has started playing; however the in-point has not yet been reached. The PreRoll is counting down the amount of time remaining before the in-point is reached (9 seconds and 28 frames remaining in this example).</p>
<p>PLAYING</p> 	<p>The PlayItem is currently playing and has passed the in-point. PlayItem register shows the amount of time remaining before the out-point is reached (18 seconds and 23 frames in this example).</p>
<p>ROLLOUT</p> 	<p>The PlayItem has passed the out-point, and is continuing to play until the time code has reached the out-point plus the RollOut frame count (360 frames, or 10 seconds in this example). In this example, 9 seconds and 21 frames of RollOut remain before the decks associated with this PlayItem will be stopped.</p>

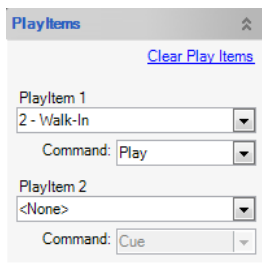
Figure 40: Register Display for each PlayItem State

Scripting with Machine Control

The ability to manually control source devices from the same interface which controls the Spyder windowing processor is very useful functionality; the full benefit of device control integration, however, is realized when using PlayItems to extend the command key / scripting platform. With Spyder it is possible for PlayItems to be executed via scripting, and alternately it is possible for scripts to be executed from PlayItems (through the use of timecode triggers). This deep level of integration allows for granular control and management of tightly coupled timed events spanning multiple discreet components.

Triggering PlayItems from Scripts

Each cue in a command key script contains its own set of properties specific to that cue. Included in these properties are options to cue, play, or stop one or more existing PlayItems. Whenever defined on a cue, a specified PlayItem operation will be executed whenever the associated script cue is executed.



To add or edit PlayItem specific properties for a script cue, start by clicking the script cue to display the dynamic property panel for the cue itself. PlayItems have their own section of the cue property panel, where one or more PlayItems are selected, along with a desired operation. Note that the PlayItems section of the cue property panel will automatically expand as additional PlayItems are defined, allowing an unlimited number of PlayItem commands to be added to the cue.

Figure 41: PlayItem Property Panel Controls

Triggering Scripts from PlayItems

Every script can be associated with a SourceMaster port, referred to as a **clock source**, which is used by the Spyder scripting engine to allow changes in timecode to trigger script execution. Each script is allowed only one clock source; it is not possible to use timecode from multiple SourceMaster ports to trigger the execution of a single script. To set the clock source for a script / command key, click a desired command key and edit the 'Clock Source' section shown in the dynamic property panel.

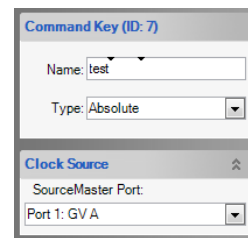
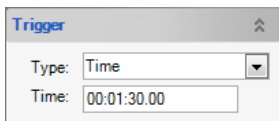


Figure 42: PlayItem Register List Controls



Each cue in the Spyder scripting engine contains a 'trigger' property, which can optionally be set to a 'Time' value. When a script executes a cue with an associated time trigger, the

Figure 43: PlayItem section of Cue Panel

scripting engine will monitor the script’s clock source port until its time code reaches a specified timecode, and then automatically execute the next cue in the script.

PlayItem Drag-Drop Operations in Script

To simplify the process of associating PlayItems with command key scripts, certain drag-drop operations can be used between the PlayItem panel and the script panel.

DRAG A PLAYITEM TO A SCRIPT CUE

When dragging a PlayItem from the PlayItem register list onto a cue in the script window a PlayItem cue command will be added one cue *before* the cue dropped on, and the drop cue will add a PlayItem play command and a time trigger to automatically advance the script at the end point of the PlayItem. The clock source for the script will additionally be set to the first machine port defined in the PlayItem.

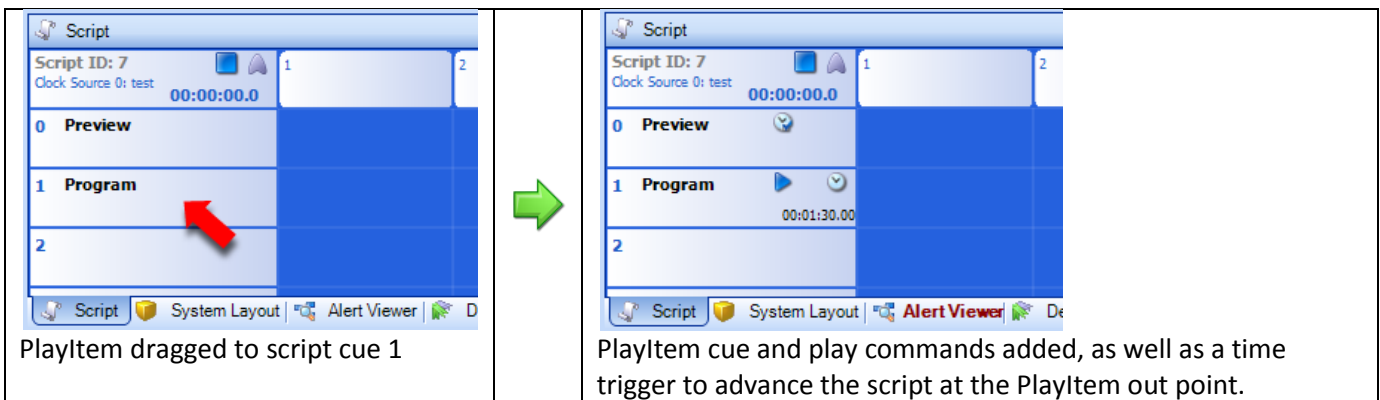


Figure 44: Dropping a PlayItem onto a Script Cue

DRAG A PLAYITEM TO A SCRIPT LAYER

Dragging a PlayItem to an unused area within the script grid will complete the same operations to the script cues as when dragging a PlayItem onto a script cue, and will additionally add a source element with the default source specified on the PlayItem (if defined).

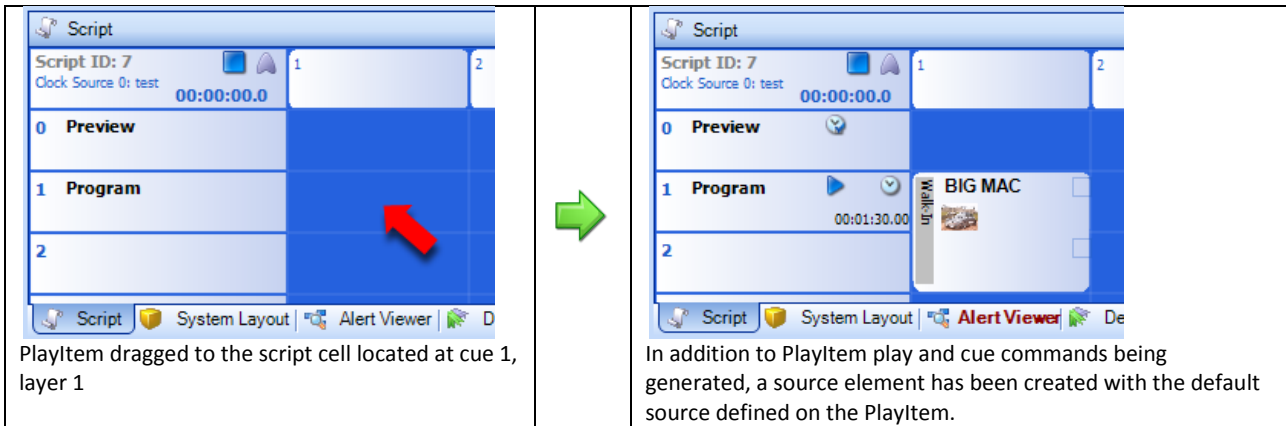


Figure 45: Dropping a PlayItem onto a Script Layer

Still Server (X20 Only)

The Still Server is a software application which can be run on an external PC and used in conjunction with the Spyder X20 product line to dramatically increase the speed of still image loading in the system.

The still image server application works by connecting to the Spyder X20 with both an Ethernet and a DVI video connection. When a still image file needs to be loaded, the X20 sends the file (if needed) and control commands which instruct the still server to display the image on its DVI output. The DVI signal is then captured directly into memory at the X20 OpMon input connector and routed as needed through the system.

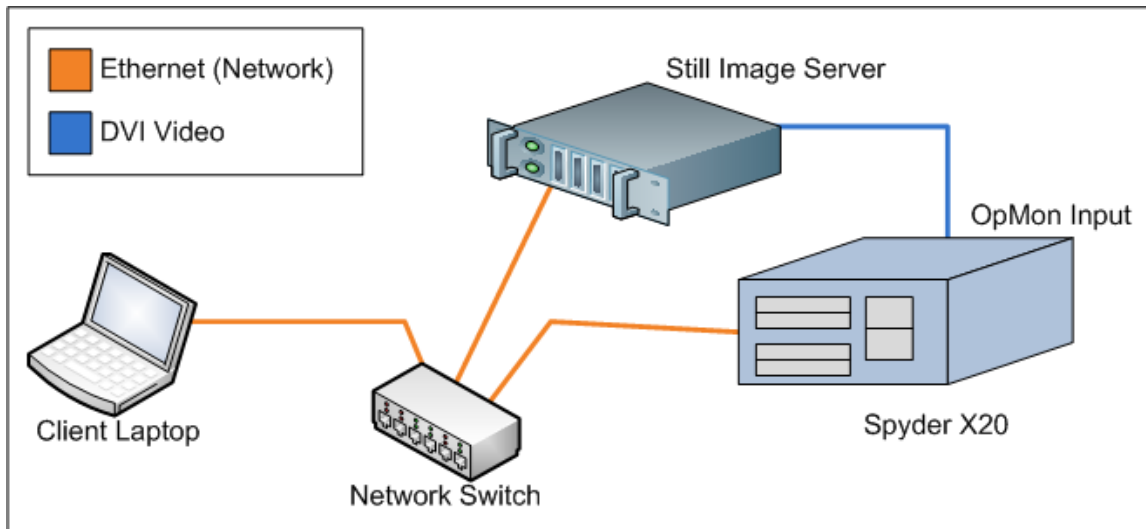


Figure 46: Still Image Server Topology

The figure above shows the high-level topology of the still server when used in conjunction with the Spyder X20.

Still Server PC Requirements

The still server application does not require a PC with a large amount of processing resources; it can be run with most off-the-shelf Windows based computers with a DVI output. Being a graphics server with network image transfer functionality, the greatest performance gains can be made from newer graphics cards and a gigabit Ethernet enabled network. The minimum and recommended specifications for the Still server PC are below:

Minimum Requirements:

- Pentium 4 2.5Ghz CPU
- 512Mb RAM
- Windows XP SP3
- 100Mbit Network port
- DVI output supporting 2048x1200 resolution

Recommended Specification:

- Intel Core™2 Duo 2.6Ghz CPU
- 2048Mb RAM
- Windows Vista / Windows 7 (Note Windows 8 or above is not supported)
- 1000Mbit Network port
- DVI output supporting 2048x1200 resolution

Note: The still server application should not be run on the same PC running the Vista Advanced client application.

Installing and Configuring the Still Server

The still server application is available on the Christie web site, along with the latest release versions of the Vista Advanced software platform. While not always required, it is always recommended that the still server application software be updated at the same time as the Vista Advanced / X20 server software.

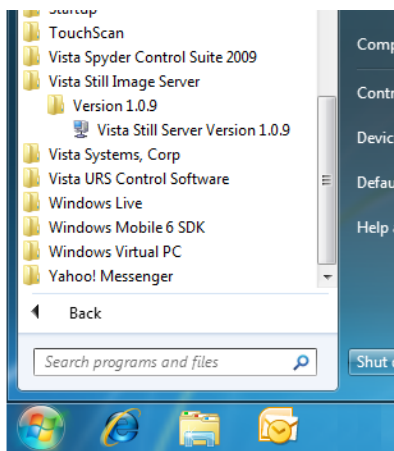


Figure 47: Setting Clock Source

Christie provides a Windows installer based setup experience for the still server application, much like the installation for the Vista Advanced software package. After installing the still server application, the still server application will appear in the Windows start menu, as shown in figure 46 (left).

If desired, the still server application shortcut can be copied to the Startup folder in the Windows start menu, causing the still server application to automatically run each time Windows starts.

By default, the still server application will position its diagnostic window on the main screen, and the still server capture window will be maximized on the second screen (if present). In cases where only one output is configured on the still server PC, the still server's capture window will be maximized to

cover the primary screen, which initially appears as a solid black screen. To close this window at any time, simply press ALT+F4 to close the still server application.

Configuring X20 to use the Still Serve

Additional settings in the X20 must be configured using the Vista Advanced software after a still server is configured and running on the Spyder network. After connecting to a Spyder X20 using the Vista Advanced software, select the 'Still Server Configuration' option from the 'Server' menu. This will cause the still server configuration property panel to be displayed.



The **'Still Server Enabled'** checkbox controls whether or not the X20 should attempt to contact an external still server for image loading, and the **'IP Address'** field must contain the address of an available still server.

The **'Delay Before Capture (ms)'** option is an advanced setting which adjusts the amount of time the X20 will wait (in milliseconds) between sending the command to display an image and the time it actually captures the image. Reducing this value effectively reduces the delay time involved in image captures, and may yield faster image load times. Too low of a value may cause the image capture process may become unreliable, as shown in Figure 48. The minimum capture delay value varies depending on the computer platform being used for the still server application, and so experimentation may be required in scenarios where still loading performance increases are desired even when using the still image server. The default delay value as of the time of this writing is 300ms.



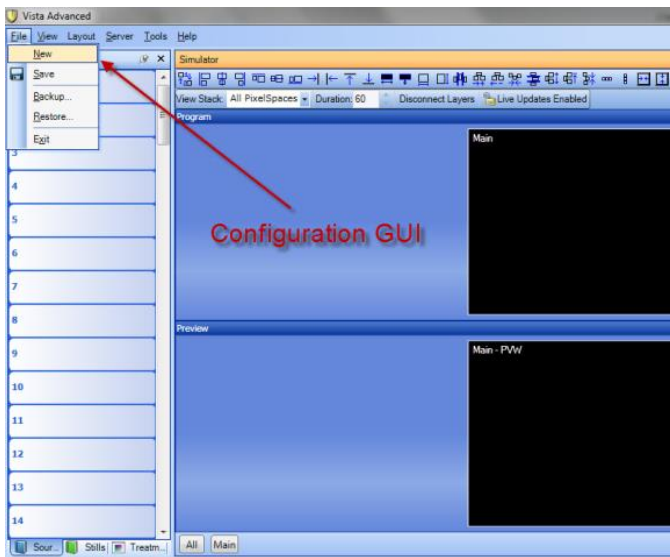
Figure 48: Sixteen stills loaded into layers using a still image server

Sample Configuration

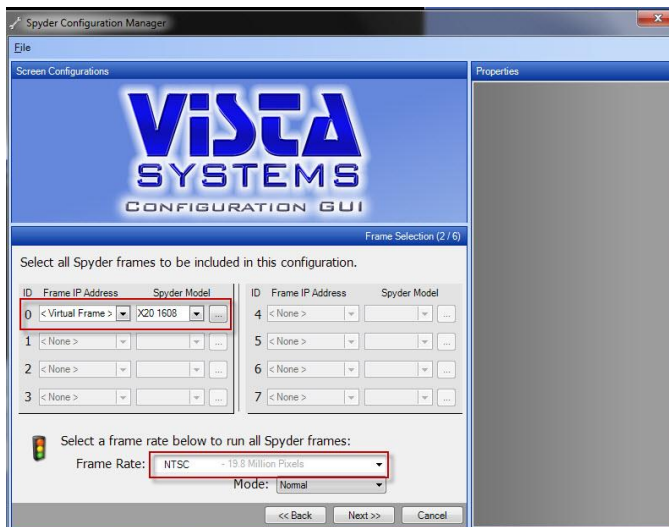
This section contains a sample configuration.

Using the Setup Configuration GUI

Setting up the X20 to work with the Vista Advanced Software GUI is accomplished by using the setup GUI. This section of the manual will create a sample two screen configuration. The Vista Advanced GUI will allow you to configure a system virtually to either preconfigure a unit or to become familiar with the Vista Advanced Software.

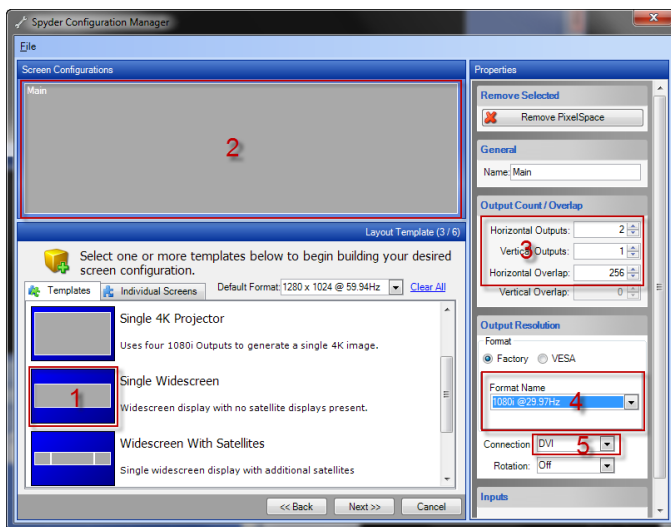


1. Go to File → New. The Vista Systems Configuration GUI will open.
2. Select “Start with new empty configuration”

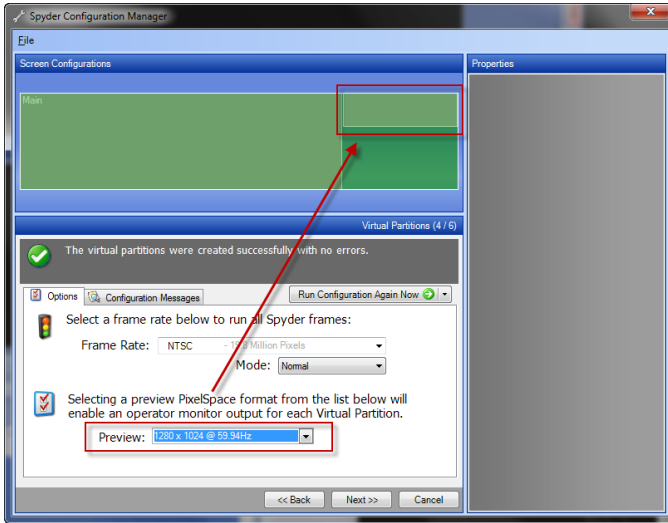




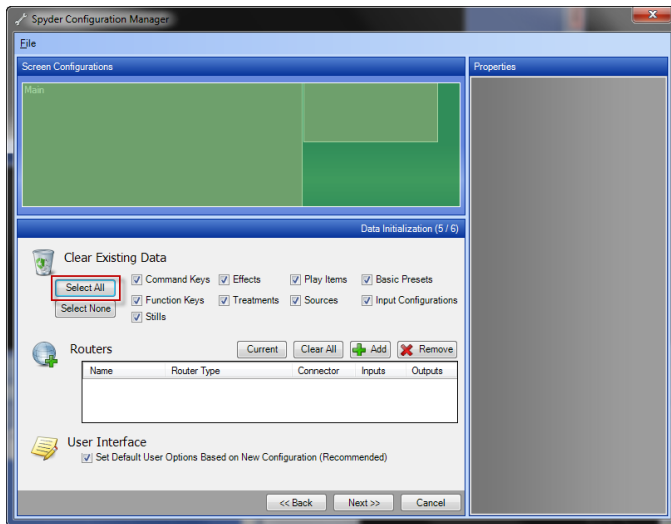
3. Select “Virtual Frame for the I.P. address and X20 1608” for the Spyder Model type. Select NTSC or PAL depending on your region/video standard.



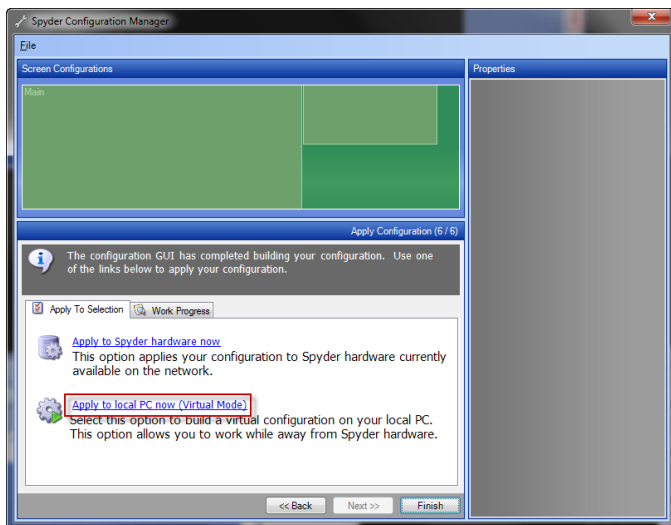
4. Select “Single Widescreen”.
5. Note the Pixel Space is Automatically Created.
6. Set the number of outputs to 2. This will create a 2 projector blend with 256 pixels of overlap.
7. Set the resolution of your projectors under the output resolution Format Name drop down menu. This should match the native resolution of your projector for optimal image quality.
http://en.wikipedia.org/wiki/Display_resolution
8. Set the Connection type to match your projector input type i.e. DVI, SDI, VGA.
9. Click Next.



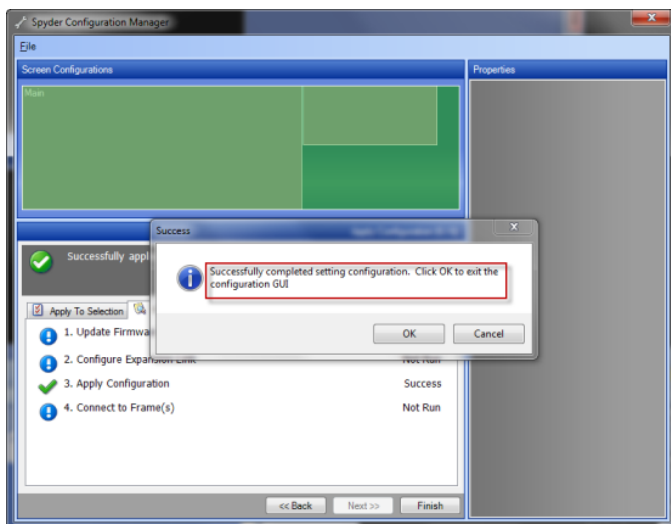
10. Select a preview monitor. Note that a preview pixel space is automatically allocated in the V.I.



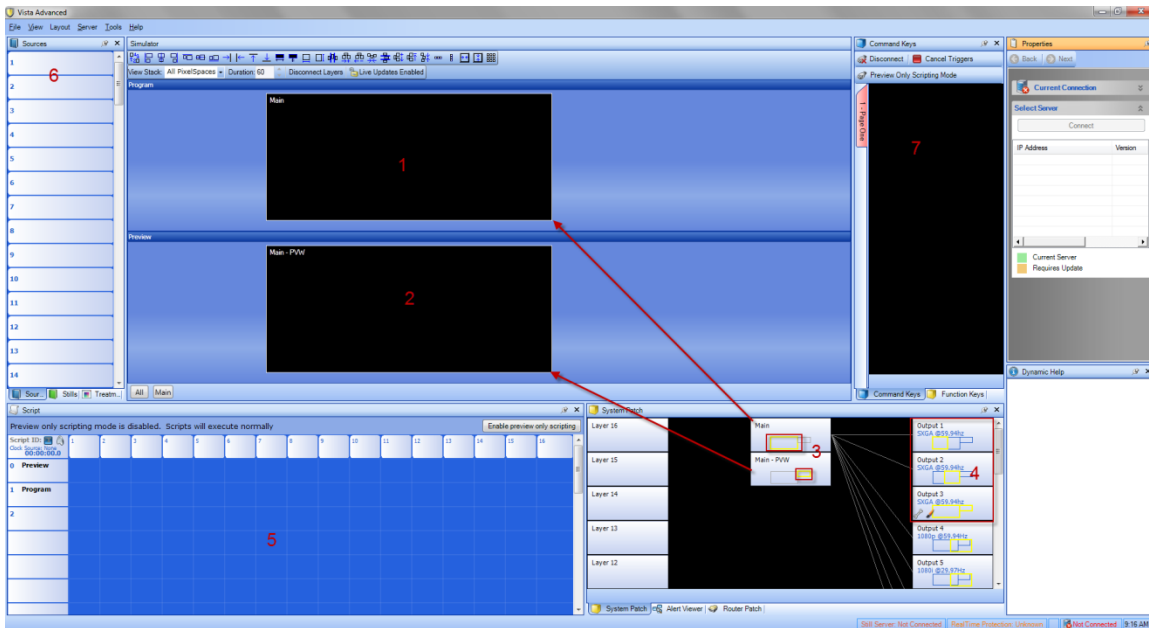
11. Items like Stills, Input Configurations and Presets are stored in the Processor. To start with a clean configuration Click “Select All”. All of the Checkboxes will populate automatically. This is also where you may select an external router. We will be using the X20 internal router for this sample configuration so no router selection is needed. The X20 Internal Crosspoint Switcher will be used to route video.



For this sample configuration we will be using a virtual X20. Configuring an X20 can be done offline in virtual mode so that full configurations can be created offline.



A success message will appear indicating the configuration is valid and the virtual GUI is ready for programming.



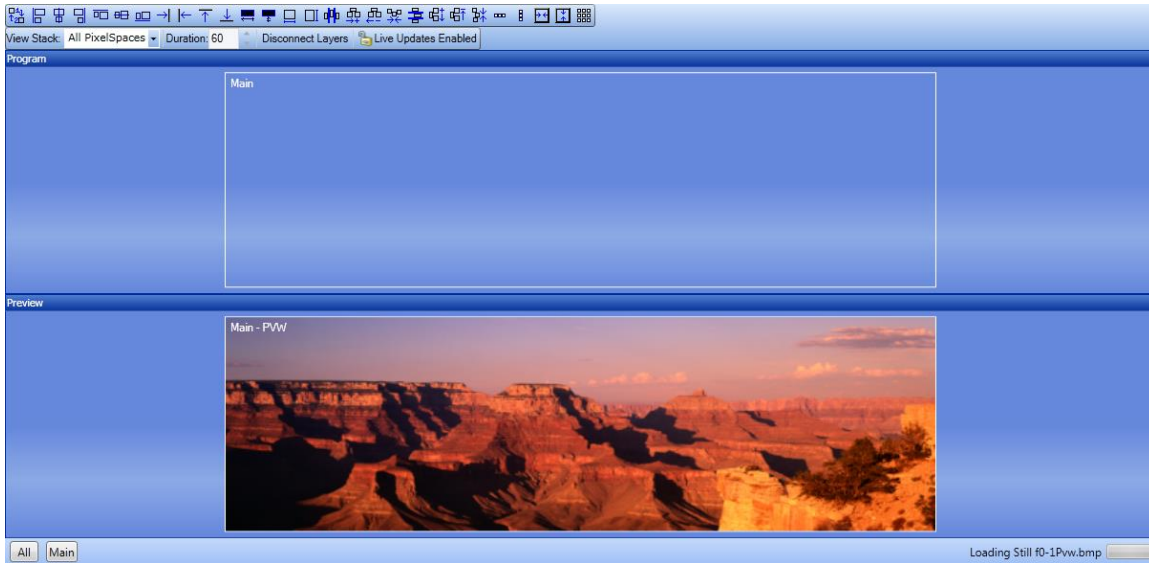
The Vista Advanced Default Layout

- Main Screen PixelsSpace. This represents “Program Out” which are the two projectors in this case seemed together with an edge blend.
- Main PVW is the Preview output
- Looking at the System Patch you can see how the PixelSpaces are allocated.

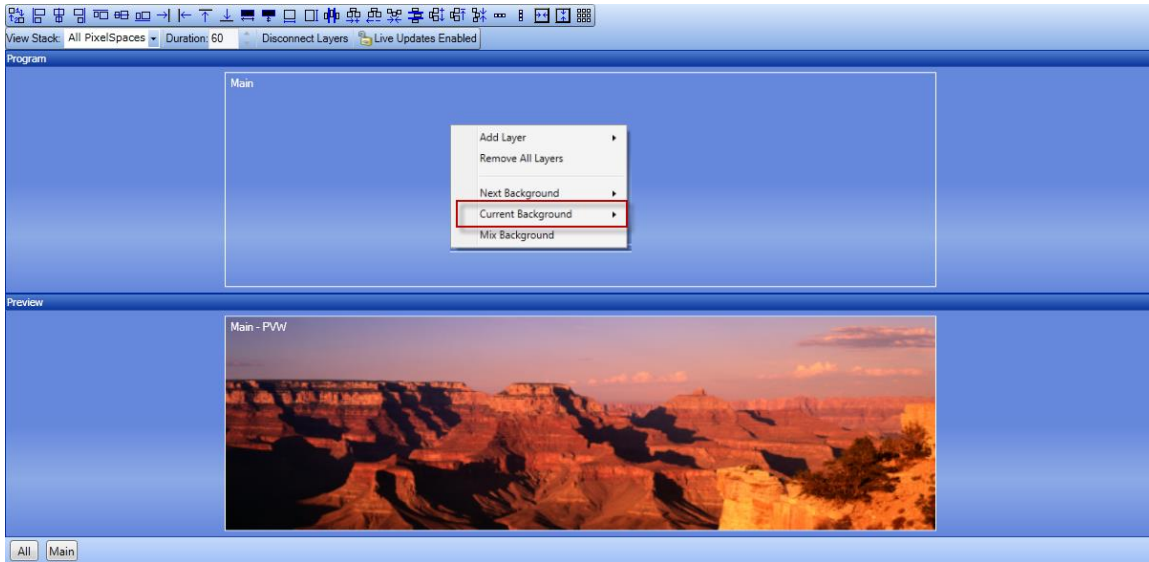
Output 1 (Left Projector) and Output 2 (Right Projector) together comprise the main output PixelSpace. Output 3 is allocated for the “Preview” output.

Adding Background Images to the V.I. Canvas

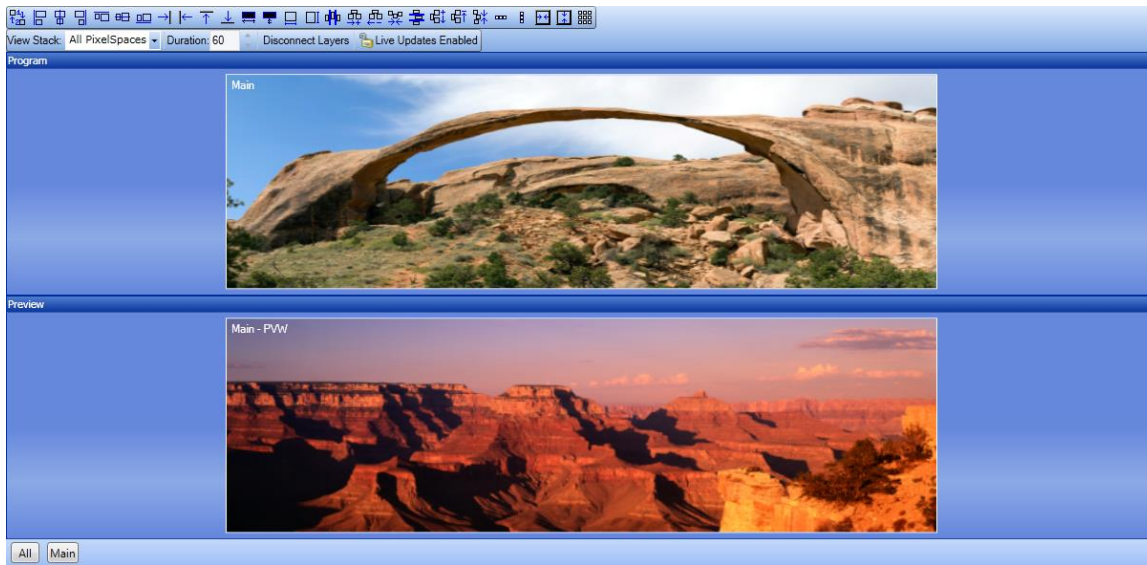
By right clicking in the Preview (PVW) space a custom image or color can be selected.



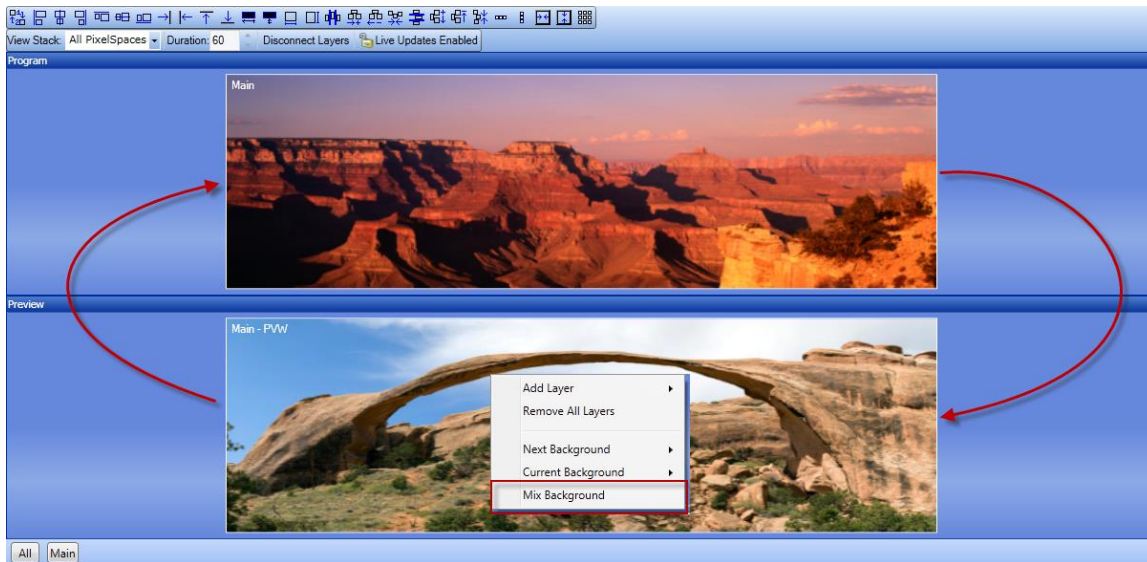
Select an Image with sufficient resolution and the correct aspect ratio for your PixelSpace for optional image quality.



Use the same process from the Program or (Main) Pixel Space and select a different still background Image.



We have now created backgrounds for both Program and Main that are mixable.



By right clicking and selecting “Mix Background” notice that the backgrounds for Main and Preview swap with a smooth mix transition. The rate of the mix is determined by the “Duration” rate which is 60 frames (or one second) in this example.

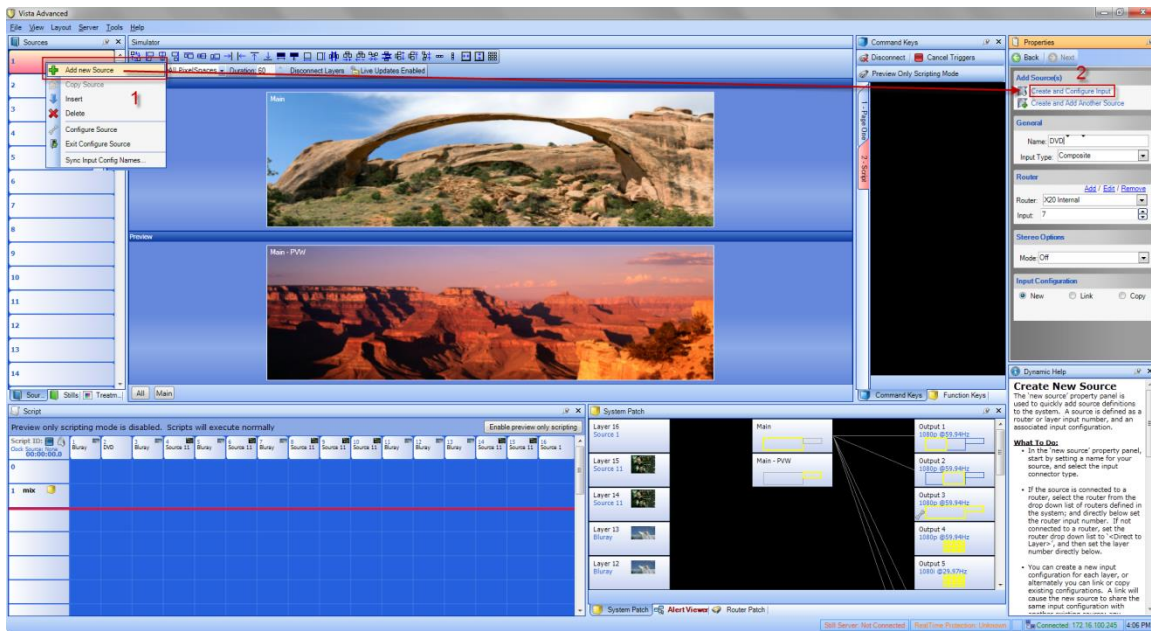
Adding Input Sources

It will simplify things if you know which sources you want to connect to the Spyder. Creating a source list will simplify the input configuration. In this example we will connect:

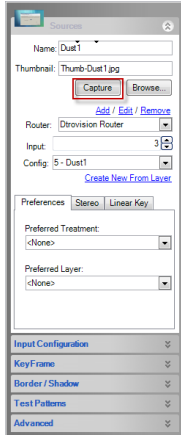
Input	Format	X20 Input	Input Type
1	NTSC Composite	1	BNC
2	1400 x 1050 DVI	2	DVI
3	RGB Component	3	BNC
4	1400 x 1050 DVI	4	DVI
5	HDSDI	5	BNC
6-16	TBD		

Note that the Physical inputs on the X20 are BNC for Odd numbered inputs and DVI for Even numbered Inputs. Connect Sources from the Source list. Interlaced sources cannot be used on the DVI connector. Only odd inputs have de-interlacers.

- Right Click in the Sources Tab on Source 1 and select “Add new Source”.
- Select “Create and Configure Input”.
- Select the input type. In this case select “Composite”.
- Select the “Autosync button. “Save Required” will appear. Click the Save button.



- Repeat this for each input source.
- Pressing the Capture Key will create a custom Icon in the simulator by frame-grabbing the respective input source and creating an Icon of the representing the full input image. You can also select a custom icon to identify inputs graphically.



Note that odd numbered inputs are BNC and even numbered inputs are DVI connectors.

Adding Sources to the PixelSpace

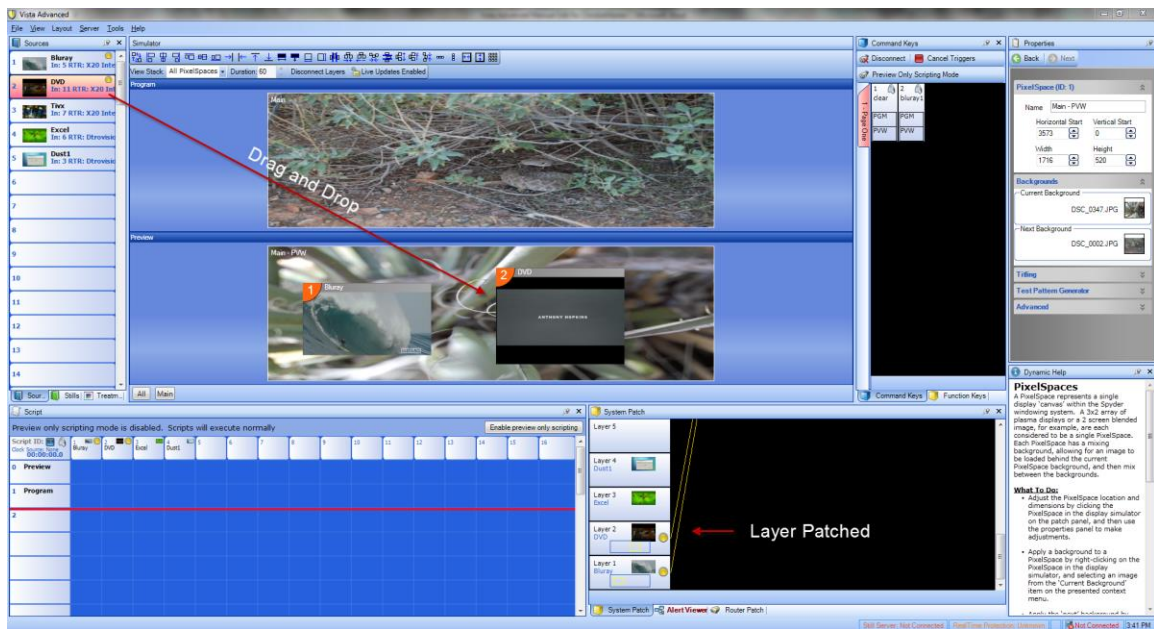
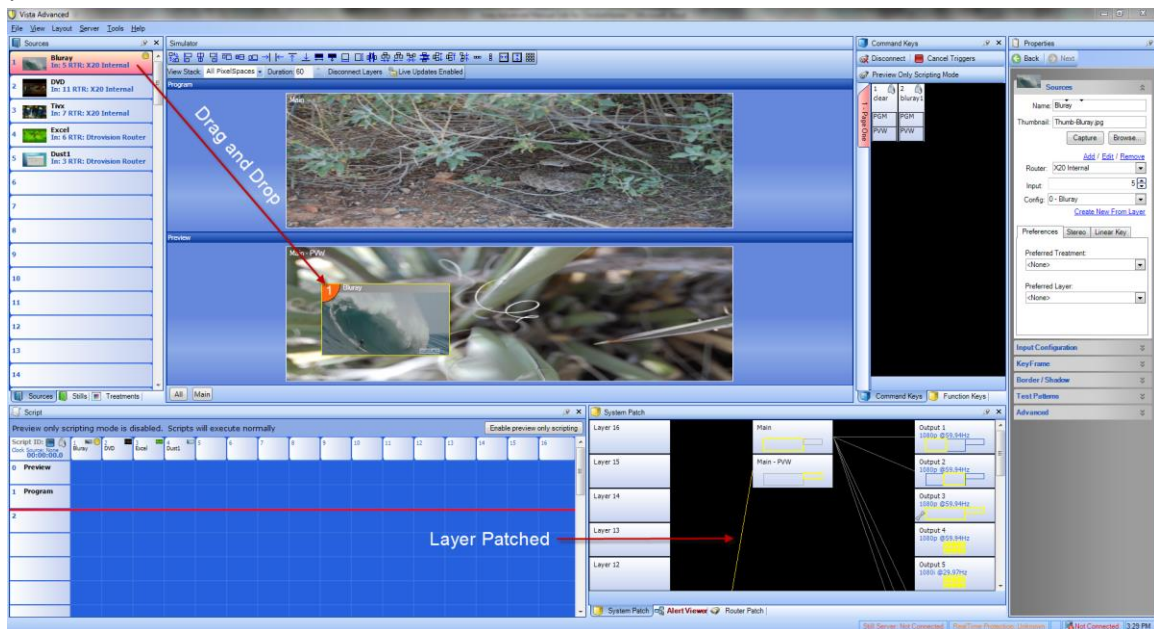
After inputs have been configured the input source list should look something like this.



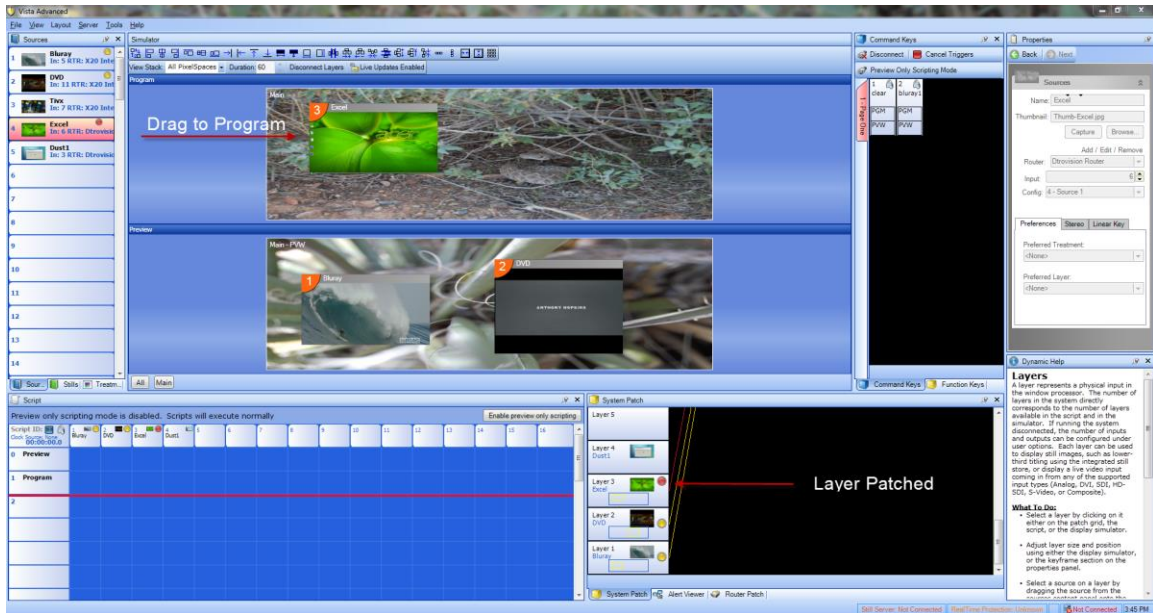
Click on a source and it will highlight red.



The input can now be dragged to the Program or Preview Pixelspace. Note that the System Patch routes input source 1 (Layer 1) to the Preview Pixelspace. Also note the yellow route patch and the yellow border around Source 1. The Yellow indicates that Source is in Preview.

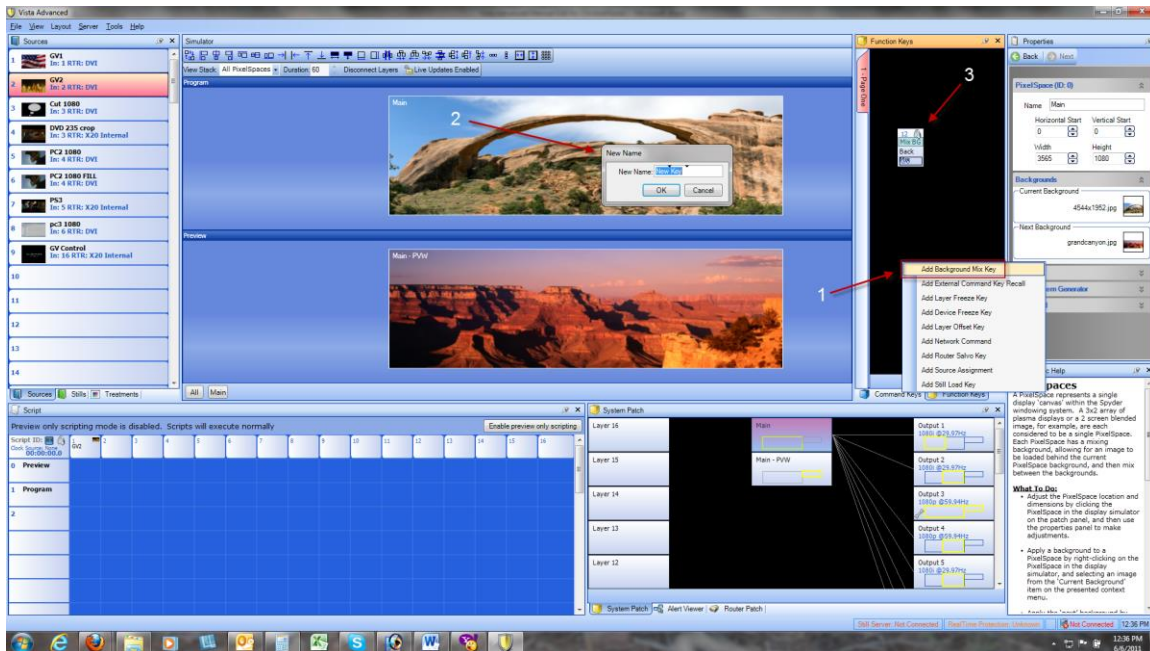


When you drag a new Source to preview a new router patch is created in the System patch.



Dragging a Source to Program will make the Source immediately live on the Program output. Note that the router patch is now Red for Source 3 and that there is a red dot on both the Source List and Router Patch indicating that the source is live in Program. Also note that Sources 1 and 2 have Yellow dots next to the Source icons in both the Source List and Router Map indicating Sources 1 and 2 are in Preview.

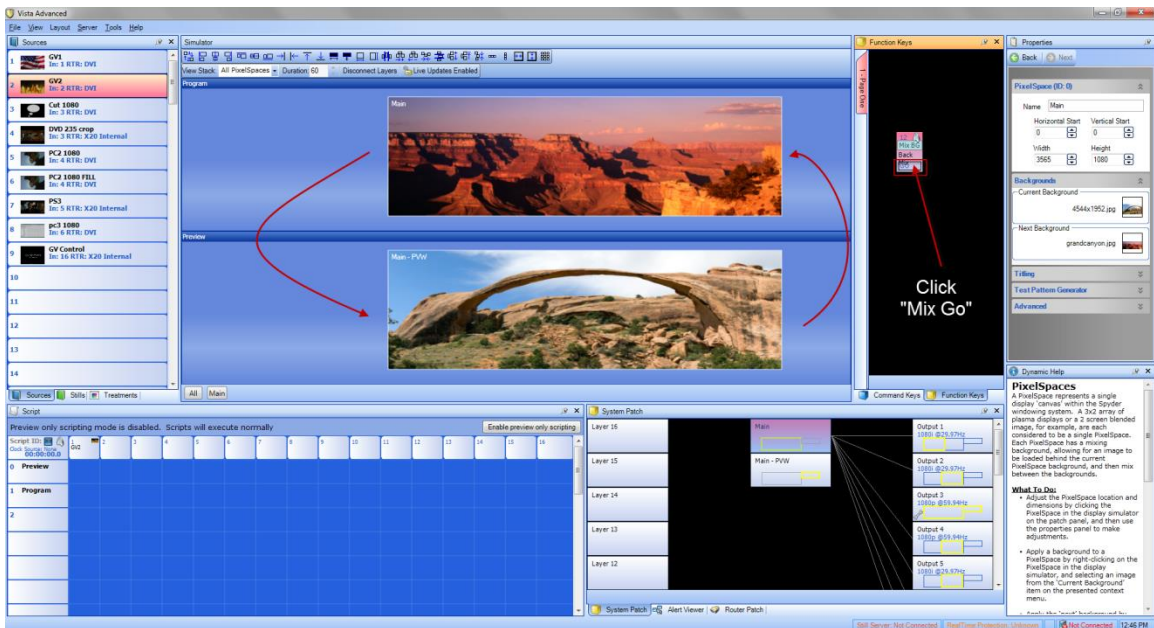
Automating Tasks with Scripts and Function Keys



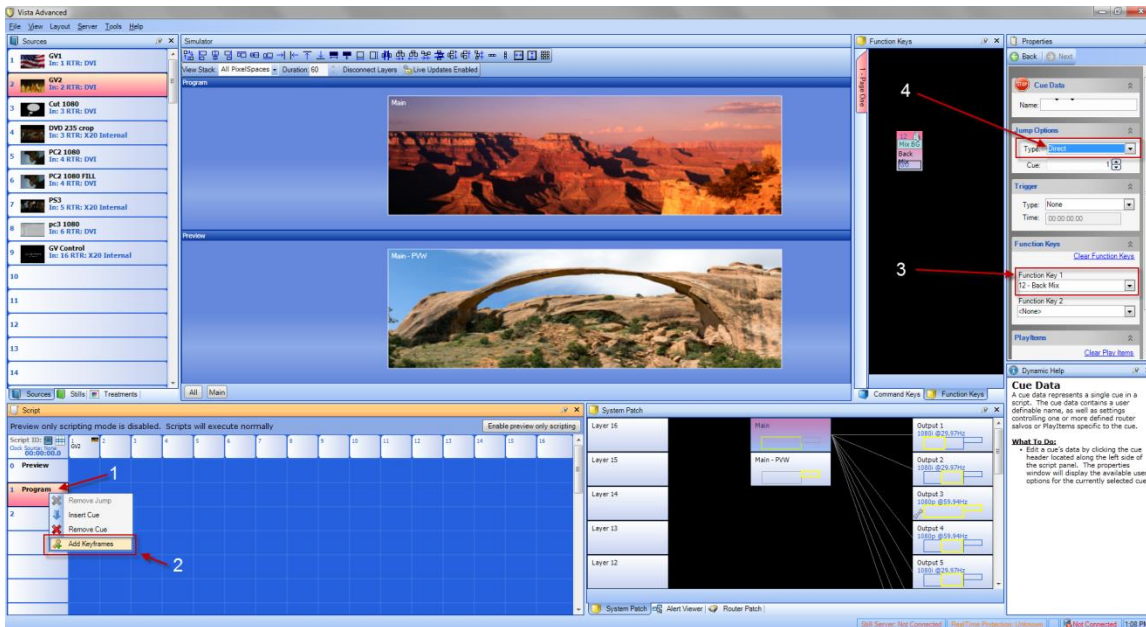
In this example we will use a Function Key to automate the Mix Background function.

- Select the Function Key tab and then right click. Select Add Background Mix Key.
- You will be prompted to name the Function.

- The Function Key is created.

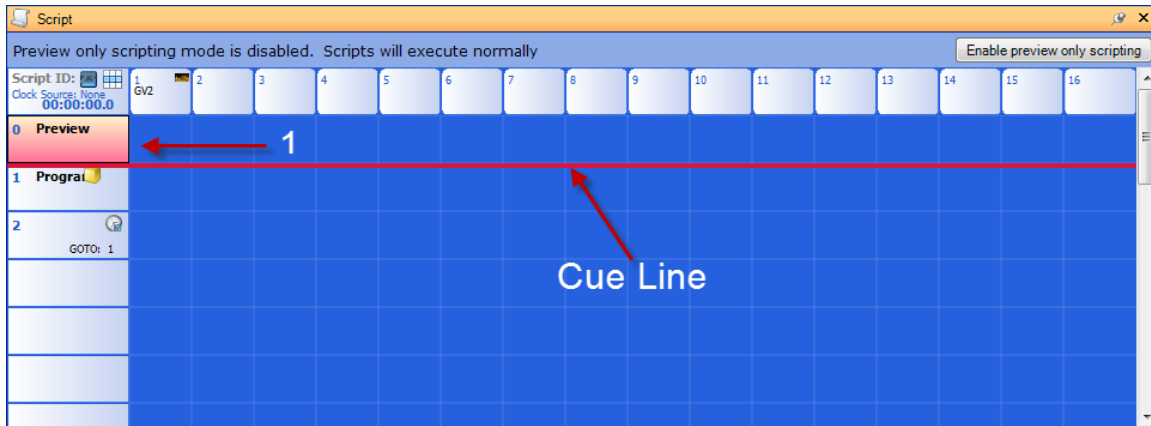


By Clicking on the “Mix Go” Function key the Background images will Mix from Preview to Program.



This example will automate Mixing the Backgrounds.

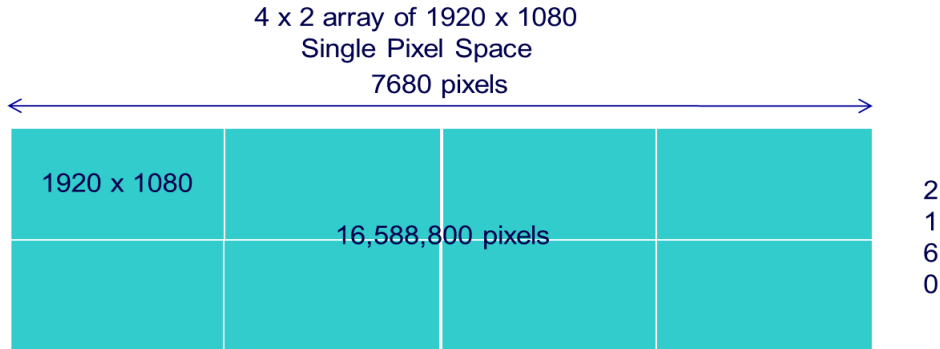
- Right Click on “Program” in the Script window.
- Select Keyframe.
- Select the “Back Mix” Function Key.
- Select Script Position 3 and Add an Additional Keyframe. Select “Jump Options” and make sure Cue 1 is selected.



- Double Click on the Preview Cue (Cue Zero).
- Hit the spacebar
- The Cue Line will move down and execute the Keyframe “Back Mix” function.
- The GOTO 1 will execute the Keyframe mix with each spacebar press.

Sample Screen Configurations

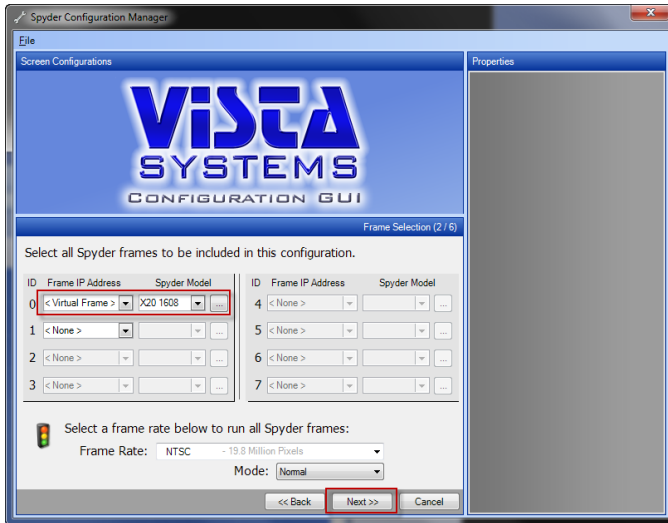
(4 x 2) PixelSpace Sample Configuration



To create this PixelSpace using the Vista Advanced Configuration GUI.

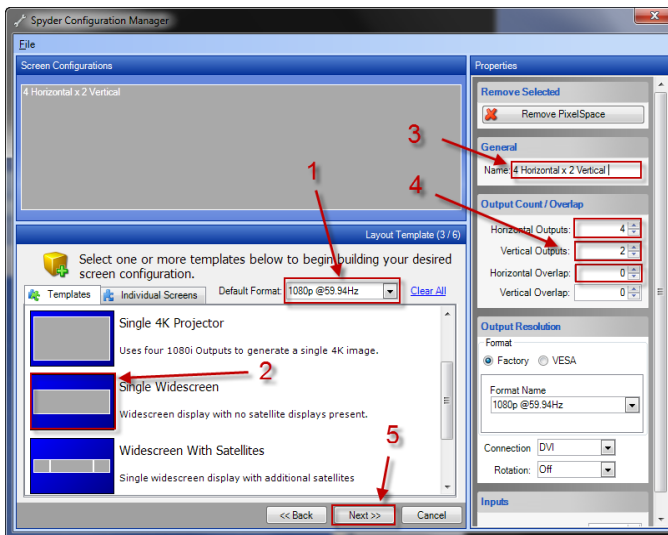


Start with new empty configuration.



Select the model of Spyder you are using.

Click next.



Select screen output format.

Select Single Widescreen

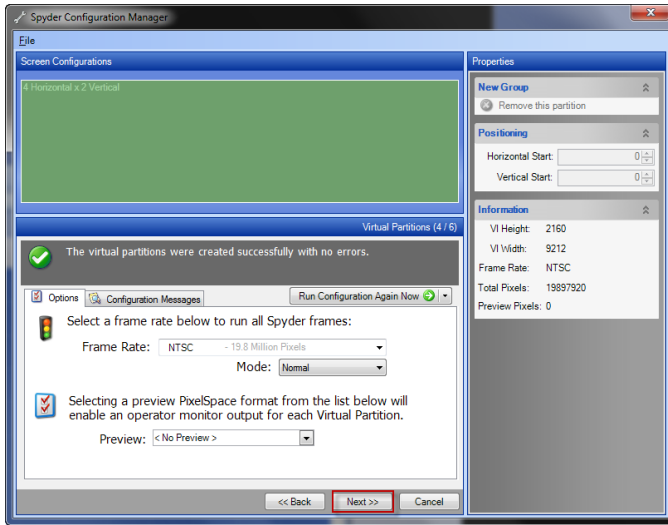
Name the Screen

Change the Screen output from the default (3) to (4).

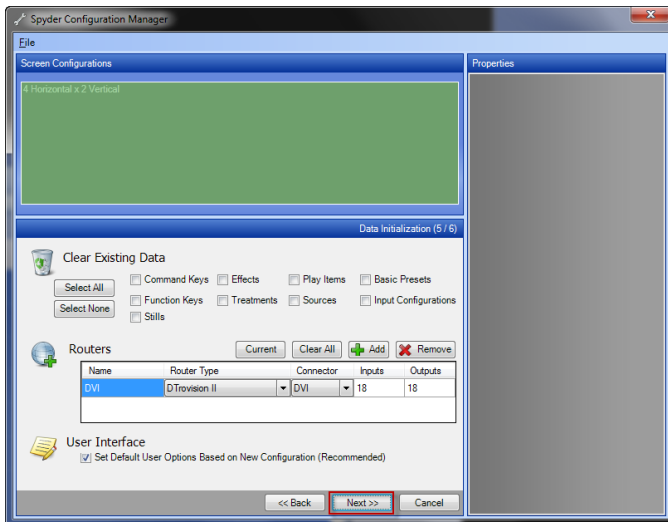
Change the Vertical output from the default (1) to (2).

Change the Horizontal Overlap from the default of (256 for edge blending) to (0).

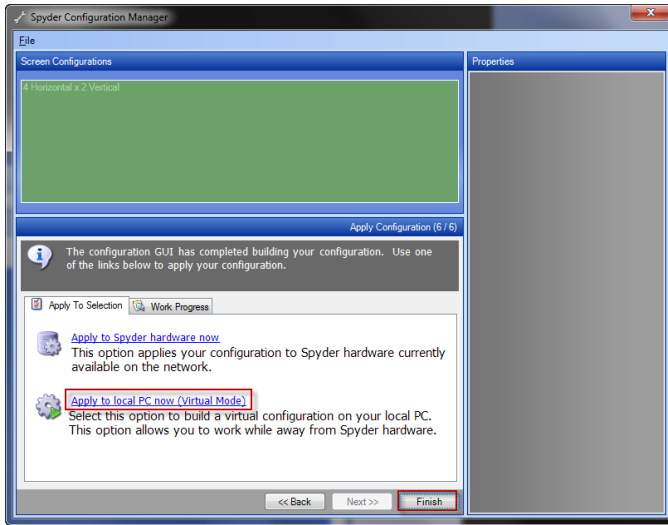
Click Next.



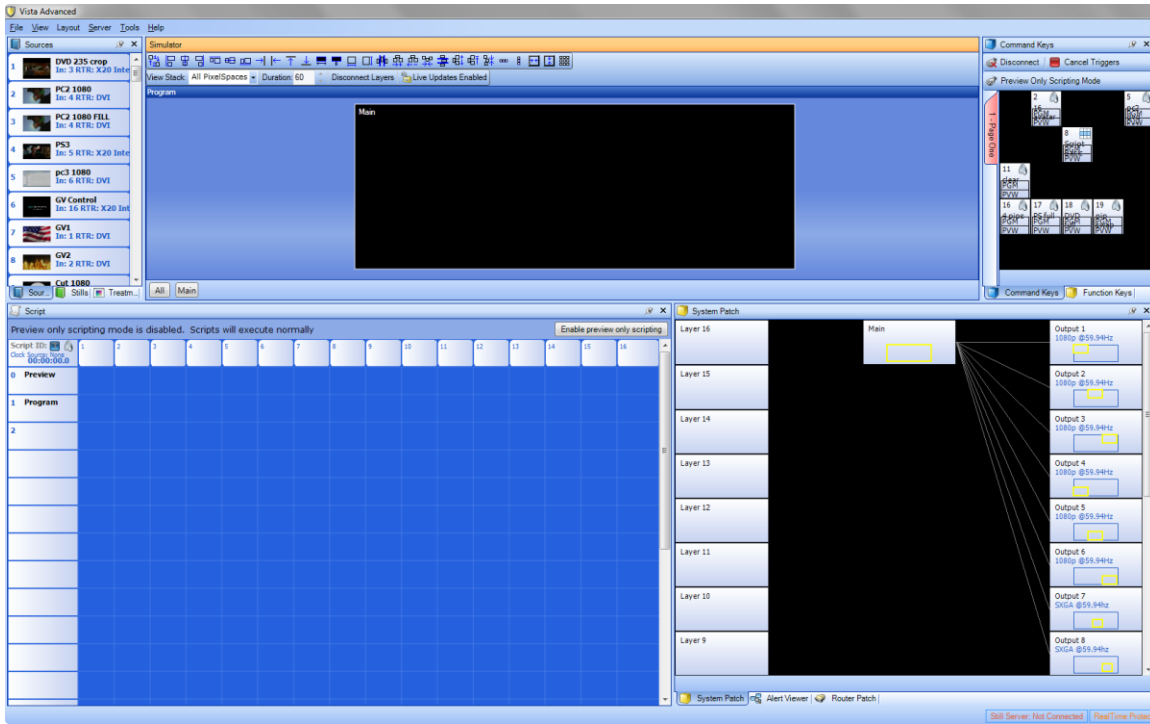
Select Frame Rate and click next.



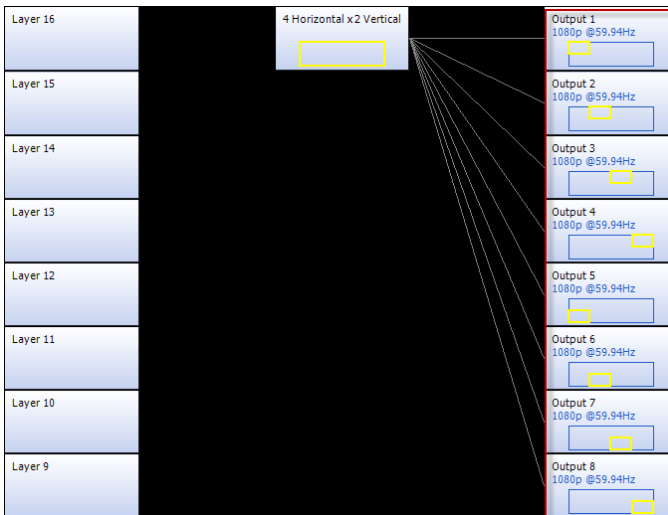
Click Next.



Click Apply to local PC now (Virtual Mode).



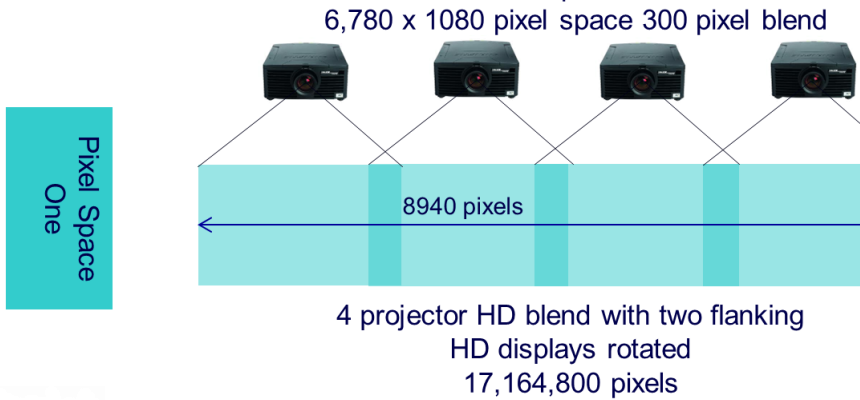
These output positions are automatically created by the GUI wizard.



Screen	H-Start	V-Start
1	0	0
2	1928	0
3	3856	0
4	5784	0
5	0	1080
6	1928	1080
7	3856	1080
8	5784	1080

The Pixelspace is now configured and ready to use. Note that the yellow boxes are each graphically representing which area of the screen they are contributing to.

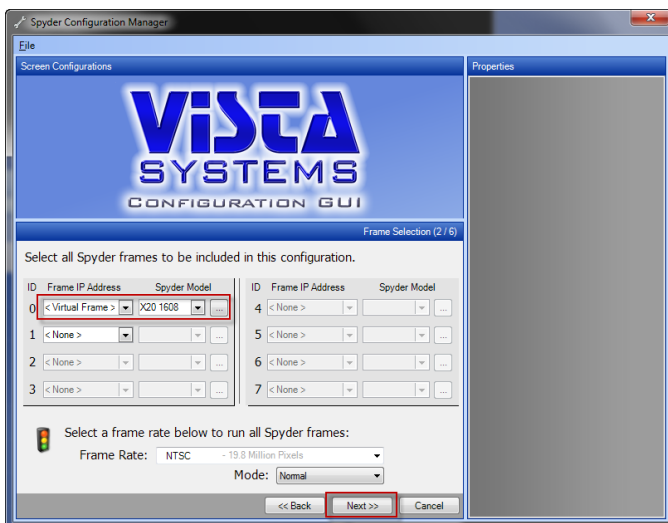
(4) projector Blend with Rotated flanking displays



To create a four projector blend with a 300 pixel overlap and two rotated displays using the Advanced GUI.

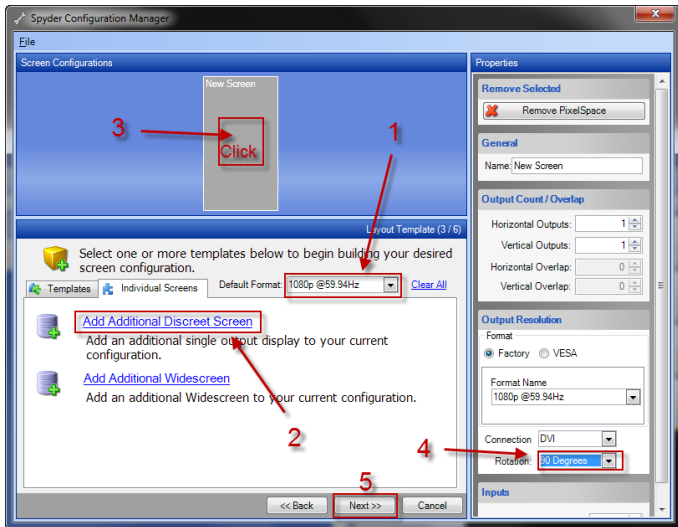


Start with new empty configuration



Select the type of Spyder you are using.

Click Next.



Note: Building the pixel space from Left to Right will simplify the process.

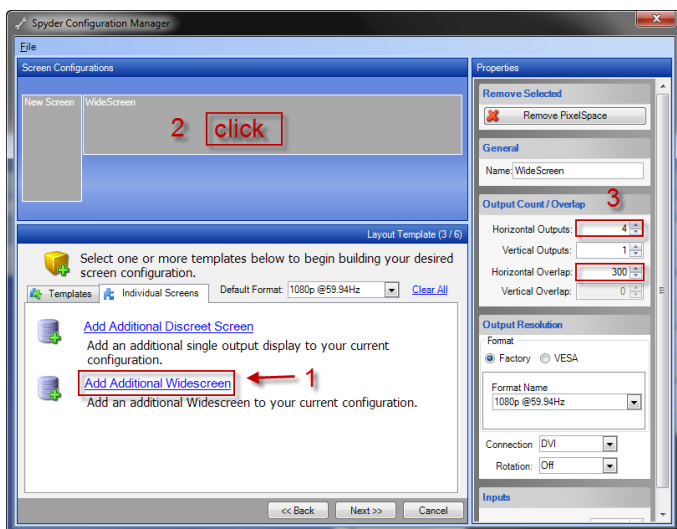
Select the display resolution

Click Add Additional Discreet Screen.

Click the New Screen to open the properties panel.

Select Rotation 90 degrees since this is the left most rotated display.

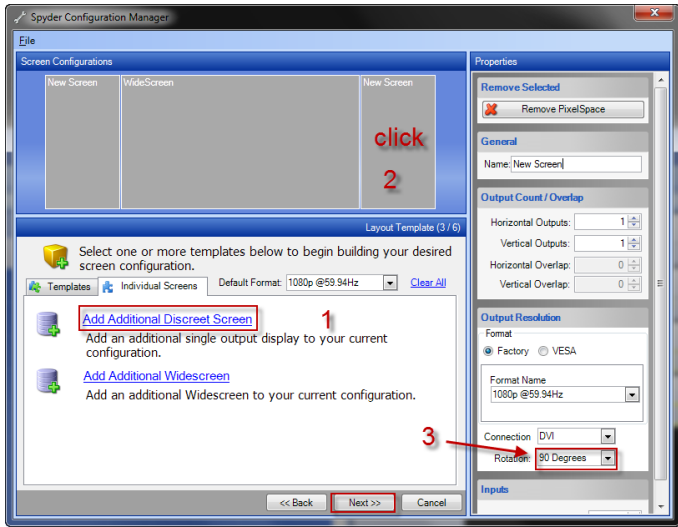
Click next



To add the Widescreen

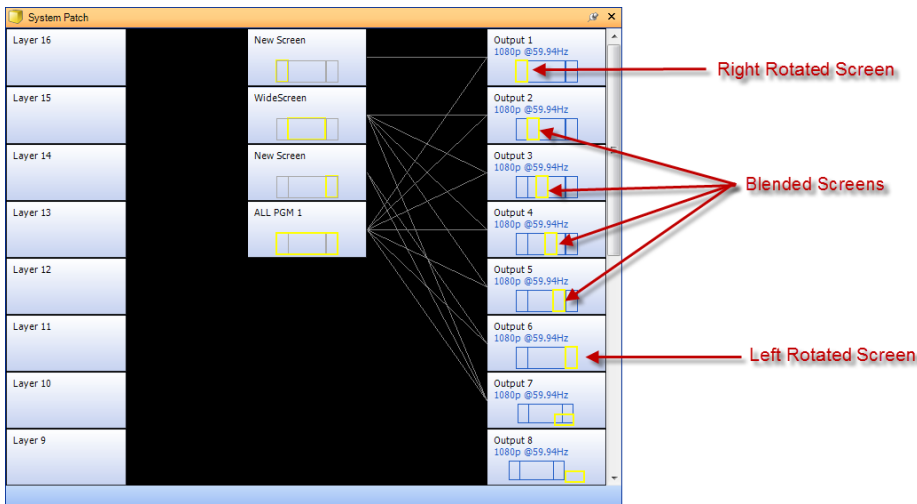
1. Click Add Additional Widescreen
2. Click the Widescreen PixelSpace to reveal the Properties.

3. Change the Horizontal Outputs for the default (3) to (4).
4. Change the Horizontal overlap from the default (256) to (300)



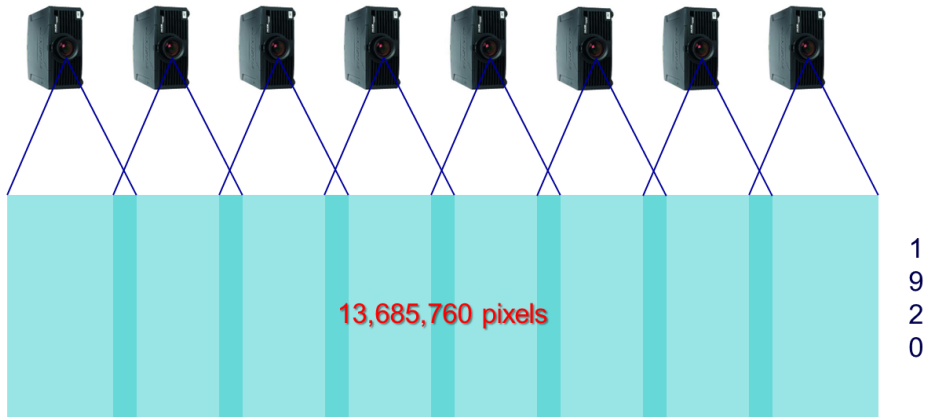
Add the final screen

1. Select Add Additional Discreet Screen.
2. Click in the New Screen Pixelspace.
3. Select 90 Degrees on the Rotation drop down.
4. Click next.
5. One the next two screens click next and then Apply to local PC (Virtual Mode).



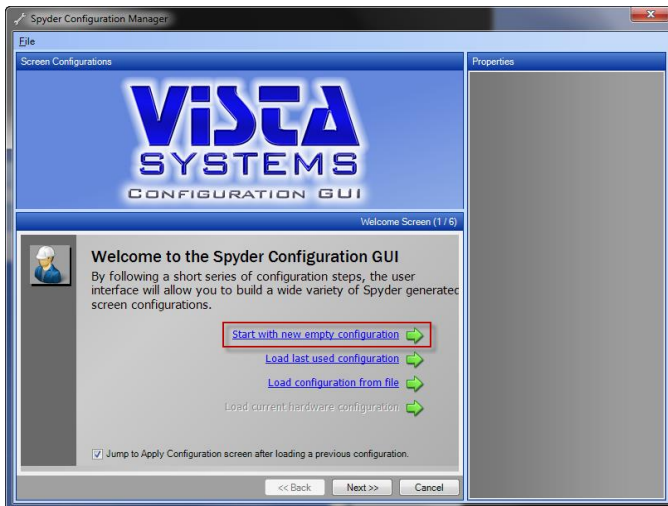
The System Patch graphically displays how the screens are allocated in the V.I.

(8) projectors EdgeBlend and Rotated

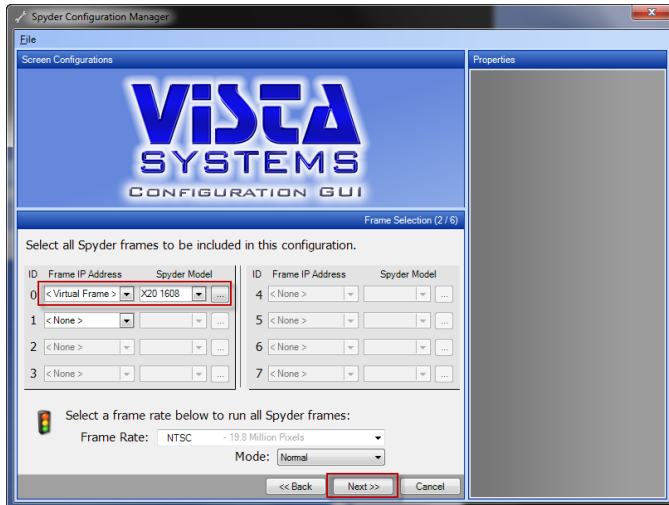


Eight 1920 x 1080 projectors rotated and blended 216 pixels

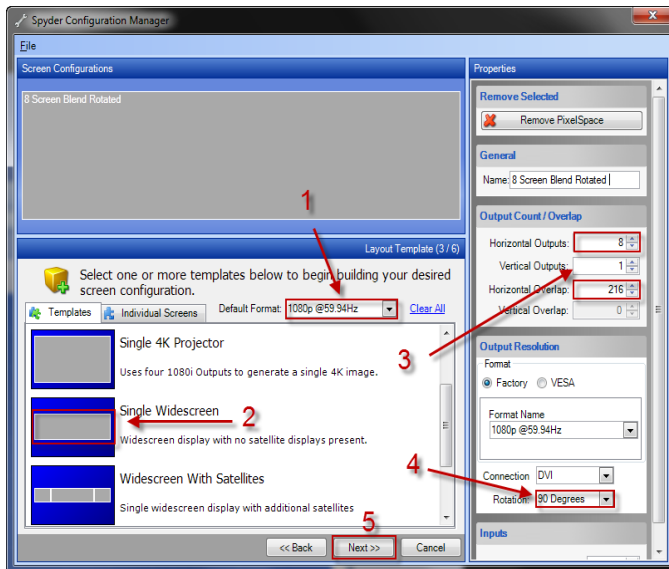
To create this Pixelspace using the Vista Advanced Configuration GUI.



1. Start with a new empty configuration.



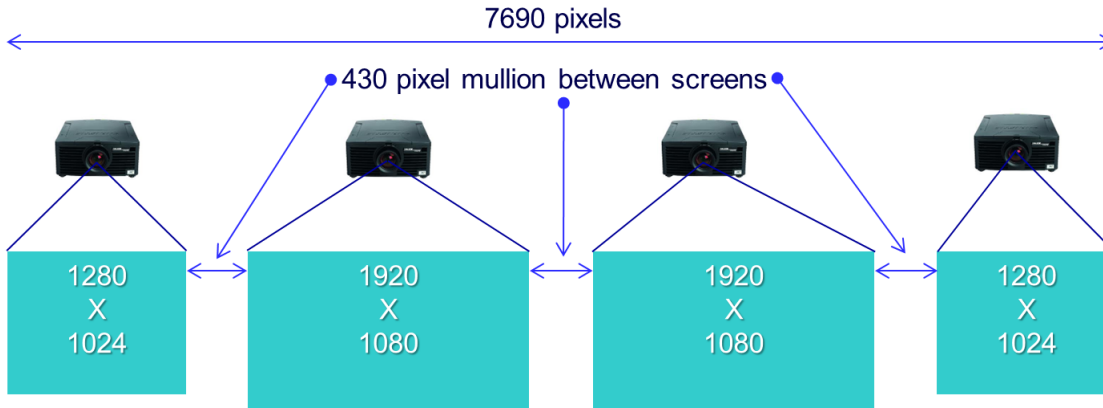
2. Select the type of Spyder you are using.
3. Click next.



4. Select screen output format.
5. Select Single Widescreen
6. Change the Screen output from the default (3) to (8).
 - a. Change the Horizontal Overlap from the default of (256 for edge blending) to (216).
7. Change the rotation setting to 90 Degrees.
8. Click Next.
9. On the next two screens click next and then Apply to local PC (Virtual Mode).

Working with Mullions (Dead Space for Fluid Window Fly's)

Taking an advantage of 20 megapixels here is an example of utilizing single pixel spaces but a mullion is created between pixel spaces to allow 'space' for flying PIPs. The mullions require real pixels which are calculated into the total number of pixels.



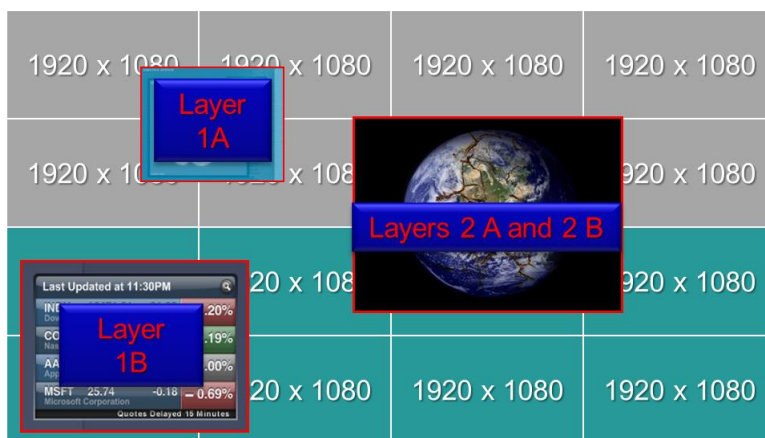
Spyder X20 in Parallel



When there is the need to expand beyond 20 megapixels or eight outputs for a single conclusive system the X20 is capable of running in a mode called 'parallel'. When the X20s are in this mode each X20 has its area of responsibility, called AOR, in which sources that are required to be shared between AORs use an input from each X20. A single user interface is used.

1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080
1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080
1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080
1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080

The top screens are controlled by X20 (1) and are Frame Group 1. The bottom screens are controlled by X20 (2) and are Frame Group 2



This 4 x 4 cube array with a VI of 7680 x 4320 pixels is an example of a Parallel Expansion. The upper grey represents Frame Group A and the lower green Frame Group B. Each frame group supports 8 outputs assigned to the AOR (area of responsibility) of the entire VI. Each Frame Group has inputs (layers) that are contained to that Frame Group. When a source is displayed across both Frame Groups it will need a layer from each as in the example above (Layers 2A and 2B). If a source is NOT across two frame groups as in the other two examples just the layer in that Frame Group is used. An upstream matrix switcher will automatically assign the same source in both the A and B layers and the system will automatically assign the slave layer when required.

Troubleshooting

This section contains information to help troubleshoot your system.

Changing the IP Address on the X20

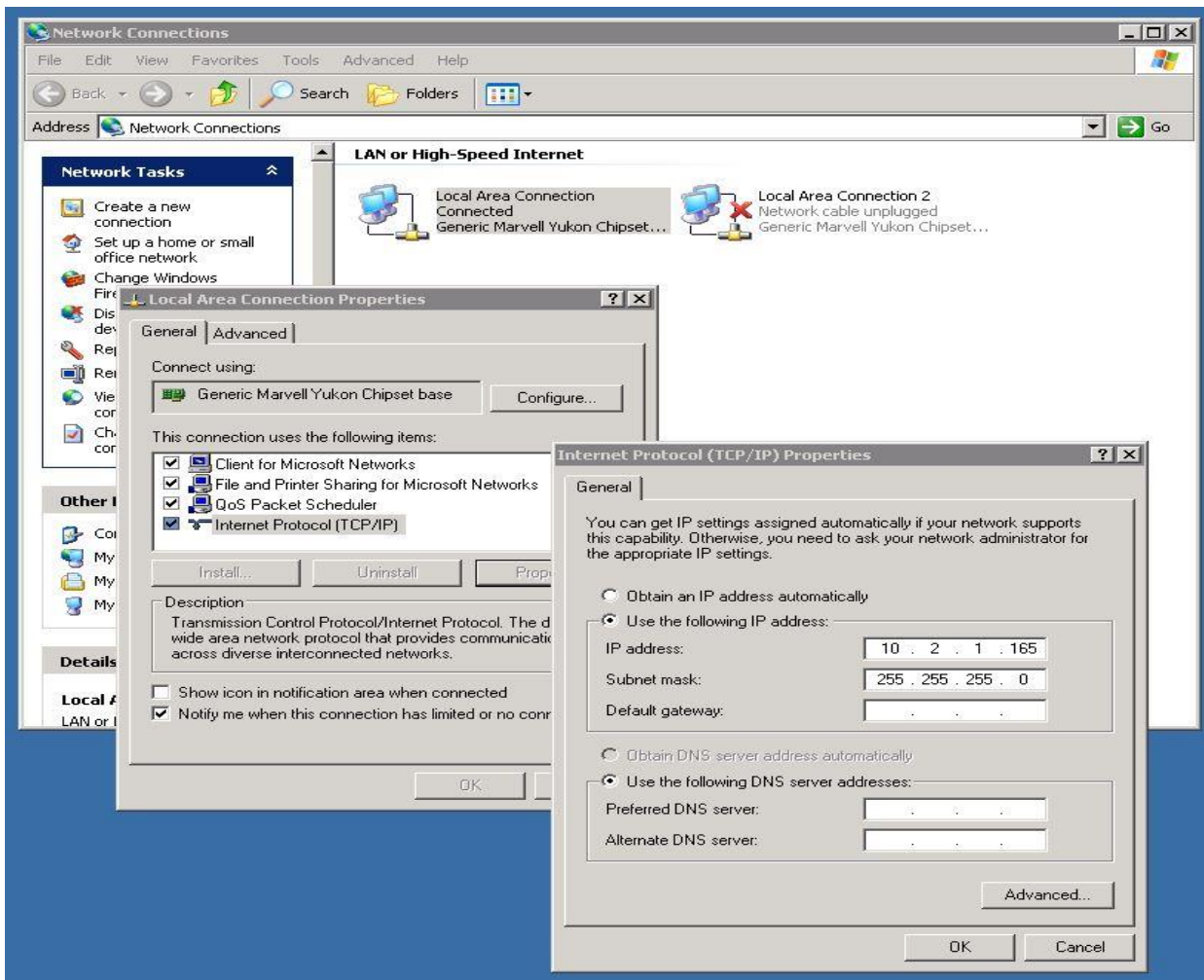
1. Click the Start Button>All Programs>Accessories>Remote Desktop Connection. Depending on your operating system, the Remote Desktop Connection may be further embedded in an Accessories>Communication folder.
2. Enter the existing know IP address of the X20 frame in the Computer: field and click Connect.



3. You should see a generic Windows login screen appear. The login and password for the Spyder frame is Cricket and Cricket.



4. Once logged into the X20 frame, you are now sitting in front of a generic Windows XP installation and will want to navigate to your Network Connections window. This is usually, Start> Settings> Network Connections. You are looking for the active Local Area Connection.
5. Right-click, select Properties, choose Internet Protocol (TCP/IP), and click Properties again.
6. Here, you should be able to change the IP address, verify the Subnet Mask is the same on the X20 frame as it is on your Vista Advanced client machine (typical settings include 255.255.255.0 and 255.255.0.0, for example), and a Default gateway is not necessary. Click OK.
7. You will be disconnected from the Remote Desktop Session since the IP address has now changed. The unit will need to be manually power cycled for the new IP address to be applied.



Using X20 for configurations with a tall VI

More Information

Currently, the maximum VI height when using X20 is 2400 pixels tall. If larger than 2400 pixels tall is necessary, multiple X20 frames can be operated in parallel to achieve the desired height. When a configuration exceeds 1860 pixels, the system will restrict which layers are able to accept stills. This also has an effect on which layers

are able to use the bitmap borders and shapes feature in the X20. In these configurations, layers 3, 6, 11, and 14 are able to use these features.

Affected Versions

All versions

FIX: Application Crashes Related to DirectX

More Information

In versions of Vista Advanced 2009 prior to 3.5.0, the display simulator portion of the user interface was generated using a managed implementation of Microsoft's DirectX platform (MDX). DirectX is commonly found in gaming and data visualization applications, and allows applications to high performance by taking advantage of hardware acceleration found in commodity graphics cards.

The managed DirectX implementation was deprecated by Microsoft in 2009, in favor of newer technologies such as XNA and WPF. While the simulator control continued to work, it was unable to take advantage of newer versions of DirectX technologies. Additionally, a small (but growing) number of customers running on various PC hardware reported compatibility issues that ranged from simulator 'lock-ups' to no simulator display at all.

Resolution

As of version 3.5.0, the display simulator portion of the Vista Advanced interface was rebuilt using the Windows Presentation Foundation (WPF). WPF allows Vista Advanced to continue providing a high performance, hardware accelerated UI while resolving the issues mentioned above and ensuring future compatibility with the latest enhancements with the Microsoft software platform.

All users experiencing problems in software versions prior to 3.4.3 are encouraged to upgrade to the latest version of software (Version 3.5.5 at the time of this writing).

Applies To

Vista Advanced 2005 (All Versions)

Vista Advanced 2009 Version 3.4.3 and lower

LAN Card Priority Setting Network Not found

Often times, a user is connected to a wireless network for internet access as well as a LAN adapter for Spyder communication. In the past, it was recommended or necessary for the wireless network adapter to be disabled due to the fact the wireless adapter IP would take priority over the LAN adapter IP and interfere or inhibit Spyder communication.

The METRIC parameter of each of the adapters on the computer can be manipulated to force an actual priority. To do this, navigate to the Network settings on the client PC and access Properties for the LAN network adapter. Access the TCP/IPv4 properties for LAN network adapter and at the normal screen for entering the IP settings

you will see the Advanced button at the bottom of the window. Clicking that allows you to attach multiple different IP addresses to the same network card. At the bottom of that window is the METRIC setting. By default, Windows will set this to AUTOMATIC. Uncheck AUTOMATIC and enter the value "2" as the metric parameter for the wired LAN adapter on the network that Spyder is on.

Now access TCP/IPv4 settings for the wireless adapter, and set the metric parameter to "3" (windows reserves the metric parameter of "1" for the loopback adapter).

When Vista Advanced starts up, it is "looking" at the adapter with the lowest METRIC.

Connecting to an X20 using remote

Remote desktop is included with the Windows XP and later operating systems. If you are running Windows 2000, the Remote Desktop Client can be downloaded at <http://www.microsoft.com/windowsxp/download...entdl.msp>.

The steps below outline the process of connecting to the Spyder frame using the Remote Desktop Client.

1. Open Remote Desktop (Start -> Programs -> Accessories -> Communications -> Remote Desktop Connection.)
2. For the 'Computer' name in the Remote Desktop Connection dialog box, enter the current IP Address of the Spyder system and then click 'Connect'. The IP Address of the Spyder can be viewed from the LCD display on the front panel of the Spyder frame.
3. A Windows XP logon box will be displayed. Enter the following username and password, and then click 'OK' to log into the Spyder desktop.

Username: Cricket

Password: Cricket

Spyder X20 dual-link support

Overview

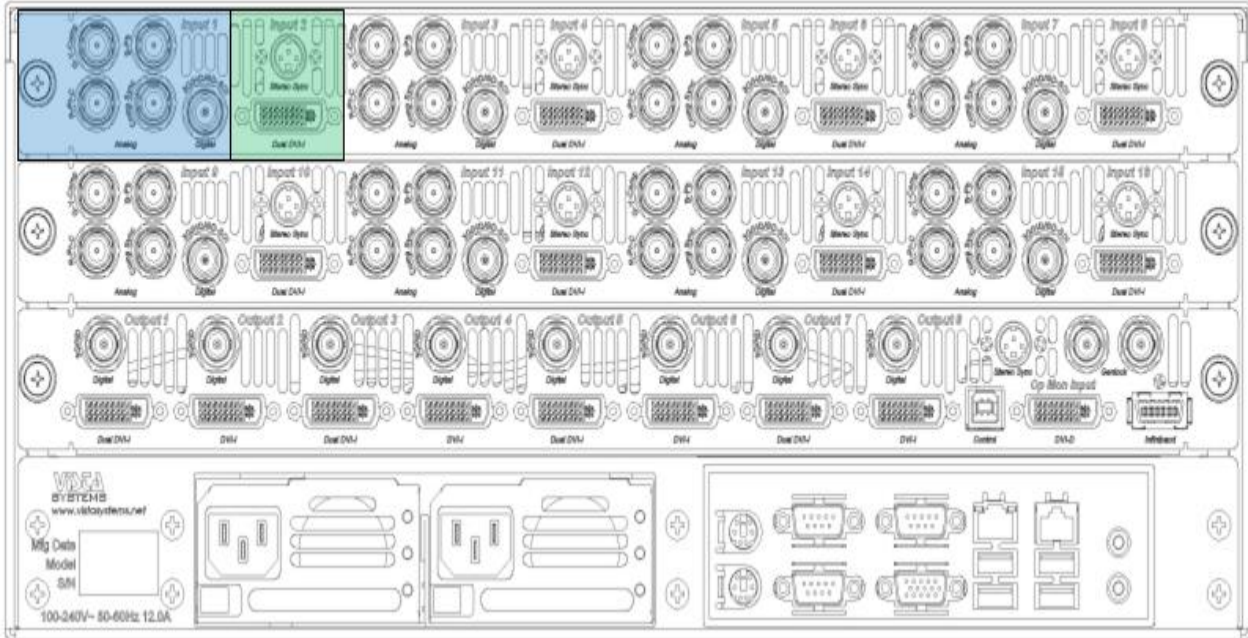
Certain inputs and outputs of the Spyder X20 will support 2560x1600@60Hz or up to 330MHz***. This document discusses the capabilities of the individual inputs and outputs.

Inputs

All of the X20 DVI inputs can support dual link resolutions, however because of the extreme bandwidth requirements, the preceding analog input connector is disabled while the dual-link source is in use.

Example:

When a dual-link source is used on input 2, the system will utilize the resources from Input 1, therefore disabling the connector.



Dual-link and layers

The following layers are able to display a dual link source: 1, 4, 7, 9, 12, and 15. Also, when one of these layers is being used for a dual link source, the next adjacent layer is also used. The X20 0808 is able to support 3 simultaneous dual-link sources (layers 1/2, 4/5, and 7/8). The X20 1608 is able to support 6 simultaneous dual-link sources (layers 1/2, 4/5, 7/8, 9/10, 12/13, and 15/16).



Example:

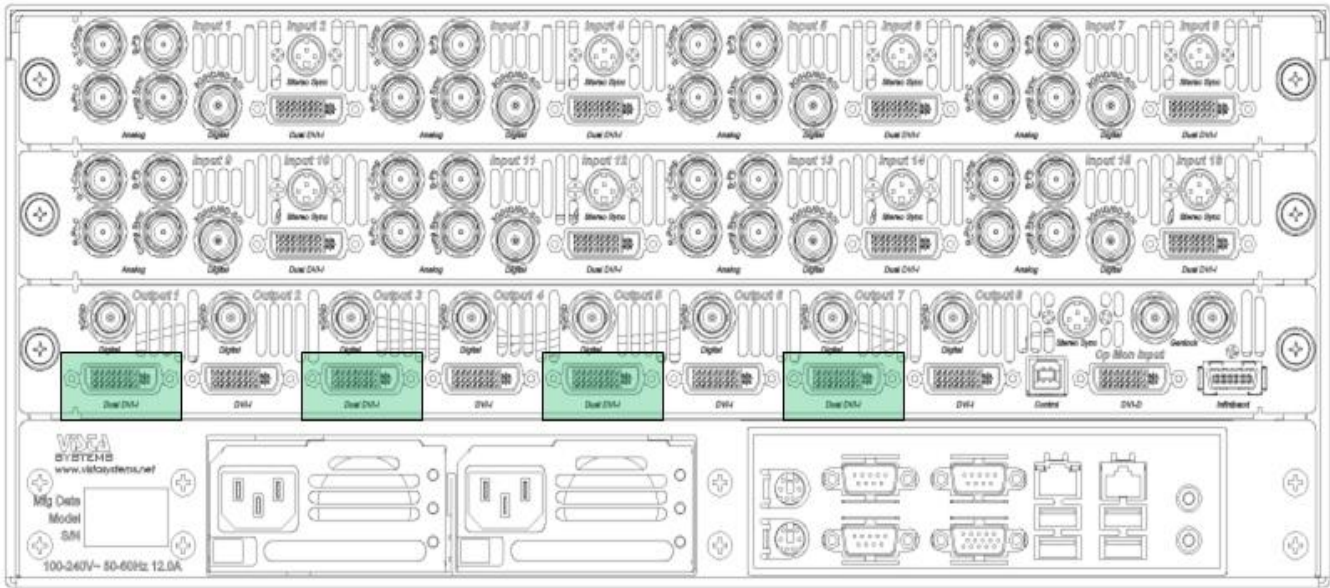
When a dual-link source is being used on layer 1, layer 2 will be used as well. This is shown in the simulator by a 1/2 in the layer label in the upper left corner.

Outputs

The Spyder X20 will support dual-link resolutions on odd numbered outputs.

Example:

Outputs 1, 3, 5, and 7 will support dual-link.



External Control Protocol

The Spyder / Spyder X20 frame uses an ASCII based command system for external control. Connectivity is available via an RJ-45 (Ethernet) connection, or a 9-pin RS-232 serial connection to the frame. Both the Ethernet and Serial interfaces respond to the same string commands, and can do so concurrently.

Serial Connectivity

One of the three RS-232 serial ports available on the back of the Spyder frame can be configured to accept external control commands by using the Vista Basic or Vista Advanced user interface. See the software operation’s manual for more information on configuring Spyder for external control.

Note: When using serial control, each command must be terminated with a carriage return.

RS-232 Serial Pinout	
Pin	Function
2	Receive (RX)
3	Transmit (TX)
5	Ground

Index	Character
0	s
1	p
2	y
3	d
4	e
5	r
6	0x00 (hex)
7	0x00 (hex)
8	0x00 (hex)
9	0x00 (hex)

Ethernet Connectivity

The Spyder frame can be controlled remotely by sending the ASCII commands listed below within a UDP packet sent to port 11116 on the frame; no configuration is required. Each message sent to Spyder over UDP must be precluded by a 10 byte message header. This header is shown to the left of this paragraph.

Note: Do not put an argument delimiter (space character) between the header and the external control command.

Note: Commands and arguments are delineated by a single space character.

Command Overview Table

The command table below is valid when using either an Ethernet or a serial connection to the Spyder or Spyder X20 system.

Command	Description	Command	Description
BPL	Learn Basic Preset	FKR	Function Key Recall
BPR	Recall Basic Preset	ARO	Aspect Ratio Offset
ICR	Input Config Recall	ILA	Input Level Adjust
ICL	Input Config Learn	ILK	Input Luminance Key

Command	Description	Command	Description
SDN	Restart Spyder Server	ICK	Input Color Key
SAV	Force Server Save	LAP	Layer Assign PixelSpace
RSC	Recall Script Cue	FRZ	Freeze Layer(s)
TRN	Transition Layer(s)	RSN	Request Source Names
KSZ	Layer Size Adjust	RLC	Request Layer Count
KTL	Learn Treatment	RAR	Request Aspect Ratio
KTR	Recall Treatment	SCR	Script Cue Request
SLD	Still Load on Layer(s)	RRC	Request Register Count
SCL	Still Clear on Layer(s)	RRL	Request Register List
BTR	Background Transition	ARL	Apply Register to Layer(s)
BLD	Background Load Image	RBL	Request Basic Preset List
KBD	Border Adjust	KSH	Shadow Adjust
CSO	Clear Still on Output	CRP	Crop Adjust
LSO	Load Still on Output	SRA	Source Apply to Layer(s)
RPS	Request I/O Processor Status	RPD	Request PixelSpace Definitions
LCK	Learn Command Key	LAC	Layer Alignment Control
ZPA	Zoom / Pan Adjust	RLK	Request Layer KeyFrame
RLS	Request Layer Source	LCC	Layer Clone Control
RCS	Request Connection Status	DCK	Delete Command Key
IRA	Input Config Raster	QRC	Query Router Crosspoint(s)
LSP	Layer Size and Position	OFZ	Output Freeze
OCM	Output Configuration Mode	OCF	Output Configuration Format
OCR	Output Configuration Rotation	OCS	Output Configuration Save
OCB	Output Configuration Blending	DMB	Device Mixer Bus Apply
DMT	Device Mixer Transition		

Note: Some commands listed display their last argument as ‘Argument x ~ XX:’. These commands allow the last argument field to be repeated, allowing multiples of the last argument to be specified with a single command.

Note: Some commands listed display argument(s) with an asterisk. These options are optional; however no further arguments may be entered in the command.

Note: When specifying layer IDs in Spyder commands, note that the IDs start at 2. Layer ID 0 and 1 are reserved for future commands using the two background layers of the system.

Note: String argument spaces must be replaced with the three character ASCII string %20 to create a valid command, as space is used as the argument delimiter.

Command Processor Responses

A response is returned for every command sent to the Spyder system. If multiple values are returned in a single response, the argument delimiter is an ASCII space character, and argument values containing a space will be converted to the 3 character ASCII string "%20". The first response argument is always the error code for the command, which lets the user know if a command was successfully processed. The table below displays the various responses which can be returned by the Spyder.

Response	Response Name	Description
0	Success	Command was successfully processed
1	Empty	Data requested is not available
2	Header	Invalid command specified
3	Argument Count	Missing required minimum number of arguments
4	Argument Value	One or more arguments were invalid
5	Execution	An error occurred while processing the command. Check alert log in Spyder Basic / Advanced software for details.
6	Checksum	* Reserved *

Supported Command Descriptions

Basic Preset Learn

Stores the current screen layout to a specified preset ID.

Command: BPL

Argument 1: Preset ID to save current window position and keyframe information to.

Argument 2: Duration. This argument is optional. If not specified, duration will default to 60.

Basic Preset Recall

This command recalls an existing basic preset from the frame, by using its corresponding ID.

Command: BPR

Argument 1: Preset ID to recall from server.

Argument 2: Duration. This argument is optional. If not specified, duration will default to 60.

Input Configuration Recall

This command loads a previously saved input configuration onto the video source of a specified layer ID.

Command: ICR

Argument 1: Configuration ID. This is the ID number to store the layer ID's current input configuration to. Set the Configuration ID to -1 to force auto sync.

Argument 2: The layer ID to apply the specified input configuration to.

Argument 3*: If -1 is set for argument 1, this value will set the connector type to be switched to and auto synced on a layer.
0=HD15, 1=DVI, 2=SDI, 3=Composite, 4=S-Video

Input Config Learn

This command saves the input configuration for a specified layer ID, to a specified input configuration ID for later recall.
Command: ICL

Argument 1: Input configuration ID to save to.

Argument 2: Layer ID to save configuration information from.

Restart Spyder Server

This command allows the user to remotely restart the server application remotely.

Command: SDN

Argument 1: 0 = Power Off, 1 = Restart

Force Server Save

This command forces the remote Spyder frame to flush all configuration and user data changes to non-volatile storage.

Command: SAV

Recall Script Cue

This command recalls an existing script at a specified cue. Use 'Vista Advanced' software interface to build scripts.

Argument 3 optionally defines the ID type being recalled in argument 1, and defaults to 'ScriptID' if not specified. See "Understanding Registers" in this manual for information on registers.

Note: To access registers on pages above the first page, add (<Page number> * 1000) to the register ID to be recalled. For example, to recall a script at register ID 2 on page 3, send a register ID of 3002.

Command: RSC

Argument 1: ID to recall

Argument 2: Script Cue to recall

Argument 3*: ID Type in Argument 1 (S=ScriptID, R=RegisterID)

Transition Layer(s)

This command transitions layers on and off of their currently assigned PixelSpace.

Command: TRN

Argument 1: 0 = Mix Off - 1 = Mix On

Argument 2: Transition Duration (in frames)

Argument 3 ~ XX: Layer ID to transition

Layer Size Change

This command sets the horizontal size of one or more specified layers. Vertical size adjusts automatically to ensure the layer's aspect ratio.

Command: KSZ

Argument 1: Horizontal Size (in pixels)

Argument 2 ~ XX: Layer ID to set size

Layer Position Change

This command sets the horizontal and vertical position of one or more specified layers. Positions are mapped in pixels, relative to the top left PixelSpace corner associated with the layer. Position changes can be relative to the layer's current position, or can be an absolute position setting.

Command: KPS

Argument 1: 0 = Absolute Position / 1 = Relative Position

Argument 2: Horizontal Position

Argument 3: Vertical Position

Argument 4 ~ XX: Layer ID to set position

Layer Size and Position Change

This command sets the horizontal and vertical position of one or more layers, as well as their size. In cases where size and position are being modified simultaneously for an application, this command is recommended over using the individual layer size and position commands. Position and size changes can be relative to the layer’s current position, or can be an absolute position setting.

Command: LSP

Argument 1: 0 = Absolute Position / 1 = Relative Position

Argument 2: Horizontal Position (Pixels)

Argument 3: Vertical Position (Pixels)

Argument 4: Horizontal Layer Size (Pixels)

Argument 5 ~ XX: Layer ID(s) to set

Treatment Learn

This command learns keyframe attributes from a specified layer.

Command: KTL

Argument 1: Treatment ID to learn (-1 for next available)

Argument 2: Layer ID to learn from

Argument 3*: Learn Position

Argument 4*: Learn Crop

Argument 5*: Learn Clone

Argument 6*: Learn Border

Argument 7*: Learn Shadow

Treatment Recall

This command recalls a treatment to one or more specified layers.

Command: KTR

Argument 1: Treatment ID to recall

Argument 2 ~ XX: Layer ID to recall treatment to

Load Still on Layer

This command loads a specified file onto one or more specified layers.

Command: SLD

Argument 1: File name to load

Argument 2 ~ XX: Layer ID to load still image on

Clear Still on Layer

This command clears any loaded still image from one or more specified layers.

Command: SCL

Argument 1 ~ XX: Layer ID to clear still image from

Load Still on Background

This command loads a specified file onto either the current or next background layer. The image name specified will automatically be scaled to fit the PixelSpace if the image is not the same size as the PixelSpace it is being loaded on.

Command: BLD

Argument 1: File name to load

Argument 2: PixelSpace ID to load to

Argument 3: 0 = Load Next / 1 = Load Current

Transition Background

This command transitions the background layers across all PixelSpaces defined in the system. Note that it is not possible to transition individual PixelSpace backgrounds.

Command: BTR

Argument 1*: Transition duration (in frames)

Border Adjust

This command forces adjusts one or more specified border properties on a specified layer. Note that the color specific arguments are optional, but all 3 (RGB) must be specified to be processed.

Command: KBD

Argument 1: Layer ID to adjust

Argument 2: Border Thickness (-255 – 255, negative for outside softness)

Argument 3*: Color Red (0-255)

Argument 4*: Color Green (0-255)

Argument 5*: Color Blue (0-255)

Argument 6*: H-Bevel offset (0-255)

Argument 7*: V-Bevel offset (0-255)

Argument 8*: Inside Softness (0-255)

Shadow Adjust

This command adjusts the shadow parameters for a specified layer

Command: KSH

Argument 1: Layer ID to adjust

Argument 2*: Horizontal Position (0-255)

Argument 3*: Vertical Position (0-255)

Argument 4*: Size (0-255)

Argument 5*: Transparency (0-255)

Argument 6*: Outside Softness (0-255)

Crop Layer

This command sets left, right, top, and bottom cropping for one or more specified layers.

Command: CRP

Argument 1: Left Crop (0.0 – 1.0)

Argument 2: Right Crop (0.0 – 1.0)

Argument 3: Top Crop (0.0 – 1.0)

Argument 4: Bottom Crop (0.0 – 1.0)

Argument 5 ~ XX: Layer ID to Apply Crop to

Source Apply

This command applies an existing source to one or more specified layers. A source is defined as an input configuration and a router input. Use Vista Advanced to create sources and define connected routers.

Command: SRA

Argument 1: Source Name

Argument 2 ~ XX: Layer ID(s) to apply source to.

Router Crosspoint Recall

This command is used to switch crosspoints on a router connected to the Spyder frame. Note that argument 2 is optional; if it is not specified, the logical patch is switched. A 'logical' output refers to the router patch configured from the Spyder software interfaces, which is stored as part of a router configuration. Also note that arguments 3 (output) and 4 (input) can be repeated as many times as a user likes to stack a series of switches into a single command. If the router and the Spyder control protocol for the router support 'stack and trigger' switching, Spyder will use this functionality automatically when sending a command with multiple switch assignments.

Command: RCR

Argument 1: Router ID to switch.

Argument 2: (L = Switch Logical Output, P = Switch Physical Outputs)

Argument 3: Output to switch (Zero based).

Argument 4: Input to switch to (Zero based).

Function Key Recall

This command will recall a single function key defined in Spyder. Optionally, layer arguments can be listed in this command for relative function keys. Argument 3 optionally defines the ID type being recalled in argument 1, and defaults to 'Function Key ID' if not specified. See "Understanding Registers" in this manual for information on registers.

Note: To access registers on pages above the first page, add (<Page number> * 1000) to the register ID to be recalled. For example, to recall a function key at register ID 2 on page 3, send a register ID of 3002.

Command: FKR

Argument 1: Function Key ID to recall.

Argument 2* ~ XX: Layer ID(s) to be included in relative function key.

Argument 3*: ID Type in Argument 1 (F=Function Key ID, R=RegisterID)

Request PixelSpace Definitions

This command returns a list of all PixelSpaces currently defined in the Spyder system.

Syntax: RPD

Response: <Result Code> <Count> [<ID> <Name> <Current Background> <Next Background> <X Position> <Y Position> <Width> <Height> <RenewalGroup ID>]...

Command: RPD

Aspect Ratio Offset

This command is used to adjust the aspect ratio offset KeyFrame parameter of one or more layers. This aspect ratio command can be used to set the total aspect ratio for a layer, or can adjust KeyFrame aspect ratio offset directly.

Command: ARO

Argument 1: A/R Type (t = set total A/R, o = set KeyFrame A/R offset, a = adjust existing KeyFrame A/R offset).

Argument 2: Floating point aspect ratio value (Ex: 0.17).

Argument 3 ~ XX: Layer ID(s) to apply aspect ratio offset to.

Input Level Adjust

This command allows for adjustment of brightness, hue, contrast, and saturation on any layer in the system.

Command: ILA

Argument 1: Brightness (0.0 – 2.0)

Argument 2: Contrast (0.0 – 2.5)

Argument 3: Hue (-180 – 180)

Argument 4: Saturation (0.0 – 2.0)

Argument 5 ~ XX: Layer(s) to apply settings to.

Input Luminance Key

This command allows for enabling, disabling, and adjustment of the luminance key for one or more Spyder layers. If disabling key with this command, all key specific arguments will not be used, and should be set to zero. Note that this command is mutually exclusive with the 'Input Color Key' command (below). If this command is used, color key will automatically be disabled.

Command: ILK

Argument 1: Key enabled (0 = Off, 1 = On)

Argument 2: Clip (0 – 512)

Argument 3: Gain (0 – 512)

Argument 4 ~ XX: Layer(s) to apply settings to.

Input Color Key

This command allows for enabling, disabling, and adjustment of the color key for one or more Spyder layers. If disabling key with this command, all key specific arguments will not be used, and should be set to zero. Note that this command is mutually exclusive with the 'Input Luminance Key' command (above). If this command is used, luminance key will automatically be disabled.

Command: ICK

Argument 1: Key enabled (0 = Off, 1 = On)

Argument 2: Color Red (0 – 255)

Argument 3: Color Green (0 – 255)

Argument 4: Color Blue (0 – 255)

Argument 5: Range Red (0 – 255)

Argument 6: Range Green (0 – 255)

Argument 7: Range Blue (0 – 255)

Argument 8: Color Gain (0 – 512)

Argument 9 ~ XX: Layer(s) to apply settings to.

Layer Assign PixelSpace

This command associates a layer with a particular PixelSpace. The layer can optionally be made visible at the time this command is applied, allowing additional commands to be sent to configure the layer before it is transitioned on screen with the TRN command.

Command: LAP

Argument 1: PixelSpace ID to associate layer with

Argument 2: Make Visible (0 = Don't make visible, 1 = Make Visible)

Argument 3 ~ XX: Layer(s) to apply PixelSpace settings to.

Freeze Layer(s)

This command is used to freeze or un-freeze one or more layers within Spyder.

Command: FRZ

Argument 1: (1 = Enable Freeze, 0 = Disable Freeze)

Argument 2~XX: Layer(s) to freeze / un-freeze

Freeze Output(s)

This command is used to freeze or un-freeze one or more outputs within Spyder. Note that this command is compatible with universal outputs only. DX4 outputs do not support individual freeze / unfreeze functionality.

Command: OFZ

Argument 1: (1 = Enable Freeze, 0 = Disable Freeze)

Argument 2~XX: Outputs(s) to freeze / un-freeze

Request Source Name(s)

Retrieves a list of sources defined within Spyder. This command returns a list of source names separated by spaces.

Command: RSN

Request Layer Count

This command retrieves the logical layer count within the connected Spyder system. As this logical layer count includes the two background layers within Spyder; applications will typically want to subtract two from the response.

Command: RLC

Request Aspect Ratio

This command is used to request the aspect ratio of a defined source.

Command: RAR

Argument 1: Source name or layer ID

Script Cue Request

This command will request the current execution cue of a specified script ID. Returns a single integer value representing the current cue of the specified script, or -1 if the specified script is not being executed on any layer.

Command: SCR

Argument 1: ID to request status for

Argument 2*: ID Type in Argument 1 (S=ScriptID, R=RegisterID)

Request Register Count

This command returns the number of registers for a specified data type, optionally in a specific page.

Syntax: RRC <RegisterType> [<Page>]

Response: <Result Code> <Register Count>

Command: RRC

Argument 1: Register type (See 'Register Types' section in this manual)

Argument 2*: Page number to return (zero based index), or -1 for all pages.

Request Register List

This command returns a list of registers and their associated IDs for a specified data type, optionally in a specific page. Because the register lists can be particularly long, additional arguments are available to request portions of the list at a time.

Syntax: RRL <RegisterType> [<Page>] [<StartIndex>] [<MaxCount>] [<chars>]

Response: <Result Code> <Return Count> [<Register1 ID> <Register1 Name>]...

Command: RRL

Argument 1: Register type (See 'Register Types' section in this manual)

Argument 2*: Page number to return (zero based index), or -1 for all pages.

Argument 3*: Start index to begin returning

Argument 4*: Maximum number of registers to return

Argument 5*: Number of characters to truncate register names to.

Apply Register to Layer

This command applies a specified register to one or more layers. This is useful for recalling register data types such as sources or treatments to layers.

Command: ARL

Argument 1: Register type (See 'Register Types' section in this manual)

Argument 2: Register ID to recall

Argument 3~XX: Layer IDs to recall specified register to

Request Basic Preset List

This command returns a list of basic preset names and their associated IDs. Because the basic preset lists can be particularly long, additional arguments are available to request portions of the list at a time.

Syntax: RBL [<StartIndex>] [<MaxCount>] [<chars>]

Response: <Result Code> <Return Count> [<Preset1 ID> <Preset1 Name>]...

Command: RBL

Argument 1*: Start index to begin returning

Argument 2*: Maximum number of registers to return

Argument 3*: Number of characters to truncate names to.

Clear Still on Output

This command will clear an image currently loaded on a specified output ID. Note that the ChannelID argument is only necessary on the quad-output DX4 output modules. If no channel ID is specified for a DX4 output ID, all channels will be cleared.

Command: CSO

Argument 1: Output ID to clear image on

Argument 2*: Channel ID on output module to clear (0-3).

Load Still on Output

This command will load an unscaled still image directly onto a Spyder output, for the purpose of loading custom test patterns. The file name specified must exist in the 'Stills' directory on the Spyder server, which can be accessed using FTP

or the Spyder client software. Note that the channel ID argument is only necessary on the quad-output DX4 output modules, in which case the channel ID argument is required.

Command: LSO

Argument 1: File Name of image to load

Argument 2: Output ID to load image on

Argument 3*: Channel ID on DX4 output module to load to (0-3).

Request I/O Processor Status

Asynchronous operations, such as still loading, are processed serially (one at a time) as background tasks in Spyder. You can query the current state of the I/O processor for use in external state logic such as needing to wait for image load commands to complete. The status returned includes a numeric value from 0-100 giving the percent progress, as well as an ASCII string with a generic description of the task being processed. When idle, this request will return 0 for progress and nothing for the status message.

Syntax: RPS [<chars>]

Response: <Result Code> <Progress> <Status Message>

Command: RPS

Argument 1*: Number of characters to truncate names to.

Learn Command Key

A command key can be learned, or recorded, from the current layer status on screen. This function will perform the same operation as learning a new command key from one of the Vista software interfaces.

Syntax: LCK <Absolute/Relative> <Name> <Register ID> <Learn From><Learn Mixers>

Response: <Result Code> <CommandKey ID> <Script ID>

Command: LCK

Argument 1: Learn as (0 = Absolute / 1 = Relative)

Argument 2: Command key name

Argument 3: Register ID to learn command key to

Argument 4: Learn from (1 = Preview Only / 2 = Program Only / 3 = Both)

Argument 5: Learn as Mixers (0 = False / 1 = True)

Zoom / Pan Adjust

The ZPA command can be used to change the zoom and/or the pan KeyFrame controls on a specified layer. Adjustments can be relative to the layer's existing pan / zoom settings or can be set to specific values directly.

Syntax: ZPA <Recall Mode> <Zoom> <Horz Pan> <Vert Pan> <Layer ID>

Command: ZPA

Argument 1: Recall Mode (0 = Absolute values / 1 = Relative adjustment)

Argument 2: Zoom Value (Effective Range = 0.0 to 20.0)

Argument 3: Horizontal Pan Value (Effective Range = -2048 to 2048)

Argument 4: Vertical Pan Value (Effective Range = -2048 to 2048)

Argument 5: Layer ID

Layer Clone Control

The LCC command can be used to adjust the clone property on the KeyFrame of a specified layer. Clone modes can be switched between Off, Mirror, or Offset, and an optional parameter can be specified to set the offset distance (in relative coordinates) for the clone position. If an Offset clone mode is specified with no offset value, the clone offset value stored in the layer's current KeyFrame will be used.

Command: LCC

Argument 1: Layer ID

Argument 2: Clone Mode (0 = Off / 1 = Offset / 2 = Mirror)

Argument 3*: Clone offset (relative coordinate number)

Request Layer KeyFrame

The RLK command retrieves the KeyFrame values for a specified layer ID. Note that additional values may be appended to this command's response in future versions of the Spyder firmware, and the requesting device software should be written to handle additional appended values.

Syntax: RLK <Layer ID>

Response: <Result Code> <Relative HPosition> <Relative VPosition> <X Position> <Y Position> <Width> <Height> <Border Thickness> <Border Red> <Border Green> <Border Blue> <Border HBezel Offset> <Border VBezel Offset> <Border Inside Softness> <Border Outside Softness> <OutSide Edges**> <Shadow HOffset> <Shadow VOffset> <Shadow HSize> <Shadow Softness> <Shadow Transparency> <Clone Mode***> <Clone Offset> <Left Crop> <Right Crop> <Top Crop> <Bottom Crop> <Crop Anchor****> <AR Offset> <Zoom> <HPan> <VPan> <PixelSpace ID> <Transparency>

Command: RLK

Argument 1: Layer ID

** Outside Edges are provided as a hexadecimal value, with the lower 4 bits indicating specific edges enabled as shown below:

- 0x01: Top enabled
- 0x02: Bottom enabled
- 0x04: Left enabled
- 0x08: Right enabled

*** Clone Mode: 0=Off, 1=Offset, 2=Mirror

**** Crop Anchor: 0 =Input Center, 1=Window Center

Request Layer Source

The RLS command retrieves the current source name and associated source register ID loaded on a specified layer. If no source is currently assigned to the specified layer, the 'Empty' result code will be returned with no further parameters. If a source is assigned to the specified layer, but no corresponding register can be found, a -1 will be returned for the register ID.

Syntax: RLS <Layer ID>

Response: <Result Code> <Source Name> <Source Register ID>

Command: RLS

Argument 1: LayerID

Layer Alignment Control

The layer alignment control allows one or more layer KeyFrames to be manipulated by the Spyder server to achieve a specified alignment effect. The alignment effects are the same as the ones available from the simulator control of the Vista control suite software clients.

Command: LAC

Argument 1: Alignment effect ID. See 'Layer Alignment Effects' table below

Argument 2: Alignment recall duration (specified in frames)

Argument 3~XX: Layer ID(s)

Delete Command Key

This command can be used to delete an existing command key by either a specified register ID, or by a script ID. Note that argument two is optional, if not supplied is defaulted to 'Script ID'.

Command: DCK

Argument 1: ID to Delete

Argument 2*: ID Type in Argument 1 (S=ScriptID, R=RegisterID)

Request Connection Status

This command allows for the current connected or disconnected status of a specified input to be queried. When called, the system will poll the current connector type of the specified input in an attempt to determine if a video source is connected. Calling applications should be careful not to call this command too frequently (more than once per second), or degraded system performance may occur as a result.

Syntax: RCS <Layer ID>

Response: <Result Code> <Layer ID> <Current Connector Type> <Connection Status>

- Connection Status (0=Disconnected, 1=Connected, 2=Unknown)
- Current Connector Type (0=HD15, 1=DVI, 2=SDI, 3=Composite, 4=SVideo)

Command: RCS

Argument 1: Layer ID to check connection status on

Input Config Raster

Input video rastering commands, which allow the video shown inside of a window to be re-positioned on a per-edge basis, can be made with this command. This command can additionally be used to perform an ‘auto raster’ (analog only), in which a specified layer inspects the video content currently in the layer and re-positions the input video automatically.

Syntax: IRA <Layer ID> <Edge> <Delta>

Response: <Result Code>

Command: IRA

Argument 1: Layer ID to adjust

Argument 2: Edge to adjust (L=Left, R=Right, T=Top, B=Bottom, A=AutoRaster)

Argument 3*: Number of pixels to move

1. Negative numbers move video edge inwards
2. Positive numbers move video edge outwards

Query Router Crosspoint(s)

This command allows one or all router outputs to be queried for their currently connected input. In the case of level controlled routers, the input returned will be the input connected to the output on the level configured to be controlled by Spyder. If no specific output is supplied, the inputs for all outputs will be returned. Outputs / inputs returned are zero indexed, so for example output 1 on the router will be returned as a zero (0). An output with no input connected (disconnected) will return a -1 for the input.

Syntax: QRC <Router ID> [<Output ID>]

Response: <Result Code> <Router ID> <Output>:<Input> [<Output>:<Input>]

Command: QRC

Argument 1: Router ID to query

Argument 2*: Router output to query status for

Output Configuration Format

This command sets the video format being output by a specified output. Currently this command supports configuring VESA output formats only. Additionally, Spyder outputs support specific output refresh rates, and in cases where an unsupported refresh rate is specified, the closest available refresh value will be used.

Syntax: OCF <Output ID> <HActive> <VActive> <FrameRate> <Interlaced> [<Reduced Blanking>]

Response: <Result Code>

Command: OCF

Argument 1: Output ID to set (zero based)

Argument 2: Horizontal Active resolution

Argument 3: Vertical Active Resolution

Argument 4: Refresh Rate (Supports floating point precision (Ex: 59.94))

Argument 5: Interlaced format (0 = Non-Interlaced, 1 = Interlaced)

Argument 6*: Reduced blanking timing (0 = Standard Timing, 1 = Reduced Blanking Timing)

Output Configuration Mode

This command sets the output mode for a specified output. The argument list for this command varies depending on the mode being applied. Supported modes include Normal, OpMon, and Scaled.

Syntax (Normal Mode): OCM <Output ID> Normal [<HStart>] [<VStart>] [<DX4 Channel>]
 Response: <Result Code>

Command: OCM
 Argument 1: Output ID to set (zero based)
 Argument 2: Mode (Set to the ASCII string 'Normal')
 Argument 3*: Horizontal start position for output on the VI
 Argument 4*: Vertical start position for output on the VI
 Argument 5*: DX4 Output Channel (0-3) (Note: Applies only to DX4 output cards)

Syntax (OpMon Mode): OCM <Output ID> OpMon <PixelSpace ID>
 Response: <Result Code>

Command: OCM
 Argument 1: Output ID to set (zero based)
 Argument 2: Mode (Set to the ASCII string 'OpMon')
 Argument 3: Program PixelSpace to focus OpMon on. If a preview ID is supplied, its associated program PixelSpace will be applied.

Syntax (Scaled Mode): OCM <Output ID> Scaled <PixelSpace ID>
 Response: <Result Code>

Command: OCM
 Argument 1: Output ID to set (zero based)
 Argument 2: Mode (Set to the ASCII string 'Scaled')
 Argument 3: Program PixelSpace to focus Scaled output on. If a preview ID is supplied, its associated program PixelSpace will be applied.

Output Configuration Rotation

This command sets the rotation parameter of a specified output. Note that rotation is not supported on all output module types (contact Christie support for additional information). Also note that rotation is available in 90 degree increments only.

Syntax: OCR <Output ID> <Rotation Angle>
 Response: <Result Code>

Command: OCR
 Argument 1: Output ID to set (zero based)
 Argument 2: Rotation Angle (Valid values are 0, 90, 180, 270)

Output Configuration Blending

This command enables or disables the blending on a Spyder output, and additionally allows the blend curve size, type, and curve parameters to be adjusted.

Syntax: OCB <Output ID> <Edge> <Enable> <Blend Width> <Mode> <Curve1> <Curve2>
 Response: <Result Code>

Command: OCB
 Argument 1: Output ID to configure (zero based)

Argument 2: Edge (L = Left, R = Right)
 Argument 3: Enable (0 = Disable, 1 = Enable)
 Argument 4*: Width of blend size (in pixels)
 Argument 5*: Blend Mode (Valid Values are Bezier, Gamma, Velocity)
 Argument 6*: Curve Parameter 1 (Range 0.000 – 1.000)
 Argument 7*: Curve Parameter 2 (Range 0.000 – 1.000)

Output Configuration Save

This command forces the active configuration for an output to be saved to persistent storage on the Spyder server. This command must be called after making output configuration adjustments to prevent changes from being lost when the system is restarted.

Syntax: OCS <Output ID>
 Response: <Result Code>
 Command: OCS
 Argument 1: Output ID to save (zero based)

Device Mixer Bus Apply

Intended for devices configured as Mixers, this command allows the active bus to be selected for one or more control devices defined in the system. The available bus selections are described below:

OFF: Both layers for a device are off screen
PVW: The program layer of the device is in preview, and the preview layer is off screen
PGM: Both the program and preview layers are visible in their respective PixelSpaces

Syntax: DMB <Duration> <Bus> <Device Index 1> [<Device Index 2>...]
 Response: <Result Code>
 Command: DMB
 Argument 1: Transition duration to be applied to layers coming on or off of program (in frames)
 Argument 2: Bus state to apply to device (OFF, PVW, or PGM). See description above.
 Argument 3-XX: Target Device index(es) (zero based)

Device Mixer Transition

Intended for devices configured as Mixers, this command allows a mixer AutoTrans to be initiated on one or more devices. Note that the duration can be set to 1 to effectively force a 'cut' transition.

Syntax: DMT <Duration> <DeviceID> [<DeviceID>...]
 Response: <Result Code>
 Command: DMT
 Argument 1: Transition duration to be applied (in frames)
 Argument 2-XX: Target Device index(es) (zero based)

Layer Alignment Effects

Recall ID	Effect Name	Minimum Layers	Description
0	Align Bottom	2	Repositions specified layers vertically to make bottom edge of layers match the first specified layer.
1	Align Center	2	Repositions specified layers horizontally to make center position of all layers match the first specified layer.
2	Align Left	2	Repositions specified layers horizontally to make left edge of all layers match the first specified layer.
3	Align Middle	2	Repositions specified layers vertically to make center position of all layers match the first specified layer.
4	Align Right	2	Repositions all specified layers horizontally to make right edge of all layers match the first specified layer.
5	Align Top	2	Repositions specified layers vertically to make top edge of layers match the first specified layer.
6	Center Horizontal	1	Repositions all specified layer(s) as a group so that layers are centered horizontally in their current PixelSpace.
7	Center Vertical	1	Repositions all specified layer(s) as a group so that layers are centered vertically in their current PixelSpace.
8	Horizontal Decrement	2	Decreases the horizontal spacing between two or more layers.
9	Horizontal Increment	2	Increases the horizontal spacing between two or more layers.
10	Make Horizontal Equal	3	Makes the horizontal spacing between all specified layers equal to the spacing between the first and second specified layers
11	Make Same Height	2	Makes all specified layers the same height as the first specified layer, maintaining aspect ratio in all layers.
12	Make Same Width	2	Makes all specified layers the same height as the first specified layer, maintaining aspect ratio in all layers.
13	Make Vertically Equal	3	Makes the vertical spacing between all specified layers equal to the spacing between the first and second specified layers.
14	Remove Horizontal Spacing	2	Removes spacing between specified layers, causing them to be horizontally stacked in the order specified.

Recall ID	Effect Name	Minimum Layers	Description
15	Remove Vertical Spacing	2	Removes spacing between specified layers, causing them to be vertically stacked in the order specified.
16	Size to Display Height	1	Resizes specified layer(s) to fill their respective PixelSpace vertically. No adjustment is made to the horizontal position.
17	Size to Display Width	1	Resizes specified layer(s) to fill their respective PixelSpace horizontally, and centers the input vertically.
18	Snap to Bottom	1	Repositions specified layers vertically to align bottom edges of layers with the bottom of their PixelSpaces.
19	Snap Left	1	Repositions the specified layers horizontally to align left edges of layers with the left edge of their PixelSpaces.
20	SnapRight	1	Repositions the specified layers horizontally to align right edges of layers with the right edge of their PixelSpaces.
21	SnapTop	1	Repositions the specified layers vertically to align top edges of the layers with the top edge of their PixelSpaces.
22	Stack Horizontal	2	Makes all layers the same height, centers them vertically with the first specified layer, and then positions them in a horizontal array running to the right of the first layer.
23	Stack Vertical	2	Makes all layers the same width, centers them horizontally with the first specified layer, and positions them in a vertical array running downward starting at the first layer's position.
24	Swap Windows	2	Swaps horizontal position and size between the two specified layers.

Substituting Layer IDs with Device Assignments

In some scenarios it may be desirable to provide layer IDs relative to an associated control device already defined in the Spyder system. Devices provide a layer of indirection over the top of the normal layering system, and in such cases where devices are in use it can be helpful to specify device definitions in lieu of hard layer IDs and allow the external control system to determine the corresponding layer ID(s) at runtime.

A special encoding is used to specify a device assignment, and this encoding is parsed before the actual command processing is performed. As such, any command argument requiring a layer ID can accept an encoded device definition. Below are examples of the device encoding syntax:

1. Selecting Device Index 2 Program Bus: `<DVCE2:PGM>`
2. Selecting Device Index 3 Preview Bus: `<DVCE3:PVW>`

Note that the angled brackets are required. Below is an example of using a device with the existing KSZ (Keyframe Size) command:

KSZ 800 <DVCE0:PVW>

In the example above, the layer ID evaluated from the device Index 0 preview bus will be set to a keyframe HSize of 800 pixels.

Understanding Registers

Registers provide an abstraction layer from specific data types with Spyder. Common data types such as sources, stills, command keys, and treatments all have corresponding registers. In the Vista software interfaces such as Vista Basic and Vista Advanced, all lists are sorted and displayed using the register lists, which allow users to organize the way their data is displayed without changing the underlying data.

In the following figure displays a command key list in Vista Advanced containing a single command key named 'Look 1'. The number 4 is displayed in the top-left corner of the command key, denoting that the register ID for this command key is 4. Notice in the property panel to the right of the command key panel that the Command Key's data ID is 10. The 'Recall Script Cue' (RSC) command allows command keys to be recalled externally using either the register ID (4) or the command key script ID (10).

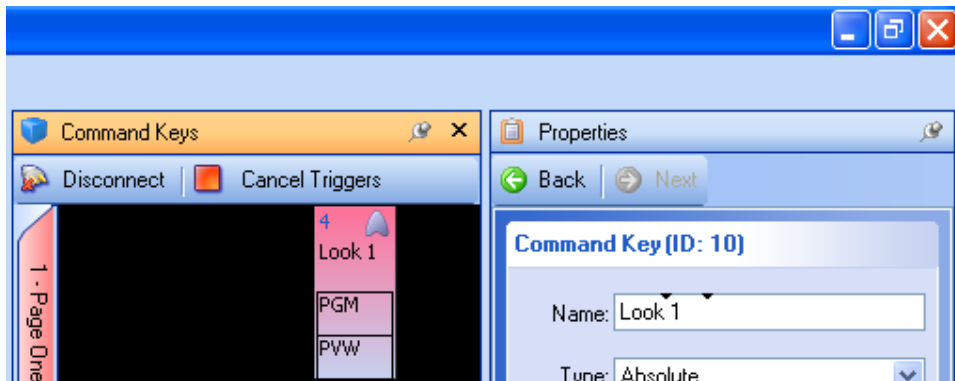


Figure 49

In the following figure the user has moved the 'Look 1' command key's position in the command key list. Notice that the register ID has changed to 5, but the command key's script ID has not changed. Recalling a script cue externally now using the register ID would require sending an ID of 5 instead of 4 to recall the 'Look 1' command key.

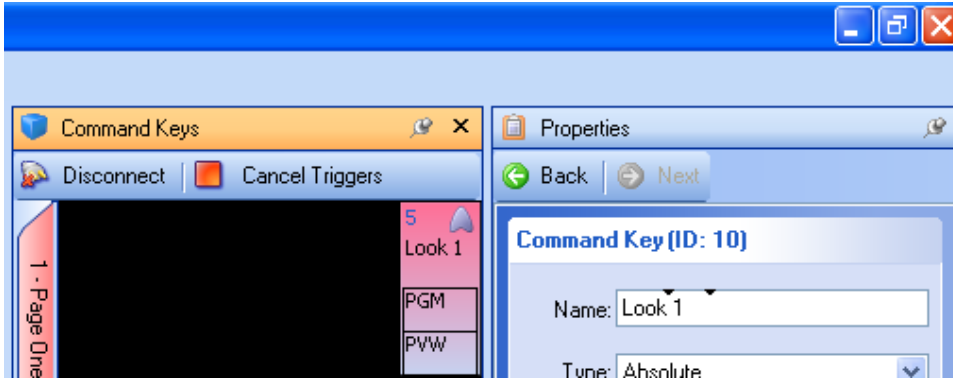


Figure 50

It may be desirable in many circumstances to recall a data element using a register ID, because it allows a user to change the functionality of an external recall command by replacing the data in a specific register. In our example, if a new command key were created and placed in Register ID 4, our original command key script recall command would recall a completely different script independent of the external control device.

Register Types

Register types represent the various types of data within the Spyder system. Any external command requiring a register type argument is expecting an ASCII representation of a numerical index which represents the register type. The lookup table to the right provides these numerical arguments required for these commands.

Register Type ID	Register Type Name
0 (0x30)	Effect
1 (0x31)	PlayItem
2 (0x32)	*Not Used*
3 (0x33)	*Not Used*
4 (0x34)	Command Key / Script
5 (0x35)	Treatment
6 (0x36)	Source
7 (0x37)	Function Key
8 (0x38)	*Not Used*
9 (0x39)	*Not Used*
10 (0x31 0x30)	Still Image

Spyder Hardware

This section is designed to give an overview of Spyder features, functionality and operation. The detailed operation of will be found in the respective manuals for each individual control platform.

Important Safety Instructions



This symbol indicates the presence of “dangerous voltage” within the product enclosure that may be significant enough to cause a risk of electrical shock.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water. Do not place objects containing water on top of or near the unit.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding – type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket or table specified by the manufacturer or sold with the apparatus. When a cart is used caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug the apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.

Cautions and Safety Notices

FCC Notice - For Commercial Use Only

This device complies with part 15 of the FCC rules. Operation is subject to the following 2 conditions: (1) This device may not cause harmful interference (2) This device must accept any interference received, including any interference that may cause undesired operation. This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Battery Warning

The battery in Spyder is not intended to be replaced by the user. Failure to follow these instructions will void the warranty of the unit.

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type of battery.

Service Warning

All servicing instructions are for use by qualified service personnel only. There are no procedures, exchange, or parts that are inside the unit that are intended to be performed by the user. Any procedure performed inside the unit is intended to be performed by qualified service personnel only.

To reduce the risk of electrical shock, the service technician shall remove the cord from the wall receptacle and the rear of the unit before attempting to service the unit.

Unplug all power and power supply cords from the apparatus before servicing

Failure to follow these instructions may void the warranty.

Class I Construction Warning

An apparatus with **Class I** construction shall be connected to a **MAINS** socket outlet with a protective earthing connection.

Operating in 110V or 220

Spyder ships in the setting predetermined by where it is shipping to be ready for operation out of the box. It comes with a sticker over the AC inlet noting if it is set for 110V or 220V. If operating with a voltage other than what it is set for, a few changes need to be made.

TO CHANGE FROM 110V TO 220V:

1. Pull the fuse holder (See figure 1.1.2) from the AC inlet (See figure 1.1.3).
2. Pull the jumper and current fuse from the fuse holder.
3. Add fuses included with shipping kit (2-3A fuses for 3RU or 2-2A fuses for 2RU). One on each side of the fuse holder.
4. Insert fuse holder back into the AC inlet and power up. You are now set for 220V.

TO CHANGE FROM 220V TO 110V:

1. Pull the fuse holder (See figure 1.1.2) from the AC inlet (See figure 1.1.3).
2. Pull both fuses from the fuse holder
3. Add jumper (See figure 1.1.1) on one side of fuse holder and fuse on the other side that is included with shipping kit (1-5A fuse for 3RU or 1-3A fuse for 2RU).
4. Insert fuse holder back into the AC inlet and power up. You are now set for 110V.

Figure 1.1.1

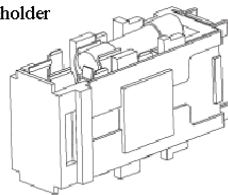


Jumper

Conversion clip included for use in single fuse applications

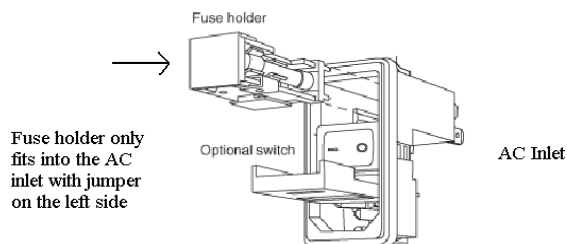
Figure 1.1.2

Fuseholder



Fuseholder shown with 5x20mm fuse

Figure 1.1.3



Spyder Hardware Family

Spyder is a compact versatile video processing product with superb capabilities to blend, window and scale a very wide array of video signals with unparalleled quality and ease.

The compact modular design allows Spyder to be used to display a virtually endless variety of windows through a single output, or stretch a single input across multiple displays to create a seamless widescreen image, and do just about anything in-between.

Spyder consists of 2 model families, the 200 and 300 series, each family has multiple configurations available to meet the most demanding environment and all models have expansion ability (optional) to provide more inputs/windows or more output/displays or both.

Spyder control can be accomplished multiple ways depending on application:

1. Spyder control suite PC based software applications
2. Hardware based Vista controllers
3. 3rd party control systems such as Crestron or AMX

Section 3: Model Descriptions

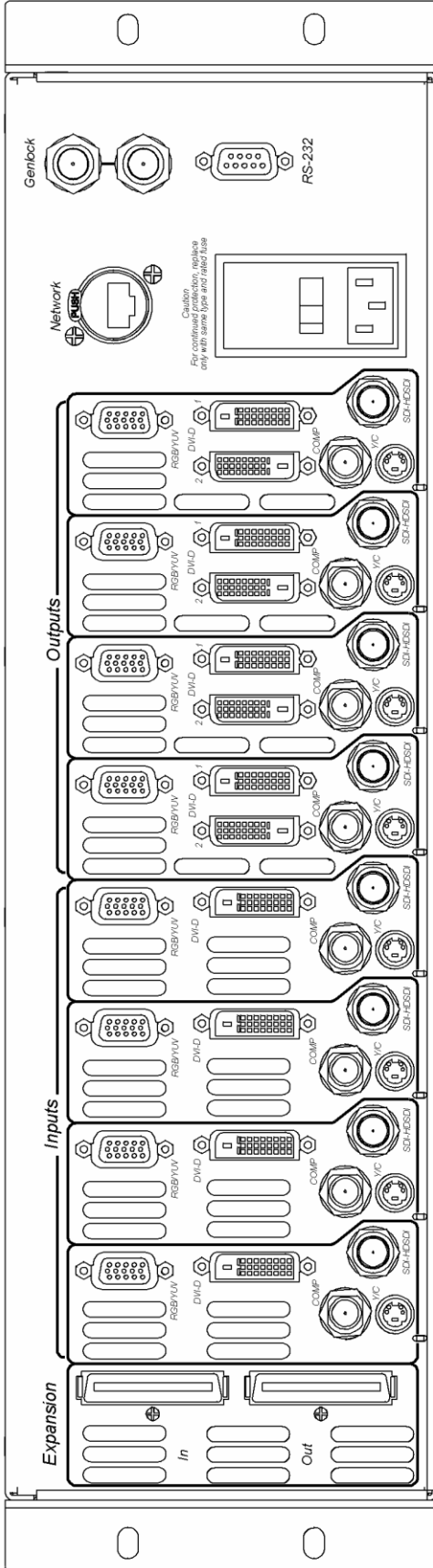


Figure 3 a Spyder 300 Series (Model 344 shown)

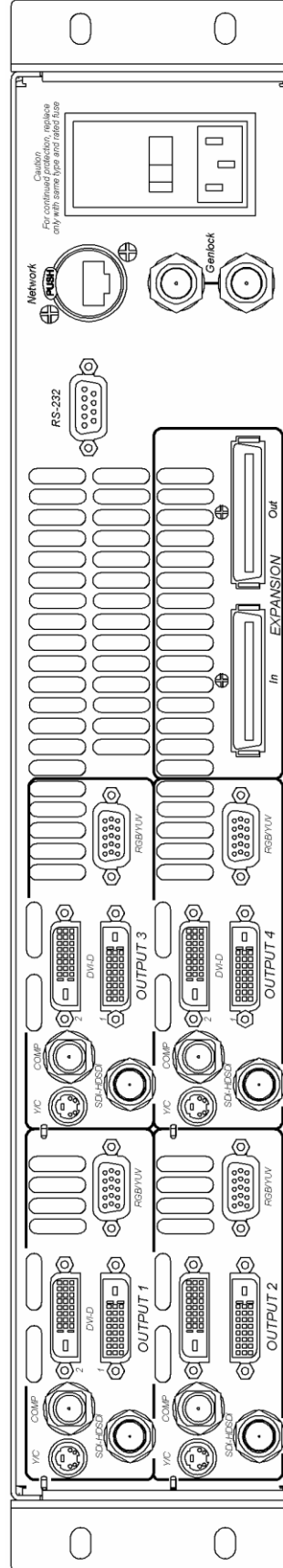


Figure 3 b Spyder 200 Series (Model 204 shown)

Spyder Models and Options

This section describes the different models and options.

Spyder 200 Series

The 200 series is a 2 RU unit that utilizes 4 I/O modules.

A sample of valid configurations is listed below.

Model Number	No. of Inputs	No. of Outputs
240*	4	0
204*	0	4
222	2	2
213	1	3
231	3	1

Spyder 300 Series

The 300 series is a 3RU unit that utilizes 8 I/O modules.

A sample of valid configurations is listed below.

Model Number	No. of Inputs	No. of Outputs
380*	8	0
308*	0	8
344	4	4
353	5	3
362	6	2

*These models available only with control expansion option. Fixed control versions not available.

Inputs

Note: Interlaced sources cannot be used on the DVI connector. Only odd inputs have de-interlacers

1. Pixel clock limits for analog and digital.

- Analog- 165MHz
- Digital- 330MHz

Below are listed the standard video formats accepted by Spyder:

- 24p, NTSC, PAL, and SECAM
- Analog RGB (SOG, Composite or Separate Sync)
- Analog YUV
- SDI (Only available on Odd Inputs)
- HD-SDI (Only available on Odd Inputs)
- DVI-Single Link
- DVI-Dual Link
- Stereo Sync



Each input module has a single input connector for the supported signal types:

1. ANALOG
2. SDI/ HD-SDI
3. DVI
4. Composite and S-Video (Comp/ S-Vid Optional)

Each input is universal: an input can be dynamically assigned and used as a mixer, a mixer, or a key. These settings are also accomplished from the chosen control type.

Outputs

Each Output Module has various video connectors on the rear. Conditions exist when multiple output types can be utilized.



Below are listed the standard video formats accepted by Spyder

- 24p, NTSC, PAL, and SECAM
- Analog RGB (SOG, Composite or Separate Sync)
- Analog YUV
- SDI
- HD-SDI
- (2) DVI-Single Link
- (2) DVI-Dual Link
- DVI Twin Link

Each output module has a single connector for the supported signal types:

1. ANALOG
2. SDI/HD-SDI
3. DVI
4. DVI –Dual
5. Composite and S-Video (Comp/S-Vid Optional)

Multiple output connector types can be used simultaneously, provided that the video format is valid for the specific video connections. Below are a few examples.

1. *DVI & Analog*: When an output is configured for Non-Interlaced Computer Signals
2. *SDI & Analog*: When configured for 480i/575i
3. *HD-SDI & Analog*: When configured for 1080i

Options

Spyder options listed below are available on either 200 or 300 Series products.

Existing units can be retrofitted once shipped but must be returned to the factory for any of these procedures.

200X/300X Expansion Option

Allows multiple units to be connected together to expand Inputs, Outputs or both. (See Figure 3.3.1 b on following page)

**InfiniBand Cable (Vista P/N CAB-60670)**

This cable allows multiple Spyder units to be connected to the Expansion Ports. This option is only applicable with the 200X or 300X Option.

200C/300C (Composite/S-Video Option)

When selected this option will provide Composite (BNC) and S-Video (SVHS) connections on each Input and each Output of the Spyder unit.

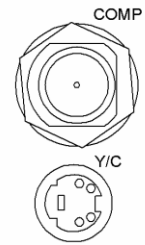
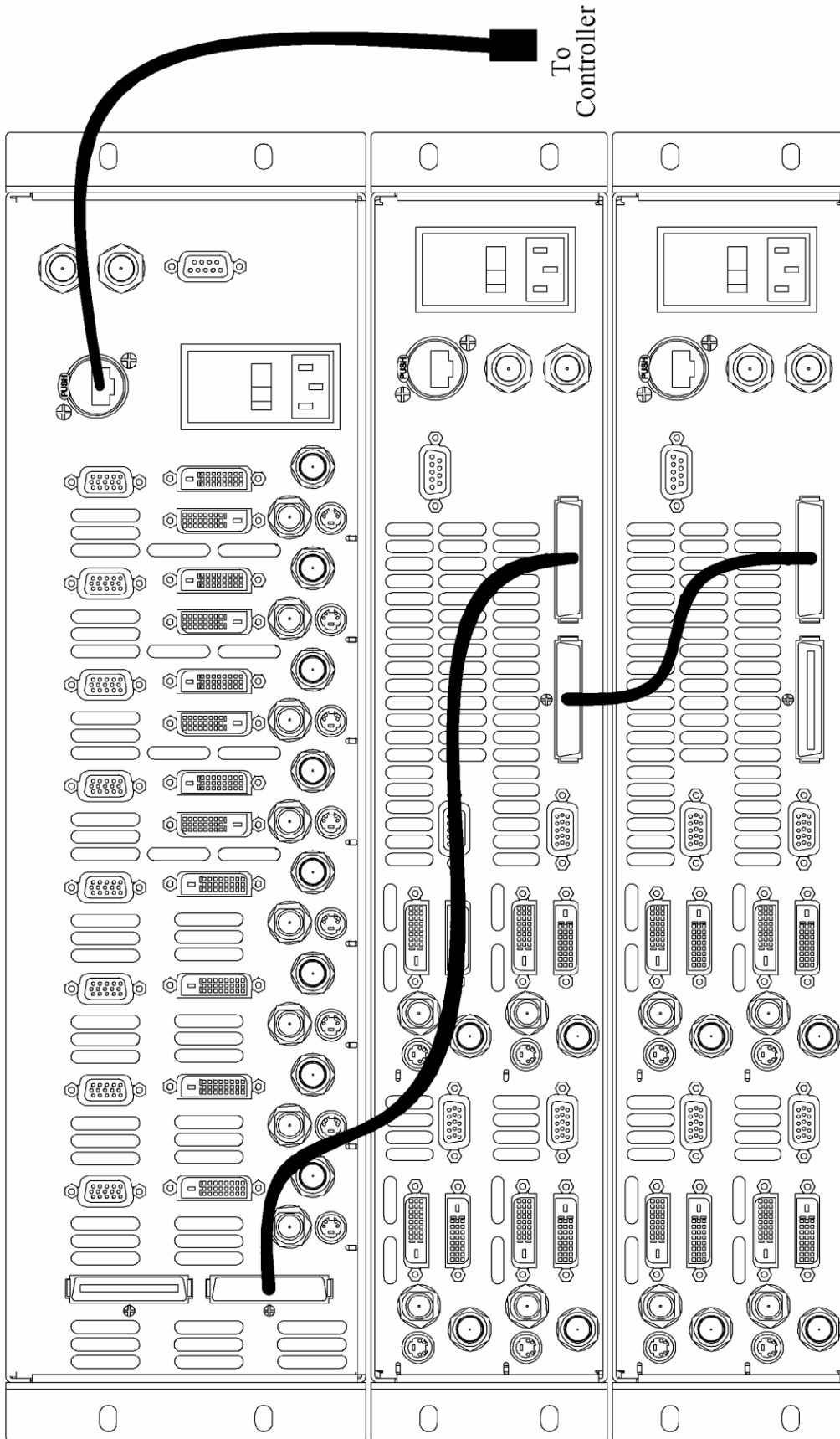


Figure 3.3.1 b Control Expansion Detail



Power Control

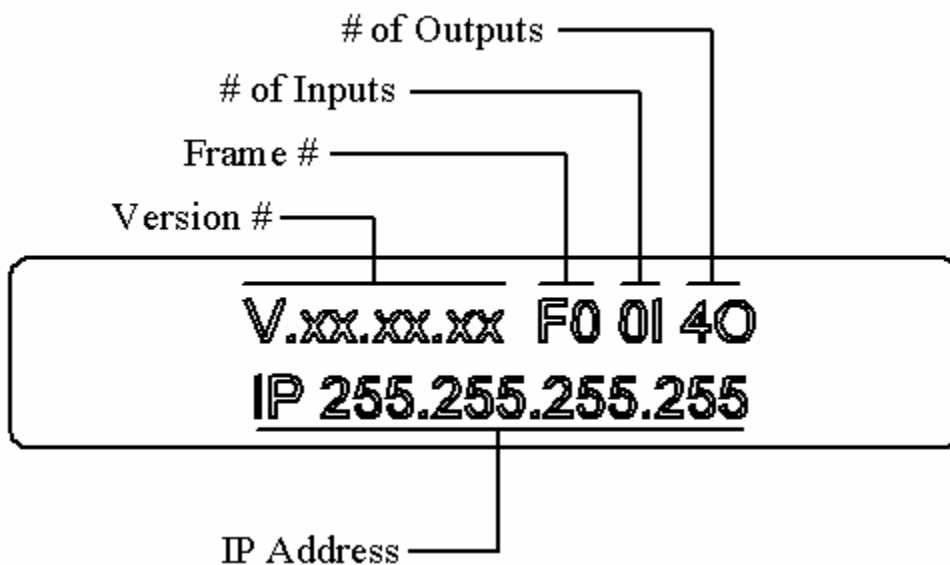
The Spyder uses a soft power scheme. Pressing the Standby switch initiates a power up cycle and after a short boot time the front panel display will indicate operational status. Pressing the Standby switch again initiates the power down cycle after which the unit enters standby mode. There is a hard power switch on the rear that should be used only when Spyder is in the standby state (Standby Switch LED is off).



The user should avoid disconnecting the primary power source (AC input) until the unit is in standby mode. Failure to do this could result in hard drive data corruption.

Display

The Spyder enclosure is equipped with a status/error display located on the front panel. This is helpful in determining proper start-up and shut-down of the unit, as well as indicating error messages. The following diagram indicates the status when the unit has been booted up and has determined the version, frame, I/O configuration and IP address.



Spyder X20 Hardware Family

Spyder X20 is a second generation Spyder hardware line. X20 increases both the I/O capacity and virtual image space (VI) available within a single chassis, making a powerful and cost-effective solution for mid-range Spyder configurations.

Spyder X20 Models

Spyder X20 uses a modular chassis design, which can be populated at the factory with various combinations of input and output channels as required. Available chassis sizes start at three-slot configurations.

Note that not all slots must be filled in a chassis; a larger chassis will operate without all slots being filled. This makes an easy hardware upgrade path for systems that may need to increase capacity over time.

Spyder X20 External Connections

The connections for the Spyder X20's internal computer are exposed on the back panel. These connections are for factory use only, and are not intended to be connected to external peripherals (keyboard / mouse / monitor) by a user. Specifically, the following connections are exposed:

Keyboard	Mouse
Monitor (HD15)	USB
Microphone Input	Speaker Outputs



Figure 51: X20 1608 Back Panel

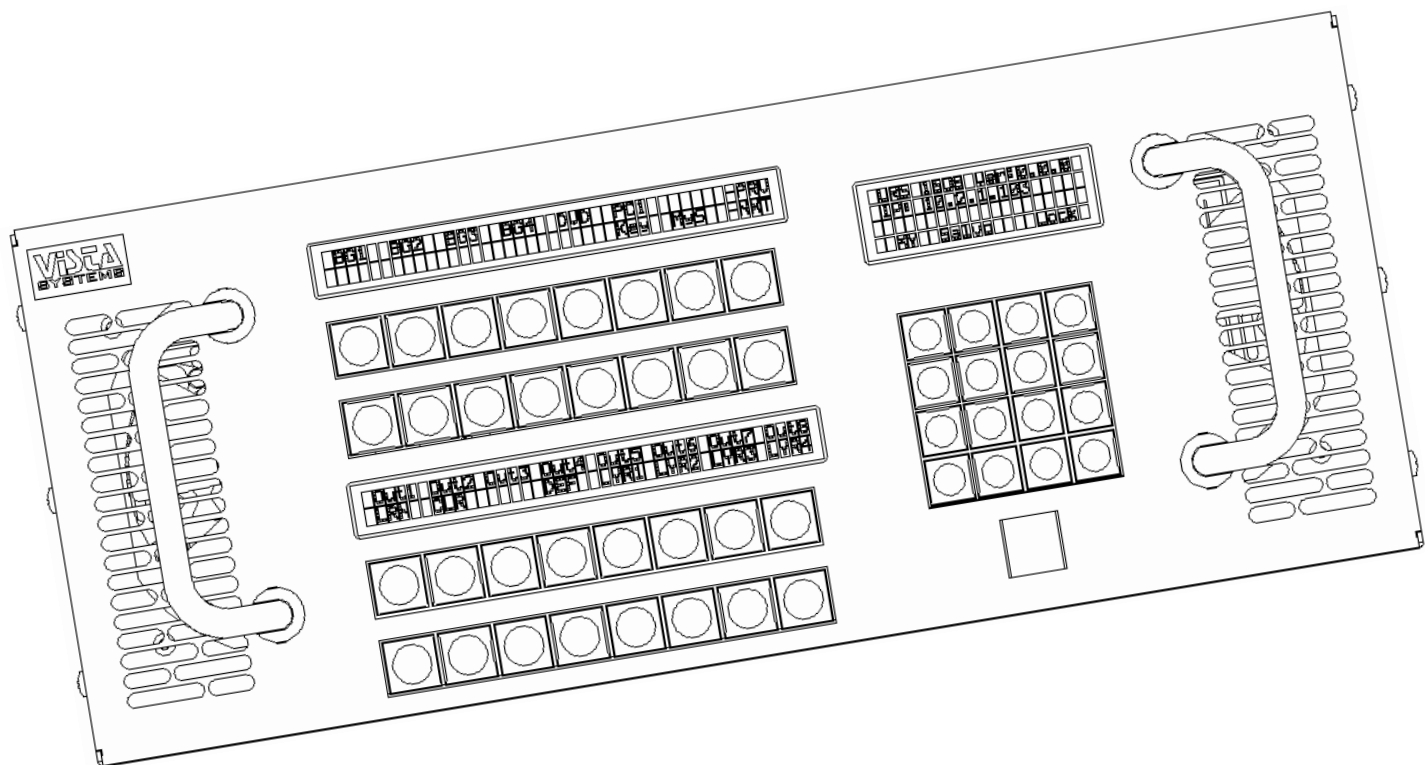
X20 Front Panel

Inputs

The connector types alternate on each input connector for maximum flexibility, and the specific connector types are listed below. For each input, only one connector / signal type can be selected at a time.

Odd Input Connectors (1, 3, 5, etc.)

1. Analog (3 or 4 wire BNC)
2. Composite / S-Video (Shares BNC with composite analog sync signal)



3. SDI / HD-SDI / 3G-SDI (Single dedicated BNC)

Even Input Connectors (2, 4, 6, etc.)

1. DVI-I (Analog and Digital on single connector)
2. Stereo Sync input (3-Pin DIN)

Outputs

Each Output Module has various video connectors on the rear. Multiple output connectors can be enabled simultaneously, provided that the user defined output format is valid for the connector. SXGA (1280x1024) for example, is valid for DVI and analog connectors, but is not a valid format for SDI, composite, or S-Video connectors.

Each output channel provides the following connector types:

3. DVI-I (Analog and Digital on single connector)
4. SDI / HD-SDI / 3G-SDI

Power

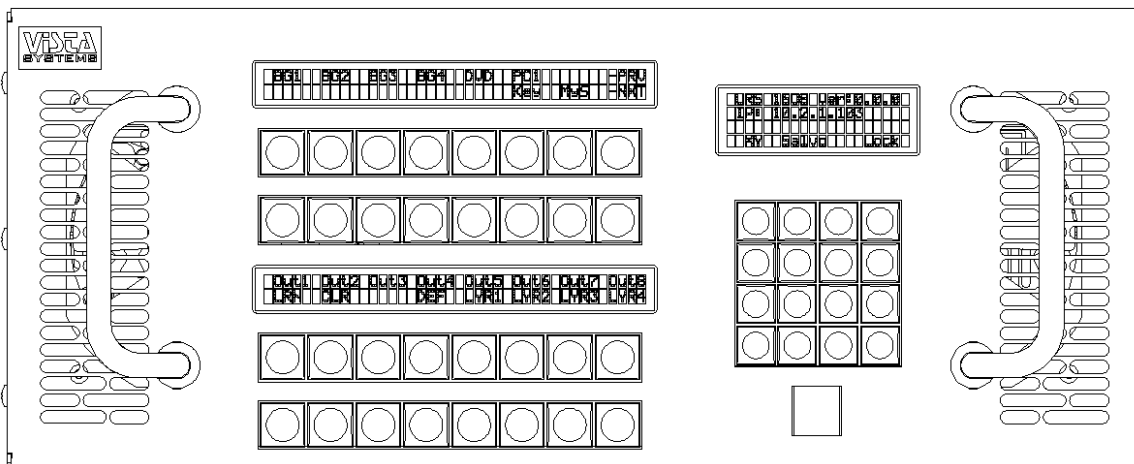
The X20 uses a soft power scheme. Pressing the Standby switch initiates a power up cycle and after a short boot time the front panel display will indicate operational status. Pressing the Standby switch again initiates the power down cycle after which the unit enters standby mode. Holding the power button on the front panel of the system for 13-15 seconds can be used to force power off, however this technique may cause permanent configuration data loss.



The user should avoid disconnecting the primary power source (AC input) until the unit is in standby mode. Failure to do this could result in hard drive data corruption.

Front Panel

The X20 enclosure is equipped with a LCD / switch button interface located on the front panel. This interface allows for both control and access to status information of the unit. As the front panel functionality is dependent on the version of firmware running on the unit, actual front panel operation is discussed in detail in the software / operator’s manual for the X20.



Physical Specifications

Dimensions (W x H x D)

1. Spyder X20 4 RU: 17.3 x 7 x 21.9 inches (43.9 x 17.78 x 55.6 centimeters)
2. Spyder 3 RU: 17.3 x 5.3 x 22.1 inches (43.9 x 13.3 x 56.1 centimeters)
3. Spyder 2 RU: 17.3 x 3.5 x 22.1 inches (43.9 x 8.9 x 56.1 centimeters)

Weight

1. Spyder X20 4 RU: 70lbs (Approx)
2. Spyder 3 RU: 33lbs (Approx)
3. Spyder 2 RU: 25lbs (Approx)

Power Consumption

1. Spyder X20 4 RU: 100-240V AC 1000W max (Fuse: Internal Auto-Resetting)
2. Spyder 3 RU: 100-240V AC 375W max (Fuse: 5A Slow-Blow)
3. Spyder 2 RU: 100-240V AC 225W max (Fuse: 3A Slow-Blow)
4. Stand By Power (200 / 300 / X20 Series): <20W

Rack mount Instructions

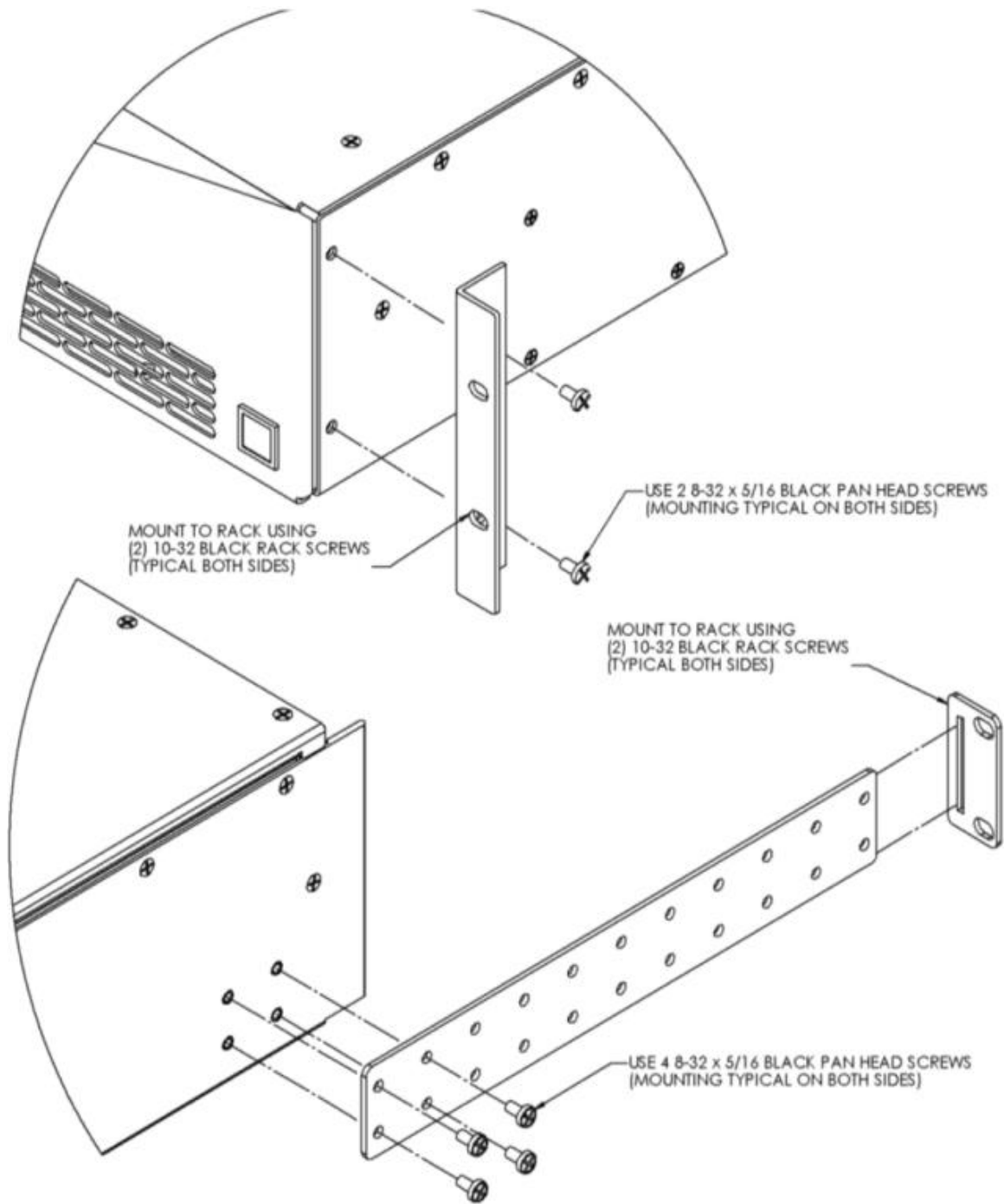


Figure 52 : Rack Mounting

Spyder Expansion

This section explains and demonstrates the expansion of Spyder Servers using the Spyder Advanced Software and assumes the software release of 2.7 or later. There are two classifications of expansion, Serial and Parallel. Serial Expansion is required to increase the total of inputs and outputs (I/O) of a system. Parallel expansion is required when the pixel limitation of one VI needs to be exceeded. There are two types of the Parallel Expansion classification, Discreet Expansion and Seamless Expansion. Any expansion requires the Spyder Servers to have the Expansion Module Option. Two prerequisites of understanding expansion, Vista System’s Virtual Image, and signal flow are required.

Virtual Image (VI)

The underlying power of the Spyder System is through the use of the Virtual Image (VI). The VI is the full amount of bandwidth available to create the user defined pixels spaces that the outputs support. The resolution of the outputs determine the amount of pixels used and therefore how much of the available bandwidth of the VI. Multiple pixel spaces can be created within the same VI, but the entire VI has a fixed bandwidth limitation. It is not necessary to use all the bandwidth but it cannot be exceeded without Parallel Expansion. The maximum bandwidth of the VI is dependent on the system frame rate which is the rate of data refresh. For example, a system running at 59.94 frames (NTSC setting) refreshes the data of the entire VI at 59.94 frames per second. The Spyder user has several preset frame rates to choose from depending on the application. The frame rate can be chosen at the original time of a new configuration using the Configuration Manager or can be changed later using the *Server/Frame Configuration* menu in the advanced software.

Frame Rate:	Suggested Applications:
59.94 6.6 million pixels	Staging and Broadcast
29.97 13 million pixels	Command and Control
50 8 million pixels	PAL Staging and Broadcast
25 16 million pixels	PAL Command and Control
24 16.5 million pixels	Film Industry and 24p applications

Note: Spydres using the SSO option must always use the higher frame rate of NTSC. When using the Stereoscopic Option VI capacity is halved.

The formula for determining the VI is: V pixels (highest) x H pixels.

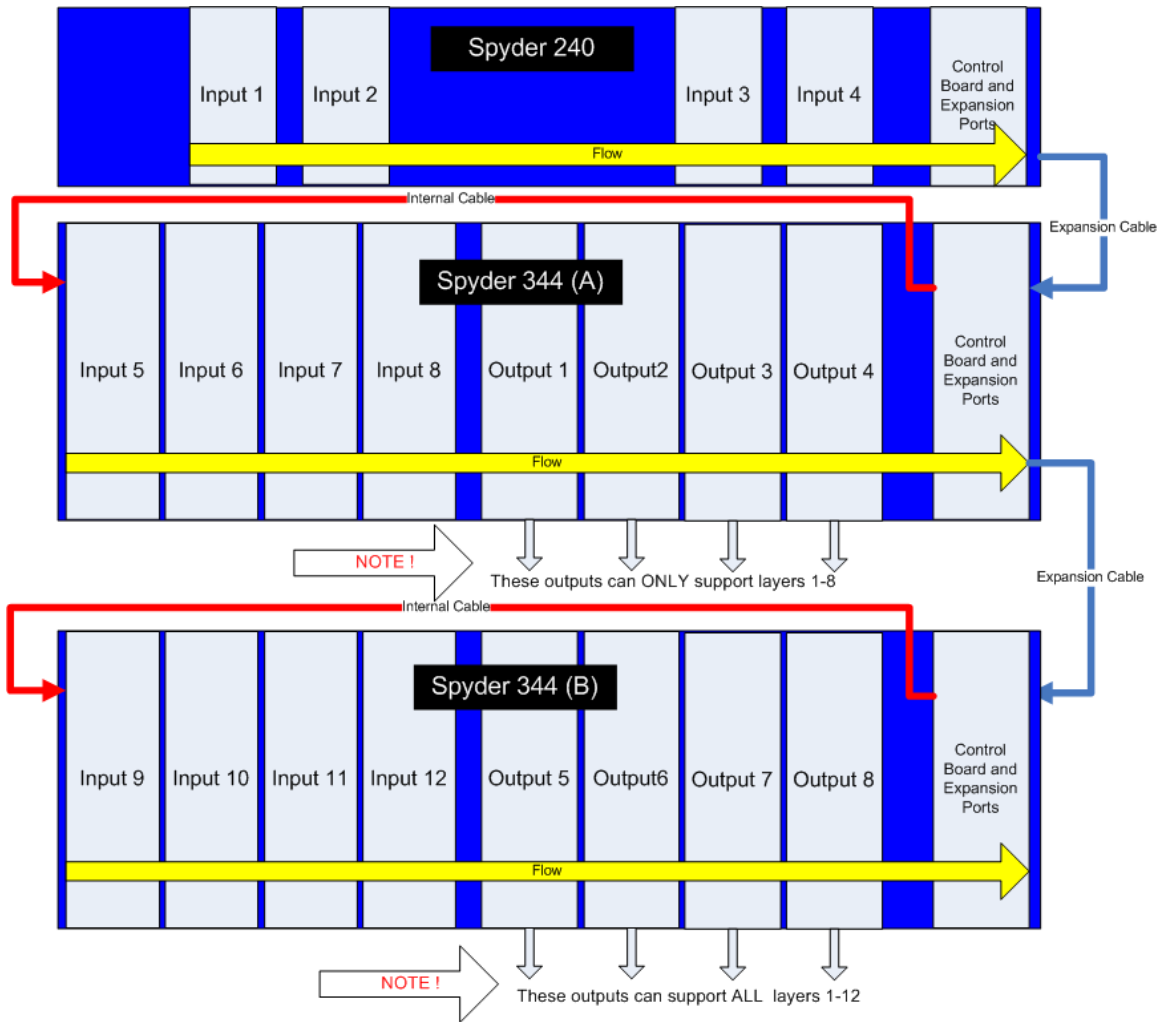
Determining if the maximum is exceeded is dependent on Frame Rate.

Example: Two outputs at 1400 x 1050 each and one at 1920 x 1080 with a 640 x 480 operator’s monitor and a frame rate of NTSC use 5,788,800 pixels of the 6.6 million available.

$$5,788,800 \text{ pixels} = 1080 \times 1400 + 1400 + 1920 + 640$$

Signal Flow

There is always a hierarchy of signal flow through any Spyder System starting upstream with the inputs and ending with the downstream outputs. Each input (layer) in the system adds its share of pixel information to the VI and passes it along downstream through the frame(s) starting with the remaining inputs, thru to the outputs, and out the expansion module port if expansion is used. The first input in a frame is always the first upstream layer. Refer to the below diagram.



Signal never flows upstream therefore upstream outputs cannot support downstream inputs.

Serial Expansion

Serial expansion is required to increase the total of inputs and outputs (I/O) of a system by using a *series* of Spyder Servers. The entire expanded system is still defined within a single Virtual Image (VI) and cannot exceed that pixel limitation. Although each individual Spyder Server is capable of supporting an entire VI, such as a standalone 344 model, I/O capacity is limited to the amount of input and output cards that can be mounted in a

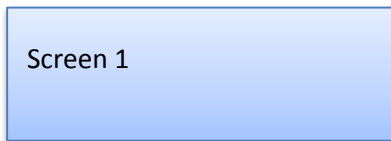
300 series frame. To increase the total I/O of the system expansion is required. Understanding the signal flow through expanded Spyder Servers is very important in designing a Spyder System and determining whether expansion is required.

Expansion requires the creation of Expansion Groups with the first upstream Spyder Server frame in the system as the Master and the remainder Slaves. Each Spyder Server is always a Master until it is put in an Expansion Group and then it may become a Slave depending on its position in the Expansion Group.

Serial Expansion Group Example

Using the above diagram as an example these are the user requirements:

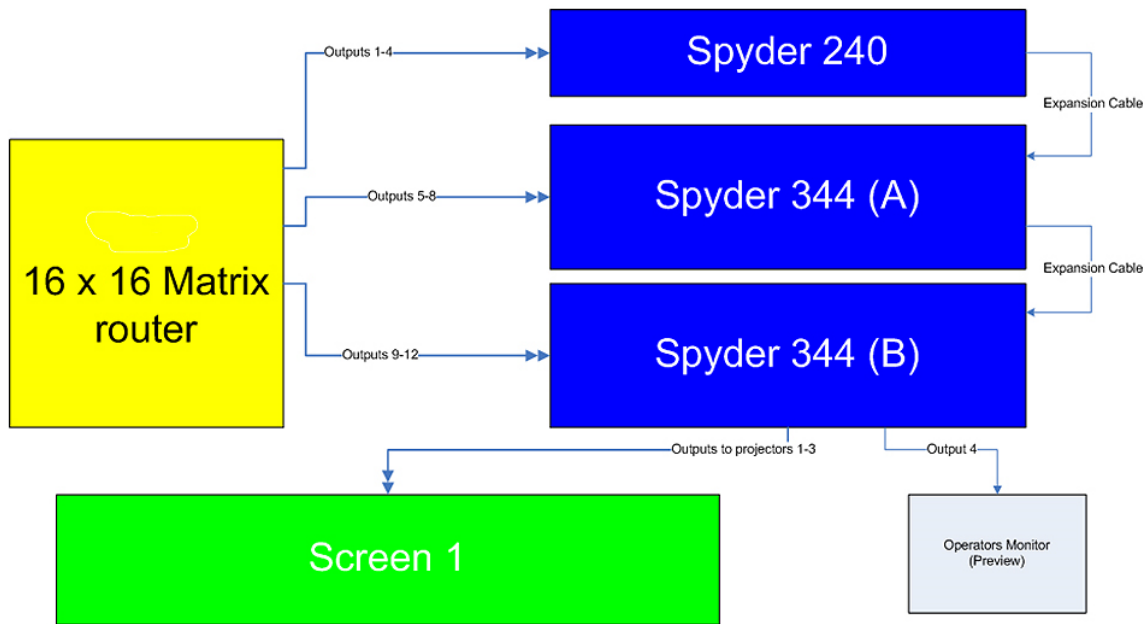
One blended projector screen using three 2K projectors with a 512 pixel blend. The requirement is for 12 layers of data or video to be placed anywhere across the pixel space simultaneously. Frame Rate will be NTSC with an 800 x 600 preview.



Hardware available:

1. Spyder 344 (A) with expansion IP: 172.16.17.20
2. Spyder 344 (B) with expansion IP: 172.16.17.40
3. Spyder 240 with expansion IP: 172.16.17.60

One ISIS analog 16 x 16 matrix switch

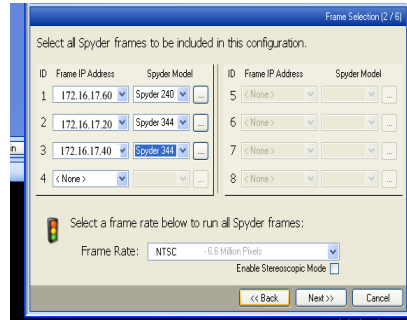
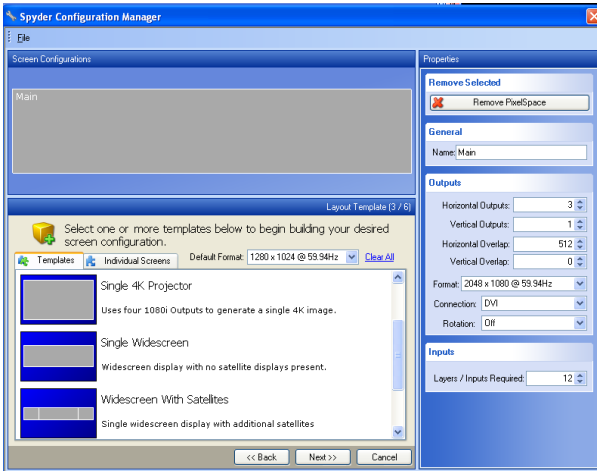


Connect the frames with their expansion cables in the following order of signal flow. Connect 240 to 344 (A) to 344 (B). The 240 will be the master frame and the two 344's will be slaves.

Connect the first 4 outputs from the ISIS matrix switch to the 240, the next 4 to 344 (A) and the next 4 to the second 344 (B). Connect the ISIS serial cable to a serial port on the 240.

Start the Advanced software on the client PC and select *File/New*. The Spyder Configuration Manager will open and select *Start with new empty configuration*.

From the drop down menus select the matching IP address to frame in the order of the system starting from the master frame which is the 240. If doing a system configuration off-line choose 'virtual' instead of an IP address. After the frames are selected choose NTSC for frame rate. Click Next.



In this menu select 'single widescreen' in the template tab. Next click on the actual pixel space for the widescreen in the Screen Configurations window and fill in the appropriate output information as follows:

Horizontal Outputs: 3

Vertical Outputs: 1

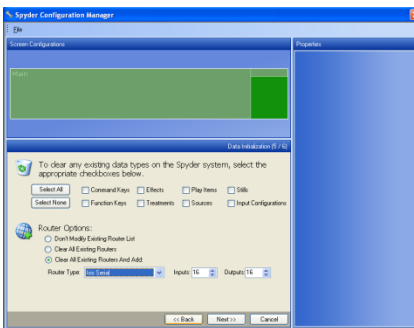
Horizontal Overlap: 512

Format: 2048 x 1080 @ 59.94

Connection: DVI if required

Rotation: none

Layers: 12

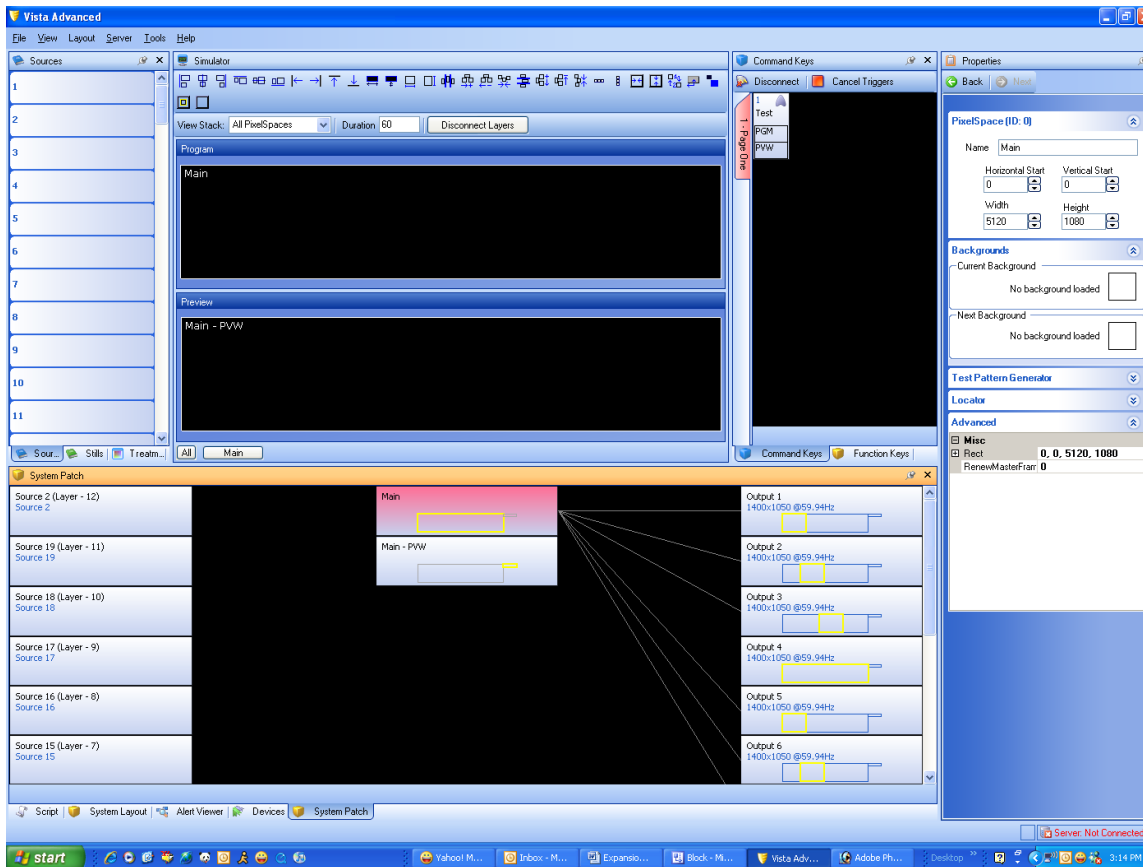


Click next and select 800 x 600 as a preview. Click next again and ‘select all’ to clear all data and ‘select clear all routers and add’: Isis serial and 16 inputs and 16 outputs

Select next and apply the configuration to either the hardware (online) or to local PC (offline).

If done online the Spyder Frames will reboot and their individual LED panel will show the 240 as Frame 0, the 344 (A) as Slave Frame 1, and 344 (B) as Slave Frame 2.

This completes the configuration and the patch and simulator portion of the GUI will look like the example below.



In the Patch click and drag outputs 1, 2, and 3 to outputs 5, 6, and 7 respectively so those outputs are representing their portion of the pixel space. Configuration is complete.

Special Note: Outputs 1, 2, and 3 from 344 (A) will display the same pixel space BUT without the downstream layers of the second 344 (B). These could possibly be used as ‘clean’ display from downstream keying or Imag.

Discreet Expansion

Discreet expansion allows the use of multiple VI’s using multiple Frame Groups however the layers/inputs associated with those Frame Groups that make up an individual VI cannot extend to outputs of other Frame

Groups of another VI. A Frame Group can be a single server or multiple servers but it refers to a single VI. Expansion enables the user to use a single control interface and a single matrix router(s) to control and support the expansion system.

If an Operators Monitor is required each Frame Group will require the pixel capacity for the preview pixel space and multiple Operators Monitors from the multiple Frame Groups will be utilized.

Discreet Expansion Example

In this example these are the user requirements.

One blended projector screen using three 2K projectors with a 512 blend.

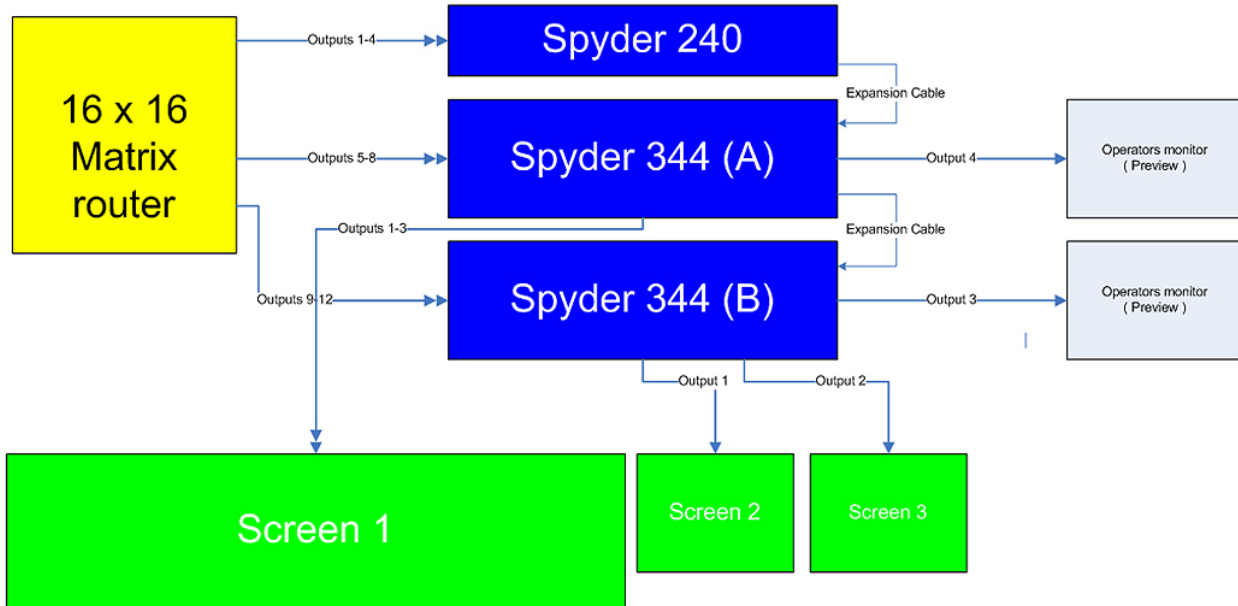
Two discreet screens using three SXGA+ projectors.



Preview is required for this installation.

Hardware available:

1. Spyder 344 (A) with expansion IP: 172.16.17.20
2. Spyder 344 (B) with expansion IP: 172.16.17.40
3. Spyder 240 with expansion IP: 172.16.17.60
4. One ISIS analog 16 x 16 matrix switch



Since the blended widescreen using an 800 x 600 preview will use 6,393,600 pixels it will be the first VI. The existing two screens will require the second VI.

The user decision is to use the 240 with the first 344 (A) to enable the use of eight layers on the blended screen which is the first VI. The other 344 (B) is the second VI and all four layers will be used as two mixers for the two screens.

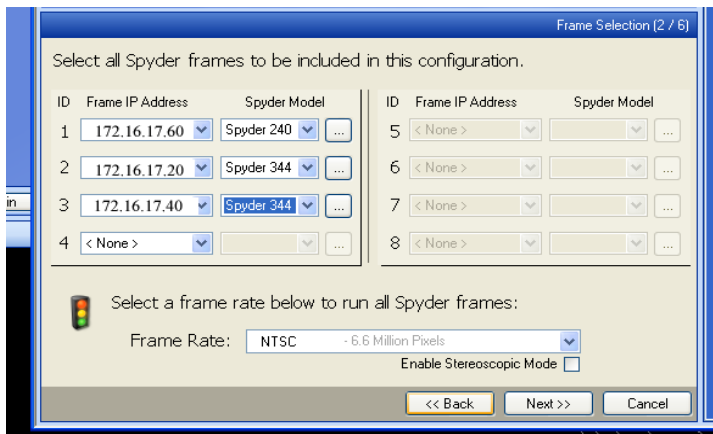
Connect the frames with their expansion cables in the following order of signal flow. Connect 240 to 344 (A) to 344 (B). The 240 will be the master frame and the two 344's will be slaves.

Although layers from the first 344 (A) will not pass into the second 344 (B) the expansion cable is still required for the creation of the expansion system. Make sure all frames are on the same network and connected.

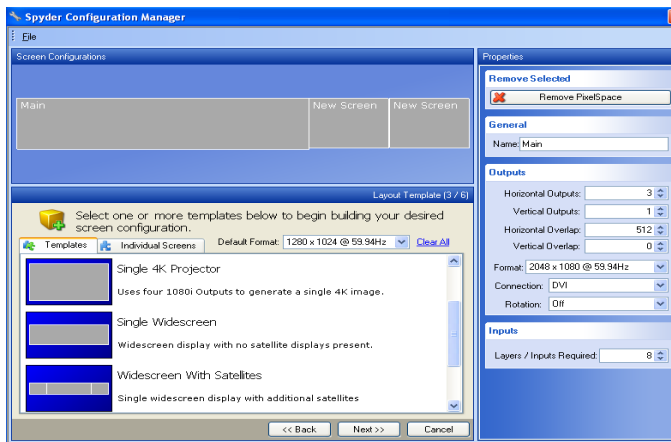
Connect the first 8 outputs from the ISIS matrix switch to the 240 and 344 (A) and the next 4 to the second 344 (B). Connect the ISIS serial cable to a serial port on the 240.

Start the Advanced software on the client PC and select *File/New*. The Spyder Configuration Manager will open and select *Start with new empty configuration*.

From the drop down menus select the matching IP address to frame in the order of the system starting from the master frame which is the 240. If doing a system configuration off-line choose 'virtual' instead of an IP address. After the frames are selected choose NTSC for frame rate. Click Next.

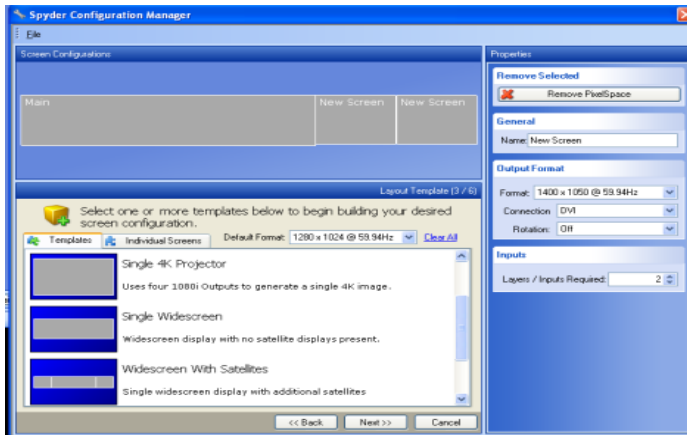


In this menu select 'single widescreen' in the template tab and select 'add additional discreet screen' twice under the individual screen tab. Next click on the actual pixel space for the widescreen in the Screen Configurations window and fill in the appropriate output information as follows:



- Horizontal Outputs: 3
- Vertical Outputs: 1
- Horizontal Overlap: 512
- Format: 2048 x 1080 @ 59.94
- Connection: DVI if required
- Rotation: none
- Layers: 8

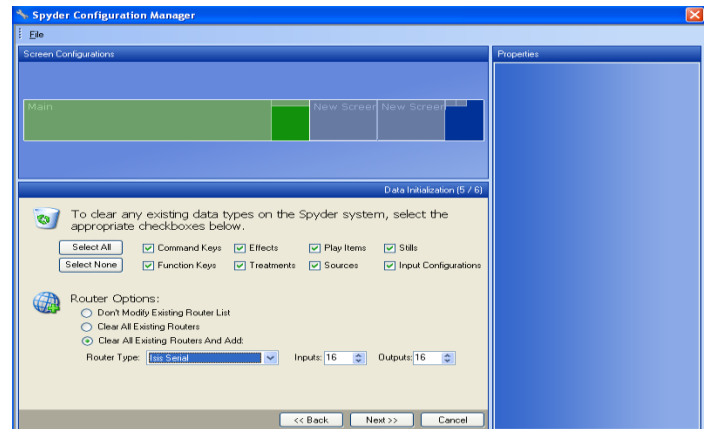
Then select the other two pixel spaces and use these settings for both:



Format: 1400 x 1050 @ 59.94

Connection: DVI if required

Rotation: none

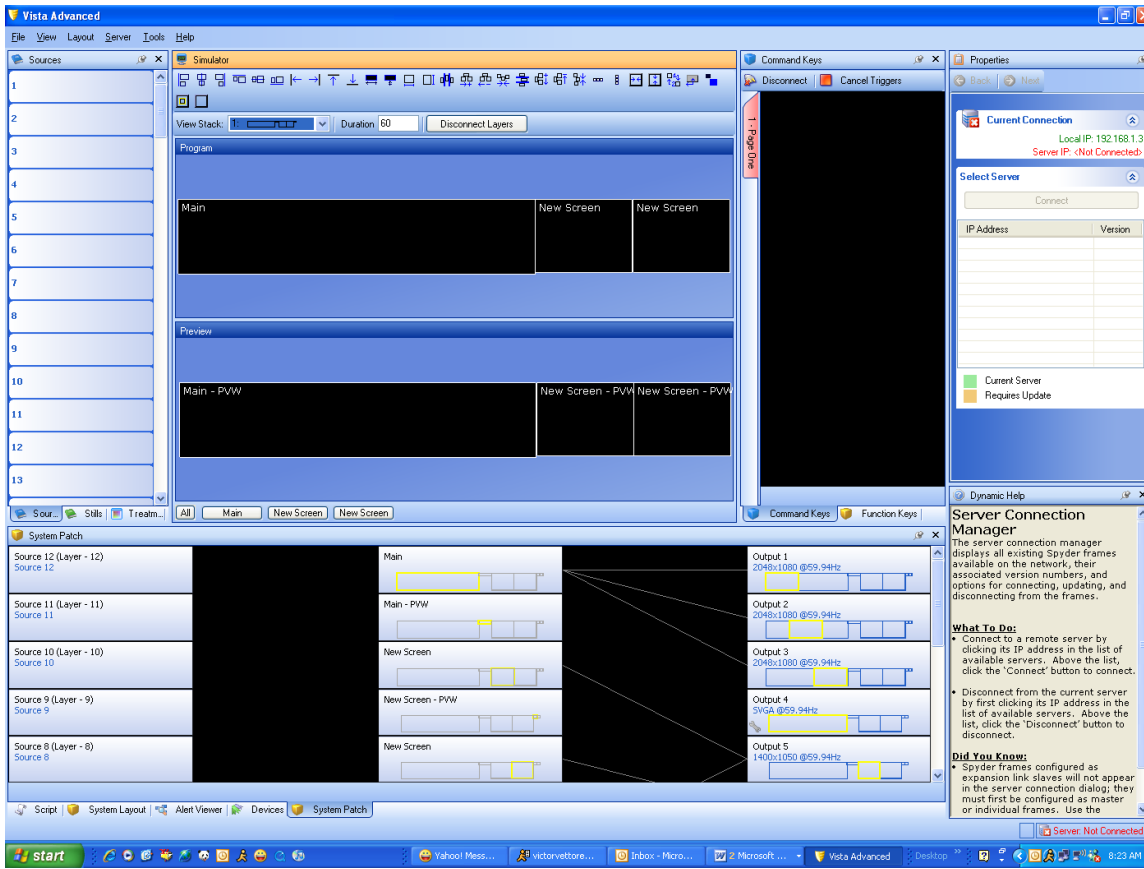


Layers: 2

Click next and select 800 x 600 as a preview. Click next again and 'select all' to clear all data and 'select clear all routers and add': Isis serial and 16 inputs and 16 outputs

Select next and apply the configuration to either the hardware (online) or to local PC (offline).

This completes the configuration and the patch and simulator portion of the GUI will look like the example below.



Seamless Parallel Expansion

The second application of parallel expansion creates one continuous pixel space beyond the limitation of a single VI. By using multiple Spyder Servers and their individual VI capacity Pixel Renewal Groups are created that represent portions of responsibility to the entire pixel space. Sources that are required to cover the span of the entire pixel space require the use of unrestricted layers.

Unrestricted Layers

Unrestricted layers can be displayed anywhere in the PixelSpace, regardless of Renewal Groups, Frames, etc... These layers are created using a Master Element in a command key or script. Unrestricted layers use one hardware layer in each Renewal Group to allow a single logical layer to cross renewal group boundaries. Unrestricted Layers provide the most power, but also consume hardware at a greater rate.

Restricted Layers

Restricted layers can be placed anywhere in their home Pixel Renewal Group. However, Restricted Layers cannot be shown outside their own Renewal Group, or on the overlap between renewal groups.

Combining Restricted and Unrestricted Layers

Mixing Unrestricted and Restricted layers is possible, with layers that will cross or reside on renewal group boundaries being setup as unrestricted while layers that will only be displayed in their home renewal group are restricted. This option offers a balance between flexibility and hardware economy.

By default a layer is restricted. To create unrestricted layers, the user will create master script elements.

Operator Monitors

If preview is enabled as part of the new configuration GUI, each frame group will require an additional universal output to be dedicated as the operator’s monitor output. Each operator’s monitor will display the preview and program PixelSpace information within its frame group’s associated frame area of responsibility.

Seamless Parallel Expansion Example

In this example we will use these requirements:

A single seamless screen blending 12 projectors at 1400 x 1050 with a 280 pixel overlap. The requirement is for 8 layers of data or video to be placed anywhere across the pixel space simultaneously. Frame Rate will be NTSC.

13,720 x 1050 Pixels

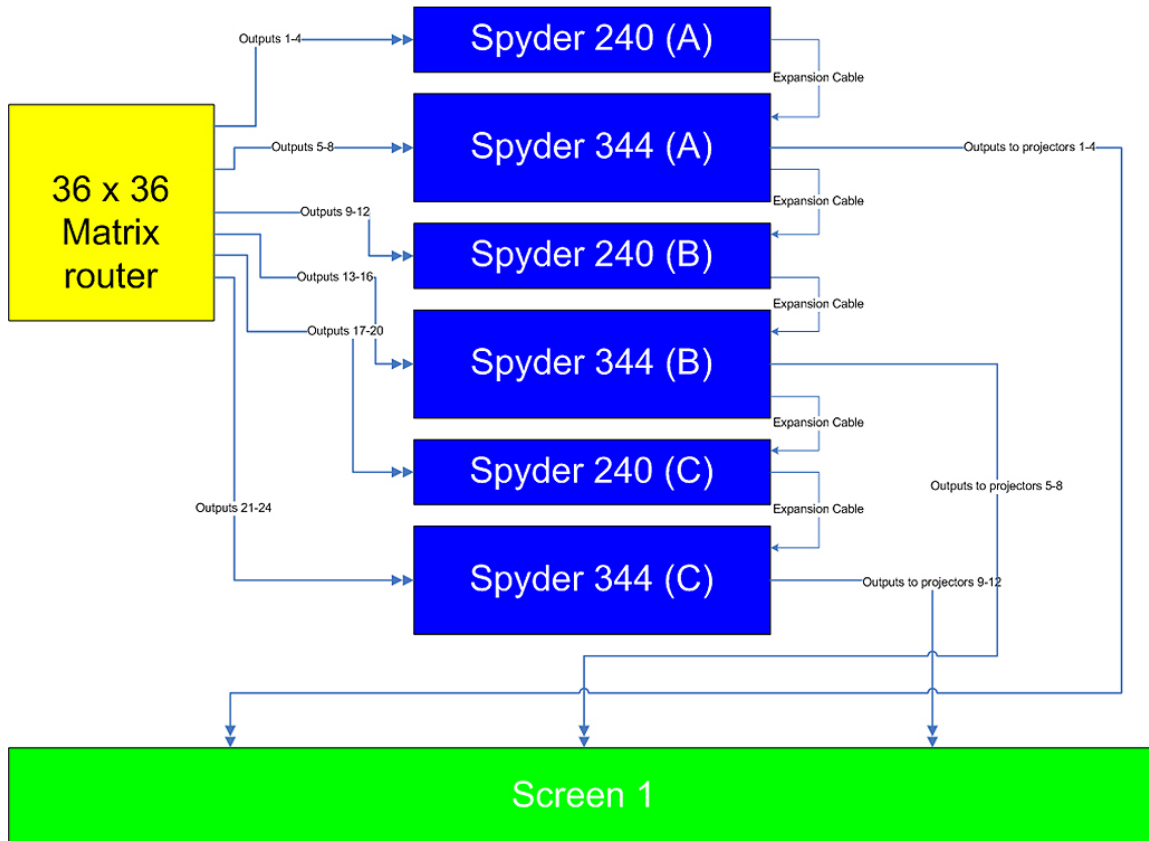
Hardware available:

1. Spyder 240 (A) with expansion IP: 172.16.16.25
2. Spyder 240 (B) with expansion IP: 172.16.16.50
3. Spyder 240 (C) with expansion IP: 172.16.16.75
4. Spyder 344 (A) with expansion IP: 172.16.17.20
5. Spyder 344 (B) with expansion IP: 172.16.17.40
6. Spyder 344 (C) with expansion IP: 172.16.17.60
7. ISIS 32 x 32 analog matrix switch.

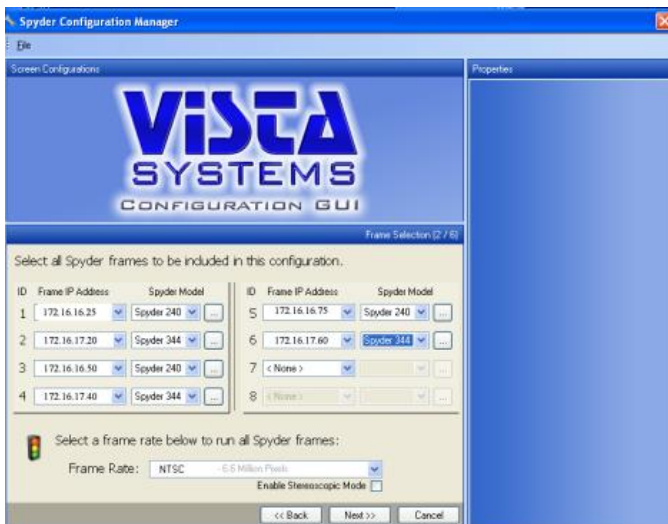
Connect the frames with their expansion cables in the following order:

Connect 240 (A) to 344 (A) to 240 (B) to 344 (B) to 240 (C) to 344 (C). The frame 240 (A) will be the master frame and remainder frames slaves. Make sure all frames are on the same network and connected. Connect the first

four outputs from the ISIS switch to 240 (A), the next four outputs to 344 (A), and continue in order. Connect the ISIS serial cable to the Master Frame 240 (A) serial port.



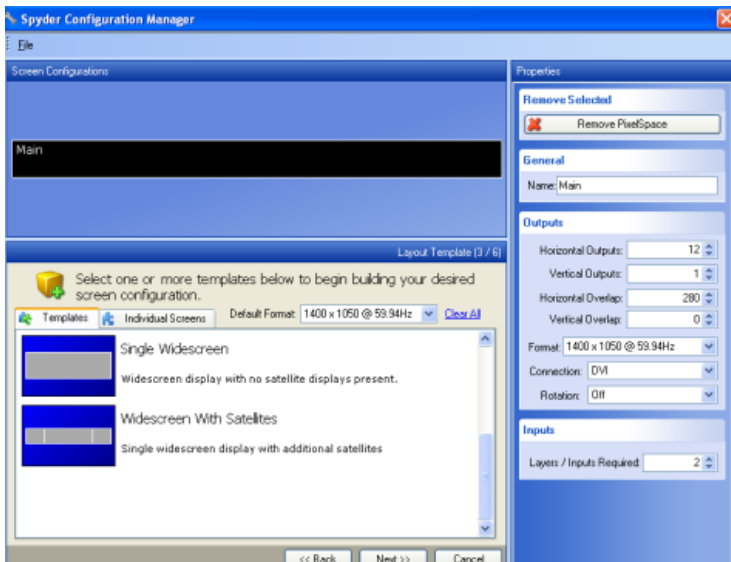
Open up the advanced software on the client PC and select *File/New*. The Spyder Configuration Manager will open and select *Start with new empty configuration*.



From the drop down menus select the matching IP address to frame in the order of the system starting from the master frame which is the 240. If doing a system configuration off-line choose 'virtual' instead of an IP address. After the frames are selected choose NTSC for frame rate. Click Next.

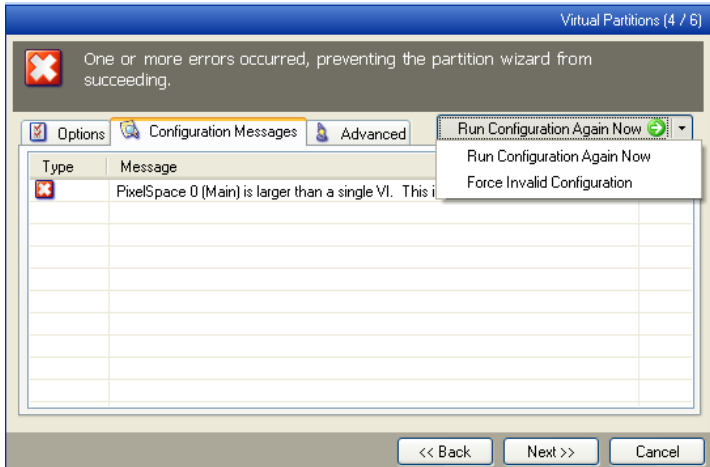
In this menu select 'single widescreen' in the template tab and next click on the actual pixel space for the widescreen in the Screen Configurations window and fill in the appropriate output information as follows:

1. Horizontal Outputs: 12
2. Vertical Outputs: 1
3. Horizontal Overlap: 280
4. Format: 1400 x 1050 @ 59.94
5. Connection: DVI if required
6. Rotation: none
7. Layers: 2 (This field can be left with the default value of 2)

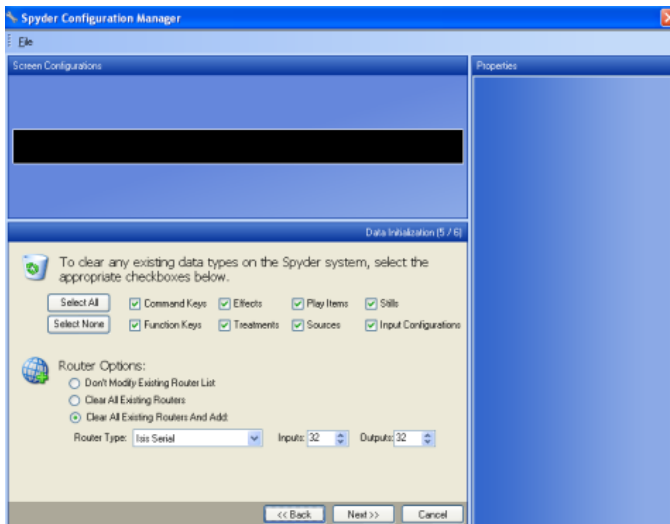
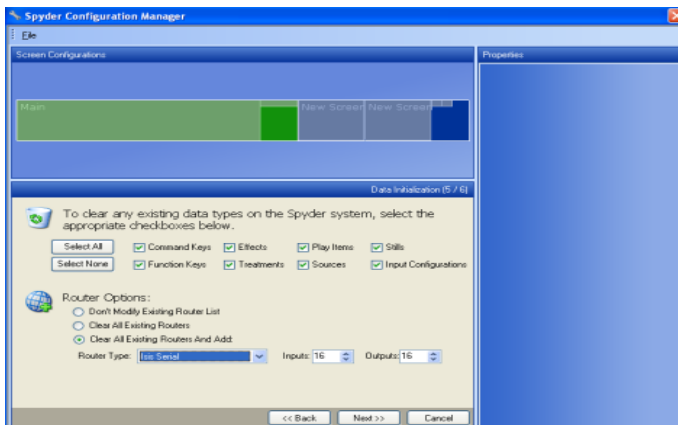


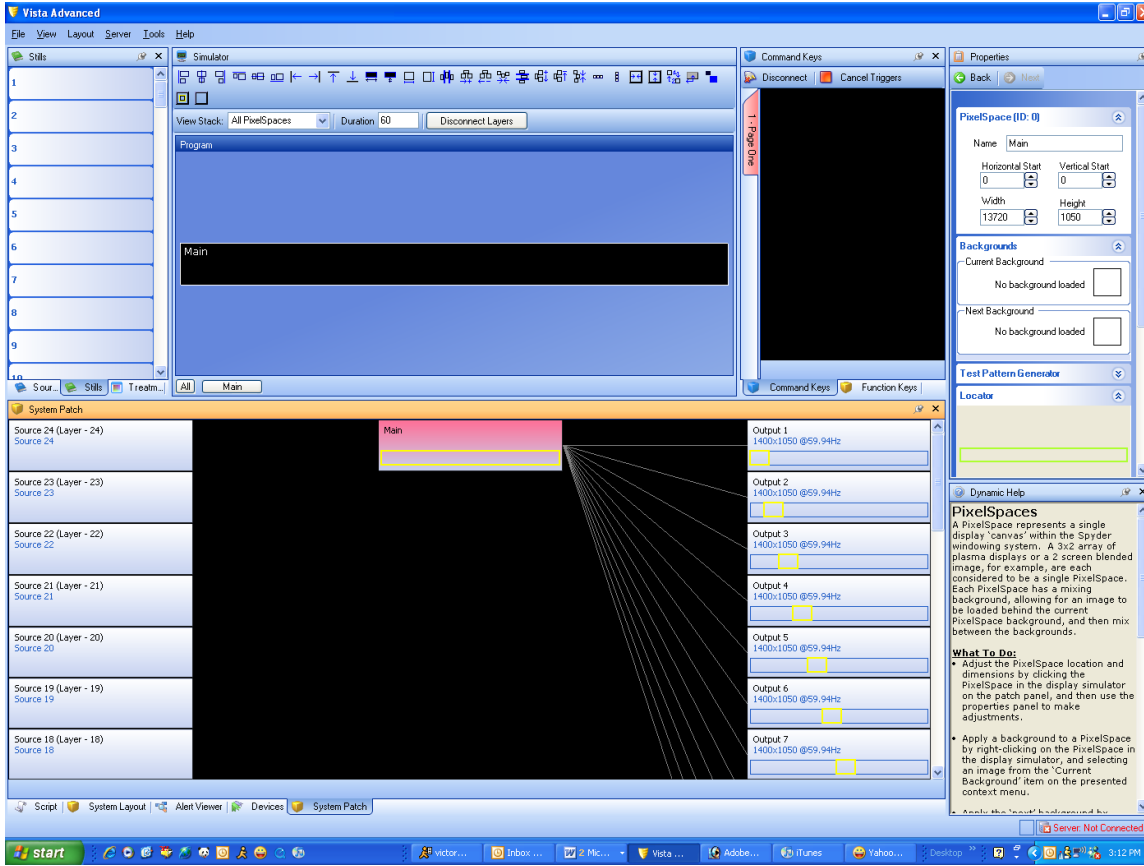
Click 'Next' and there will be an error message "Pixel Space 0 (Main) is larger than a single VI" in the message field. In the 'Run configuration Again Now' pull-down field choose 'Force Invalid Configuration'. Since we have not created the Pixel Renewal Groups yet it assumes there is only a single VI. In the next menu select NTSC and since there are no physical outputs available for a preview select 'none'.

Continue with selecting 'clear all' and add the ISIS matrix switch. Select next and apply the configuration to either the hardware (online) or to local PC (offline).



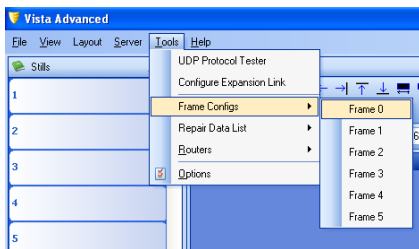
This completes the configuration and the patch and simulator portions of the GUI will look like the example below.



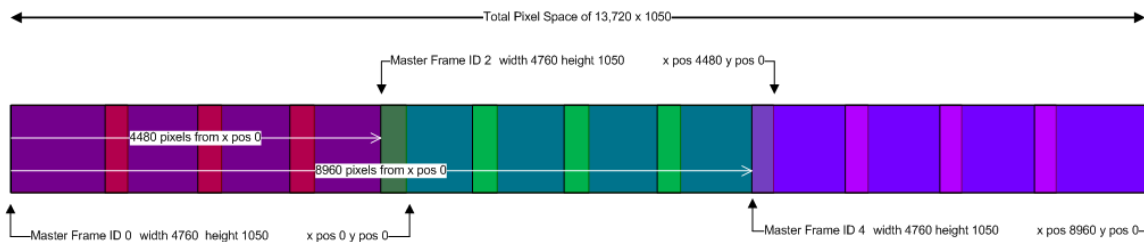


Configuring the Frame Groups and their AOR

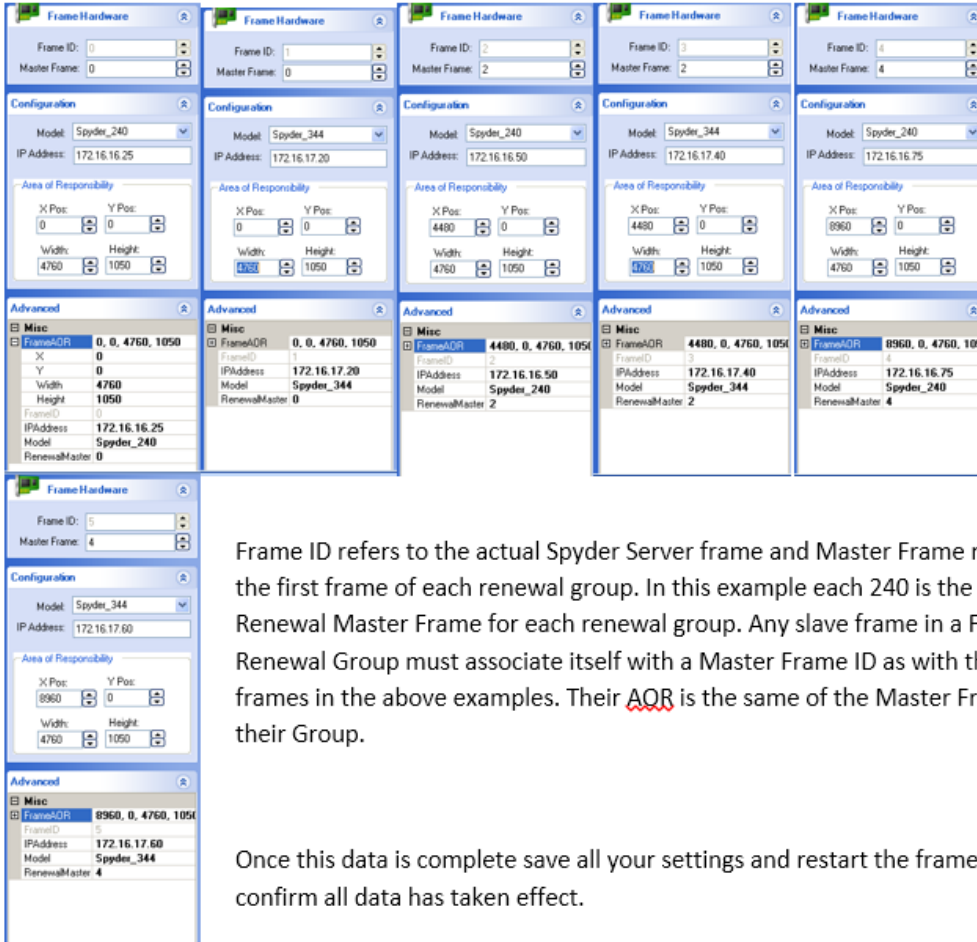
This next section will assign the Frame Groups and their area of responsibility (AOR) for the entire pixel space. Each 240 and 344 combination, such as 240 (A) and 344 (A), is a Frame Group with their VI representing a portion of the entire defined pixel space. In Advanced software select *Tools/Frame Configs > frame 0*



To define each frame group and its AOR refer to the below AOR diagram for this example to understand the next set of values that you will need to manually fill in the fields of the Frame Group hardware properties tab.

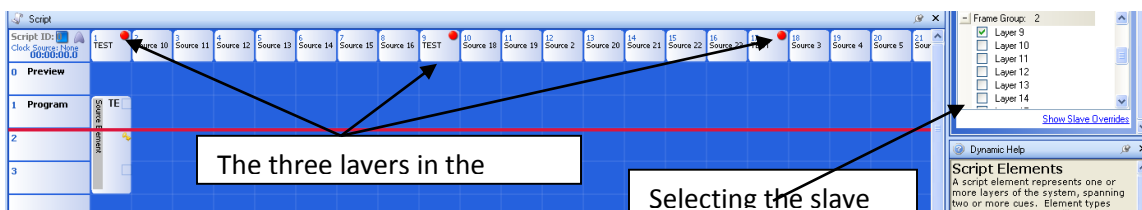


AOR Diagram

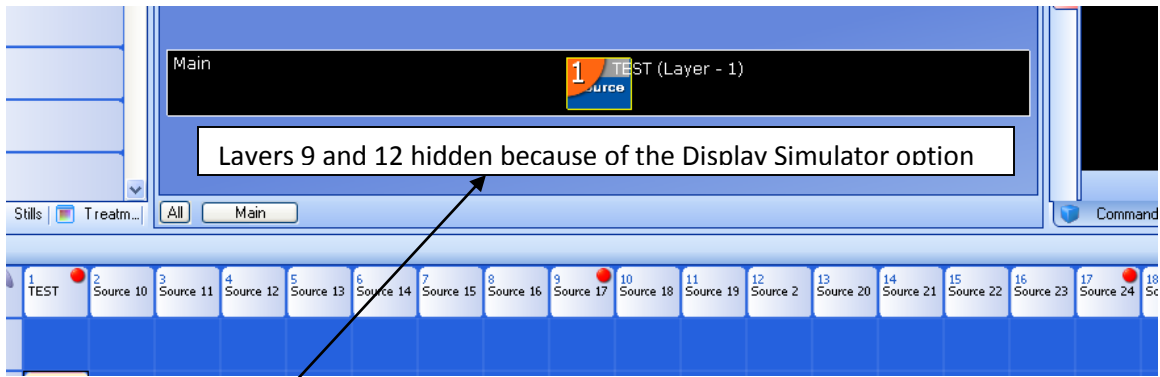


Unrestricted Layers

To create unrestricted layers a command key must first be created and an element must be applied to at least one layer. In the below example source 'TEST' is an element on layer 1 but layers 9 and 17 are 'slaved' to layer 1 so as the source is moved along the pixel space each respective layer to the Frame Renewal Group takes responsibility of the source. Click on the element in the script and in the properties section select the layer from the Frame Group to be its slave.



Note in the above example each layer has a red indicator confirming their status as belonging to a Master Element.



LastServer	172.16.17.137
Display Simulator	
DisplayPanZoomInSim	True
HideSlaveLayers	True
IgnoreRenewalGroup	False
MouseMoveWindow	10
RepositionPixelSpace	FrameGroupsOnly
ShowFrameRate	False
ShowOnlySelectedPi	False
ToolbarAlignmentMor	True
Function Keys	

In the *Tools/Options* menu there is a setting that will allow the user to decide to see the slave layers or just the master in the simulator.

When using Master Elements the matrix switch will automatically switch the same source in the slave layers.

Spyder X20 HDCP Functionality (Option)

High-bandwidth Digital Content Protection (HDCP) is a form of digital copy protection developed by Intel to prevent copying of digital audio and video content as it travels across a digital interface. The system is meant to stop HDCP-encrypted content from being played on devices that do not support HDCP or which have been modified to copy HDCP content.

HDCP (High-bandwidth Digital Content Protection) is a system designed for protecting Audio-visual content over certain high bandwidth interfaces from being copied. HDCP specification was developed by Intel and administered by Digital Content Protection, LLC which is a subsidiary of Intel. HDCP Revision 1.x was in existence since 1999 and is adopted by almost all the consumer-electronics manufacturers, content providers and prominent industry associations. HDCP is supported in various high-bandwidth interfaces (called HDCP-protected interfaces) including, but not limited to DVI, HDMI and Display port and while HDCP is an optional feature in DVI, it is mandatory in HDMI. As it is obvious, HDCP 1.x (or simply referred to as HDCP) is an interface dependent encryption system and was limited to usage in the particular interface for which they are intended, like DVI or HDMI. But with the advance of technology, several other ways of content distribution came into existence including wireless distribution, distribution over network and internet. HDCP 2.0 was designed and brought out to circumvent this issue and is interface-independent and uses more advanced encryption mechanism leveraging the advancement in encryption technologies since 1999, like AES.

X20 supports HDCP 1.4 which is the most updated revision in the 1.x specifications, and it can inter-operate with any HDCP 1.0, HDCP 1.1, HDCP 1.2, HDCP 1.3 and HDCP 1.4 compliant devices.

HDCP has three important elements in its operation, namely

1. Encryption and Decryption of Video (and Audio) data
2. Authentication and secret-key derivation
3. Revocation of compromised keys, determined by the DCP, LLC

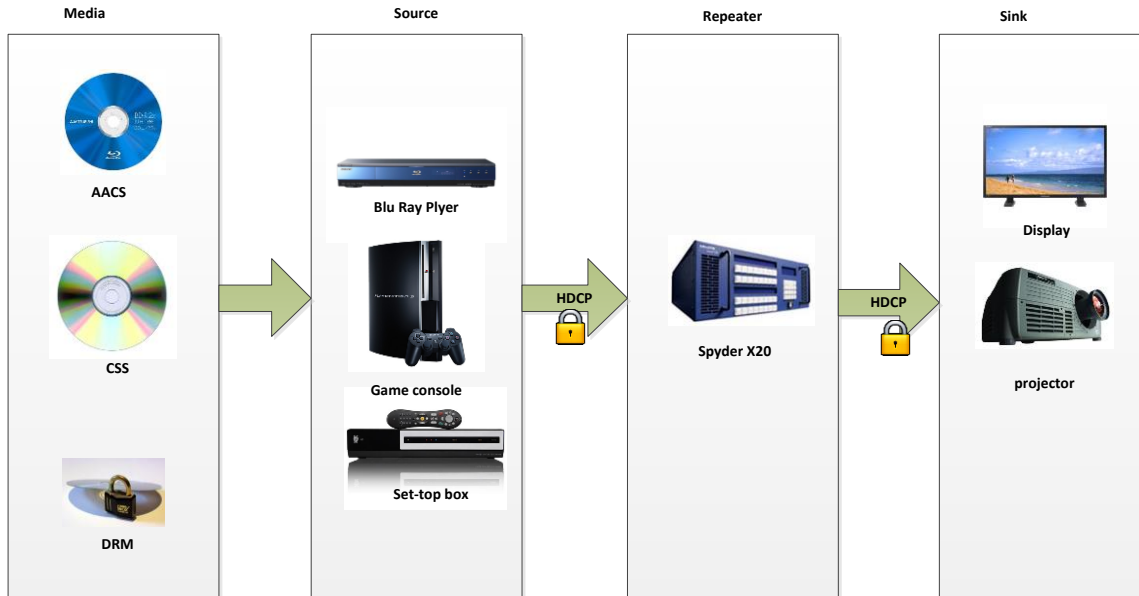


Figure 53 : Content Protection Methodology

At the core of the whole system is the HDCP Cipher which works based on the cryptographic property of the HDCP Device keys. HDCP Device key is 280 byte long secret data which is issued by DCP, LLC and which is derived from a Super Master key. Associated with this Device keys is a 5 byte vector called Key Selection Vector (KSV).

Every HDCP-enabled interface is given a unique Device Key along with a KSV which is collectively called **Device Key Set**. HDCP-enabled devices are classified as a Source (Transmitter), Receiver (Sink) or a Repeater. Transmitter enables HDCP Encryption if indicated by the media and also keeps a 'Revocation list' which is updated through distributable media like Blu-ray, DVD or through cable or network connection. Revocation list includes all the KSVs which are compromised and transmitter verifies that the connected receiver's KSV is not included in the list. The scheme of Content protection methodology followed in the industry currently is illustrated in the figure 1. Receiver responds to requests from transmitter for information and decrypts the HDCP Content. Repeaters incorporate functional blocks which include both transmitter and Receiver state machines except for the 'Revocation' mechanism in transmitter. X20 falls into the category of a Repeater as X20 receives the data in through HDCP-protected DVI interfaces and after processing, sends out the contents through HDCP-protected DVI interfaces. Every X20 input and output has a unique 'Device Key Set'.

X20 has two working modes with respect to HDCP. These modes take effect on a system-level and there is no combination involving both these modes at the same time with respect to the functions performed. Figure 2. illustrates a general connection topology of Spyder X20.

1. **HDCP mode** – HDCP-enabled devices can connect and transmit HDCP content to X20.
2. **Non-HDCP mode** –This is the normal working mode of X20. HDCP content will not be displayed.

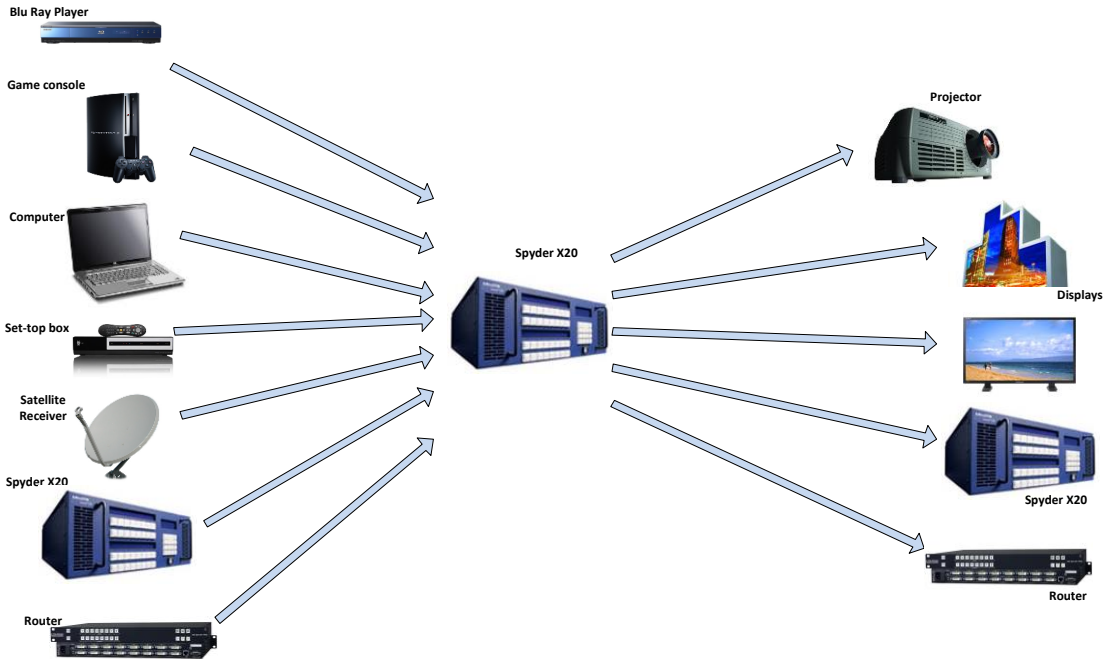


Figure 54: Connection Topology of Spyder X20

The mode selection is done in Frame Configuration option in the Vista Advanced Software and requires a server restart to take effect. In HDCP mode, all the interfaces except the HDCP-protected interfaces will be switched off. SDI and Analog will cease to function and only DVI will continue to work in HDCP mode. All Video transmitted through the outputs will be HDCP encrypted and will only be able to function with displays or receivers with HDCP capability (through DVI or HDMI). At the input side, all the inputs including non HDCP-protected interfaces will continue to work in HDCP mode.

In X20, HDCP Cipher and the associated control logic is implemented in FPGAs. During production the Device Key Set which is unique for each individual input and output DVI connection is encrypted and programmed into the PROMs from where FPGAs access these keys when required for authentication and decryption of HDCP content.

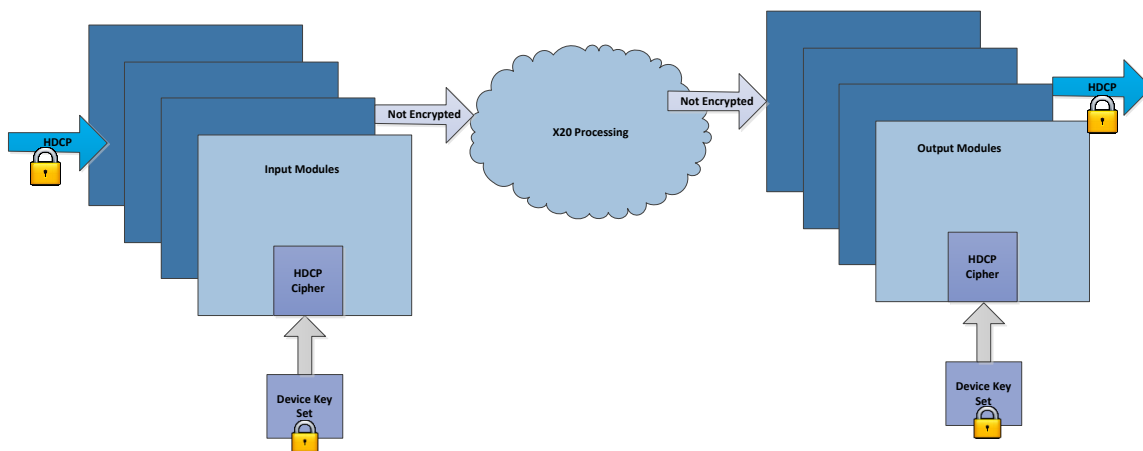


Figure 55: HDCP Operation in X20

When an HDCP-enabled transmitter is connected to the input, the transmitter may encrypt the contents using HDCP before sending through the DVI/HDMI interface. HDCP Authentication can be divided into three stages.

During the first stage, the transmitter and receiver exchanges the KSVs and calculates a secret private key by calculation done on Device Keys and a pseudo-random number generated by the transmitter's Cipher. Due to the unique Cryptographic properties of the Device Keys, this secret-key calculated independently by the transmitter and the X20 input should match. Based on this secret-key, another 2 Byte value will be generated by the HDCP Cipher and this value is read by the transmitter and should match with the transmitter's own generated value. This completes the first stage of authentication.

During the second stage of HDCP authentication, X20 collects the list of KSVs of all the downstream devices connected to the outputs and sends them to the transmitter. The maximum number of downstream devices for connection to any transmitter is limited to 127 and maximum number of levels is 7. Each repeater (like X20) makes up a level. The transmitter keeps a list of KSVs which are revoked. This list is also updated periodically with the latest list from DCP, LLC through standard means. The transmitter checks list of all KSVs against this list of revoked KSVs and if any in the list is a revoked one, transmitter does not send the encrypted content. If none of the KSVs are in the revoked list the transmitter moves on to the third stage.

In the third stage, transmitter encrypts the Audio-Video content using HDCP Cipher using the results calculated during the first stage of the authentication and sends through the DVI/HDMI interface. X20 input modules decrypts this HDCP content using the results computed during the first stage of this authentication process and passes on the video to various other stages of the video processing blocks. In case of Dual-link DVI transmitter, each link is independently authenticated and encrypted. The X20 HDCP Cipher engine works at 200MHz to service to the maximum DVI link speed of 165 MHz (for each link separately) at the inputs.

X20 DVI outputs, when connected, will try to authenticate with the receiver device(s) and collect the list of KSVs and the number of levels of the downstream devices. Based on this data collected across all the connected output devices, X20 generates a list of KSVs of all the devices connected downstream to X20 and also the number of levels. This data will be updated to each of the input modules which is used by the input modules during the second stage of authentication as mentioned. Figure 3. illustrates the HDCP operation in X20.

HDCP at X20 comes with certain limitations which are imposed by the HDCP specification implementation and compliance requirements. HDCP Contents will only be available through the digital interfaces which are supported as per the HDCP 1.4 specification (HDCP-protected interfaces), therefore in HDCP mode, all Analog and SDI outputs in X20 will be shutdown (all Analog/SDI inputs will work as in normal mode).

X20 is an HDCP Repeater and passes along all the KSVs from all the downstream devices to the transmitter device. X20 has the capability to handle and support the maximum possible levels of 7 and maximum supported number of devices which is 127. The transmitter which is connected to the X20 may not have the capability to support this many levels and number of devices and is up to the implementation of the transmitter as to the effect on going above the limit of levels and number of devices supported by the particular device. X20 does not have any control if transmitter chooses not to send HDCP content due to this in such situations.

In HDCP mode, all downstream traffic from X20 will be encrypted using HDCP Cipher irrespective of the nature of incoming video through upstream connections. The upstream devices may choose to encrypt or not to encrypt the contents based on the type of video content, but as soon as a device is connected downstream to X20, X20 starts the authentication process and only HDCP enabled displays or devices will function.

HDCP mode also restricts the X20 outputs to function only in single link mode even for the Odd numbered outputs (In normal mode Odd-numbered DVI outputs in X20 function at Dual-link rates).

During HDCP Authentication and content transfer, devices use the I2C (DDC) channel in DVI connections. The reliability of I2C communication, in certain cases may depend on the length and quality of the cable and can impact the HDCP communication.

Another concern is regarding usage of DVI distribution amplifiers, routers or splitters which are used in between the sources and X20. If these devices are unable to manage HDCP or pass-through the DDC communication with reliability, HDCP connection may end up being broken and unusable.

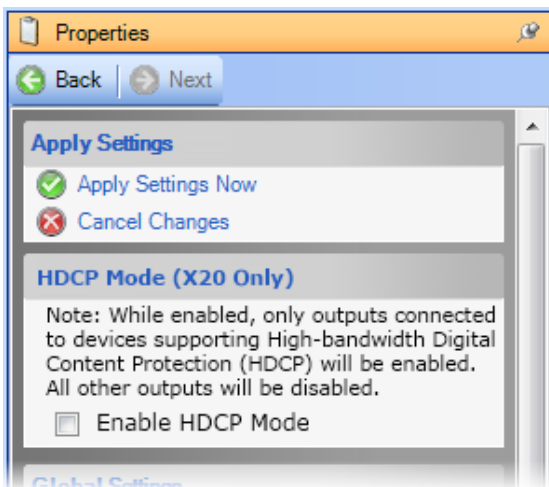
The X20 is categorized as an HDCP repeater. The definition of a repeater (from Wikipedia) is as follows:

A repeater accepts content, decrypts it, then re-encrypts and retransmits the data. It may perform some signal processing, such as up-converting video into a higher-resolution format, or splitting out the audio portion of the signal.

Note that after source content is decrypted in the X20, it may not be retransmitted / output in any unencrypted signal. HDCP support is a system-wide switch in X20, and as a result there are no supported scenarios involving simultaneous HDCP outputs and non-HDCP outputs in the same system.

Configuring HDCP Mode

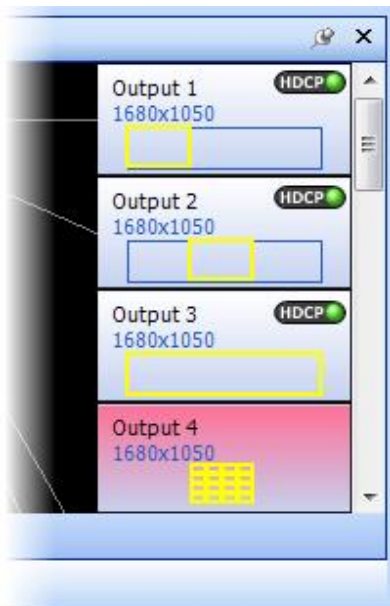
Enabling / disabling HDCP mode for X20 can be performed from the frame configuration panel ('Server' -> 'Frame Configuration') in Vista Advanced, and requires a 'soft' restart of the X20 frame. When enabled, only DVI outputs which have made a successful HDCP handshake with the downstream display device will be enabled. All other output connectors will be disabled.



Displaying HDCP Status in the UI

Output Status

Each of the X20 outputs completes a handshake with a downstream device before video will begin outputting. The result of the handshake process will be displayed in the system patch utility, and will be represented as an icon on each of the outputs. A green LED icon indicates a successful handshake has completed and the output is transmitting encrypted video. An amber/red LED icon indicates that the handshaking process has failed, and the output is not transmitting video.

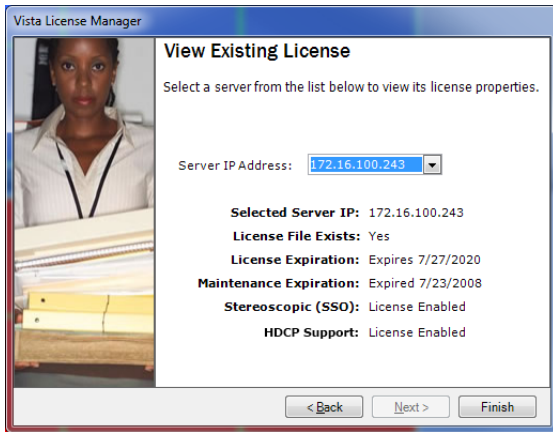


Input Status

Input handshaking status is not available with HDCP devices, and as a result no additional status information will be added for the input / source side of the system.

License Status

As with other licensed options, the licensing status of HDCP can be viewed in the existing License Administrator dialog available from the 'Help' menu.



Updating a Fielded X20 to Support HDCP

Adding HDCP support to the X20 involves a combination of hardware, firmware, and licensing modification. An HDCP license can technically be purchased for any fielded system, however a factory return may be required to apply the required updates. Please consult the factory for details.

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