The
VideoScreen 4
Suite

build 5.1362

manual

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VideoScreen 4 is presented with endless gratitude to Gerard Jonker of Jonker&Wu for his enabling the initial vision to become reality.

VideoScreen 4 is a suite of Vectorworks® Plug-In Objects that enable you to insert Hybrid (2D and 3D) models of Video Devices (such as single-area projection screens and televisions) into your Vectorworks® drawings - complete with easily-customizable screen images. *VideoScreen 4Plus* adds tools for creating edge-blended projection screens and low-resolution LED arrays. Using the Vectorworks® Object Information Palette, Video Device settings can be easily defined and changed on-the-fly as projects begin and evolve.

Notable features of the *VideoScreen 4* tools:

All of the tools...

- Will work in any 2020 or newer Vectorworks® product. Vectorworks Spotlight® and Designer® are not required.
- Allow you to change the image that appears on the device - whether it is a television screen, a projection screen, or an array of LED modules. You can use your own images or those included with *VideoScreen 4*.
- Allow you to change any of a number of settings on-the-fly.
- Will display select text on drawings. Things like visibility, color, size, and alignment, are easily changed.
- *NEW to VideoScreen 4 version 4.4*, the tools recognize Resources (projectors, stands, and television cases) in the current working drawing - not just in the Resource Folders.
- *NEW to VideoScreen 4 version 4.411*, the tools include weight tracking.
- *NEW to VideoScreen 4 version 5*, the tools include power (Wattage) tracking.
- The different parts of each video object can be assigned to different Classes and, *NEW in VideoScreen 4 version 5*, users can choose which parts are assigned to Classes and can define custom Class names.
- *NEW to VideoScreen 4 version 5*, the tools provide the means to enable the Vision® software system to recognize appropriate surfaces for video previsualization.
- *NEW to VideoScreen 4 version 5.1* is the addition of 3D text blocks (for all but *VS4-Blended Projector*).
- *NEW to VideoScreen 4 version 5.1* is the provision for user-defined labels for 2D and 3D text.
- *NEW to VideoScreen 4 version 5.1* are additional text fields for tracking data such as Purpose and Raster.
- *NEW to VideoScreen 4 version 5.1* is the ability to display additional info in 2D text blocks, such as trim, projector type, and purpose.
- *NEW to VideoScreen 4 version 5.12*, the tools use the Vectorworks® Resource Selector system for choosing screen images.
- *NEW to VideoScreen 4 version 5.12*, Braceworks® functionality has been implemented.
- *NEW to VideoScreen 4 version 5.13* are several new data fields.
- *NEW to VideoScreen 4 version 5.13*, the Object Information Palette can, in select sections, be collapsed, hiding less-used areas.
- *NEW to VideoScreen 4 version 5.136*, are Location, Position, and Unit fields.

VS4-Television, the Television Plug-In Object...

- Includes several stock models, including flat-screen and CRT monitors and televisions. *NEW to version 4.4*, are over 90 new television Symbols, representing over 25 current models in various orientations. Your own custom models can still be easily added.
- Provides the ability to add adjustable stands to flat-screen models.
- Includes a "Coverage Zone" feature to aid you in the sizing and placing of televisions for your projects.
- *NEW to VideoScreen 4 version 4.411*, includes the option to display screen size text.
- *NEW to VideoScreen 4 version 5.024*, includes the ability to define stand pole height separate from television casing height.
- *NEW to VideoScreen 4 version 5.024*, includes the ability to tilt television models.
- *NEW to VideoScreen 4 version 5.13*, television models are now chosen using the Vectorworks® Resource Selector system.
- *NEW to VideoScreen 4 version 5.131*, includes the creation of pipe-and-base stands.

VS4-Projection, the Projection Plug-In Object...

- Allows for infinitely-adjustable rectangular screen sizes - based on standard screen sizes or on your custom dimensions.
- Will create round screens, with adjustable screen diameter and border dimensions.
- Places projectors and creates their projection cones in 2D and 3D space - based on screen size and on lens ratings...or, you can specify a screen size and the projection distance and let *VS4-Projection* suggest a lens. If the latter, you can drag the projector to a new location and *VS4-Projection* will report back the projection distance and the suggested lens.
- Will create the geometry for FastFold® legs and dress kits, tripods, and, *NEW to VideoScreen 5*, roll-up and roll-down cases with a "Tab-Tensioned Sides" option. Dress kit curtain parameters have adjustable color and dimensions.
- Allows you to specify "real-world" projector placement, including flown (with a definable trim height), aligned with the top or bottom of the screen, or ground-supported (on one of the included stock floor stands: scaffolding, AV carts, or tables).
- Includes a "Coverage Zone" feature to aid you in the sizing and placing of screens for your projects.
- *NEW to version 4.411*, projector and screen aspect can be independent of each-other.
- *NEW to version 5.02*, is a new Vertical Position option, "Mounted," making for simpler alignment with structures like truss, ceilings, and pipe.
- *NEW to version 5.02*, projection calculations and cone lines recognize references other than lens center, such as projector body feet.
- *NEW to VideoScreen 4 version 5.13*, projector and stand models are now chosen using the Vectorworks® Resource Selector system.
- *NEW to VideoScreen 4 version 5.131*, 2D representation of tilted projectors is much-improved.
- *NEW to VideoScreen 4 version 5.131*, a "Floor" projector "Vertical Position" has been added.

VS4-Blended Screen, the Blended Plug-In Object, in addition to many of the
VS4-Projection features...

- Creates rectangular flat and, *NEW to version 5*, curved edge-blended projection screens.
- Determines projector spacing and places projectors based on screen size, screen area count, and projector aspect - all user-defined.
- Places projectors that are, in terms of drawing geometry, independent of the screen. This allows you to have different text display and position settings for each projector. This also allows you to track projector data in WorkSheets. Also, *NEW to version 4.4*, projectors placed by *VS4-Blended Screen* can each have different placement methods, lenses, and projection distances. *NEW to VideoScreen 4*, when you drag, rotate, or update *VS4-Blended Screen*, the associated projectors move, rotate, or update with it.
- Gives you feedback of information through the Object Information Palette, including an estimate of screen image size in pixels, an estimate of area overlap - in both measured dimensions and pixels, and projector spacing - in terms of both projector-to-projector and overall starting-point dimensions. *NEW to version 5*, the amount of overlap is adjustable - based on "ruler" measurement, pixel count, or area percentage.
- Includes a "Coverage Zone" feature to aid you in the sizing and placing of screens for your projects.
- Will allow you to specify a projection distance and be shown a recommended lens as with *VS4-Projection*.
- *NEW to version 5*, *VS4-Blended Screen* will place 3D area ID notes on screens.
- *NEW to version 5*, *VS4-Blended Screen* will automatically recalculate projector spacing and blending regions when either projector aspect or resolution is changed.
- *NEW to 5.136* is the ability to move and re-format the multi-projector tag text.

VS4-LED, the LED Plug-In Object:

- Produces arrays based on node size, module counts, module spacing, and/or array size.
- Creates different module shapes, including flat disks and tiles, tubes, domes, and capped tiles and disks.
- Easily simulates real-world devices, like panels, MiPix®, VersaTube®, LC®, ColourWeb®, PixelLine®, iColor® tiles, and SoftLED®.
- Maps images across the LED modules, taking into account "negative space" between modules.
- *NEW to version 5.1* is the inclusion of the Coverage Zone feature present in other *VS4* tools.
- *NEW to 5.1* is the addition of the display of "Secondary Units," allowing users to display array dimensions in, for example, meters if drawing units are in feet and inches.
- *NEW to 5.1* is the ability for weight calculations to follow module count changes.
- *NEW to 5.136* is the ability to create half-tiles.
- *NEW to 5.136* is the ability to miter vertical edges of tiles (resulting in more seamless curved arrays).

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VideoScreen 4 **requires Vectorworks® and Renderworks® 2020 or newer.**

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Installation

If the tools were installed through the Vectorworks 2021® (or newer) Partner Products system, this section does not apply.

Using the Vectorworks® Plug-in Manager Installer:

1. Back up any pre-existing content (screen content, and projector, television, and stand Symbols) you might wish to save.
2. With Vectorworks® running, open the Plug-in Manager through your Vectorworks® menu ([Tools][Plug-ins][Plug-in Manager...]).
3. Select the "Third-party Plug-ins" tab.
4. Click the "Install..." button.
5. In the dialog that opens, find the Zip file that you downloaded from our server. Select that file and click the "Open" button. Contents of the Zip file will be copied into the appropriate folders in your User Folder structure:
    - Manual ➞ "...Plug-ins\Landru Manuals"
    - *LandruStrings.vwr* ➞ "...Plug-ins"
    - Tools (*.vso files) and Commands (*.vsm files) ➞ "...Plug-ins\Landru Tools"
    - Default *VideoScreen* Symbol and screen content files ➞ "...Libraries\Defaults\Video Screen\Casings CRT 4-3," "...Libraries\Defaults\Video Screen\Casings CRT 16-9," "...Libraries\Defaults\Video Screen\Casings CRT Curved 4-3," "...Libraries\Defaults\Video Screen\Casings Flat 4-3," "...Libraries\Defaults\Video Screen\Casings Flat 16-9," "...Libraries\Defaults\Video Screen\Projector Models," "...Libraries\Defaults\Video Screen\Screen Images," and "...Libraries\Defaults\Video Screen\Stand Models."
    - *Texture_Destroyer_20**.vwx* ➞ "...Plug-ins\Landru Utilities" *(This file contains a script for users who are needing to open files created in Vectorworks® versions older than 2014 and are having issues with Textures created by our tools not being generated correctly. If this applies to you, open the file and follow the instructions. If not, simply ignore this folder and file.)*

    The installer will also move pre-existing copies of any Landru Design Tools and Commands to the "...Plug-ins\Landru Tools" folder.
6. In the dialog that opens, click the "Restart" button.
7. After re-opening Vectorworks®, add the newly-installed tools and commands to your Workspace. See below if you're not sure how to do that.

Manually installing the Tools and Commands:

UnZip the Zip file you downloaded, **keeping the folder structure it contains intact**. You will end up with four folders, the contents of which will need to be copied as-directed, **without Vectorworks® running**:

"Landru Manuals"	"Landru Utilities"
This folder contains the PDF manual for *Audio ToolSet 2*. Copy this folder to wherever you'd like on your hard-drive.	This folder contains a file called "Texture_Destroyer_20**.vwx." This file contains a script for users who are needing to open files created in Vectorworks® versions older than 2014 (including Template files) and are having issues with Textures created by our tools not being generated correctly. If this applies to you, copy this folder to wherever you'd like on your hard-drive, open the file, and follow the instructions. If not, simply ignore or delete this folder and file.

"Plug-Ins"	**"Libraries"**
This folder and its sub-folder contain seven or nine files, depending on the *VideoScreen 4* license being installed: the actual Plug-In files, three Command files, and a resource file. As the folder name hints, copy the contents of the downloaded "Plug-ins" folder into your Vectorworks® 2024 (or, 2023, 2022, 2021, or 2020) "Plug-ins" folder. The "Plug-ins" folder is found either in your main application folder or in your User folder. If you have older versions of the supplied files installed, you'll need to delete the old files or move them to another folder before adding the new files. If you wish, the *.vso and *.vsm files can be placed in a sub-folder of the Plug-ins folder other than "Landru Tools" but ***LandruStrings.vwr* <u>MUST</u> be placed in the "Plug-Ins" folder.**	This folder contains a folder containing nine folders and Vectorworks® files containing the default images and models used by *VideoScreen 4*. As the folder name hints, copy the subfolders of the downloaded "Libraries" folder - structure intact - into your Vectorworks® 2024 (or, 2023, 2022, 2021, or 2020) "Libraries" folder, being sure to back up any pre-existing content files you might wish to save. The "Libraries" folder is found either in your main application folder or in your User folder. **It is <u>VERY</u> important that you copy this folder structure intact into the "Libraries" folder.** If these folders already exist on your system, simply copy the files you downloaded into them. **Again, be sure to back-up and/or rename any existing files that you don't want over-written.** **Beginning with *VideoScreen 4* versions 4.411 and 5.02, it is HIGHLY recommended that you delete (or, move to a safe place on your hard-drive) any earlier-version Spotlight and/or Landru Design files previously occupying those folders if they exist. Any custom Resources (televisions, projectors, or stands) should be updated to use the version of the "__VS-ModData" record found attached to the 4.411 (or newer) Resources and should include appropriate weight values.**

After copying the folders and files and re-opening Vectorworks®, add the newly-installed tool and commands to your Workspace. See below if you're not sure how to do that.

Adding the Tools and Commands to your Workspace:

1. Click...[Tools]...[Workspaces]...[Workspace Editor]. Make sure "Edit current workspace" is selected and click "OK."
2. In the resulting dialog, click the "Tools" tab.
3. Scroll down the "Tool" section (*the left side*) until you see the "Landru" section. Click the "+."
4. Drag the desired tool icons to an existing Tool Set in the "Palette" section (*the right side*). If desired, drag "New Tool Set" into the "Palette" section to create a new Tool Set. **Do <u>NOT</u> add *VS4-Blended Projector* to your WorkSpace**.

Optional...

5. Click the "Menus" tab.
6. Scroll down the "Commands" section (*the left side*) until you see the "Landru" section. Click the "+."
7. Drag the desired Command items into the desired positions in the "Menus" section (the right side).
8. Click "OK."

Using *VideoScreen 4*

Choose the *VideoScreen 4* icon for the particular tool you wish to use *(VS4-Television, VS4-Projection, VS4-Blended Screen, or VS4-LED*) from the Tool Set into which you added it earlier. A ghost image of the tool's default casing, screen and projector, or array may appear in your drawing window. Click in your drawing to place the *VideoScreen 4* object. Rotate the screen to the desired angle and click again (*like placing Vectorworks® Symbols*). If an initial settings or preferences dialog box appears, make any changes you wish and click "OK" in that box to make it disappear and to place the *VideoScreen 4* object.

The Check and Add License Keys dialog may appear the first time you use one of these tools. If so, paste/enter the key provided by Landru Design, click the "Add" button, and then the "OK" button. If the key entered is correct, you should not see this dialog again. If you don't have a key, visit the Landru Design Web site for information about purchasing a license.

With the newly-placed screen object selected, use the Object Information Palette to make adjustments. If the Shape tab is not in the forefront of the Object Information Palette, click it to make it so.

   VideoScreen 4 - Blended Screen has additional steps in its use. See pages 18-25 for more information.

Some of the formats resize dynamically and some use pre-set models.

Where appropriate, the *VideoScreen 4* tools will give dimensional feedback through the Object Information Palette.

If you chose to install any of the three optional Commands:
1) "Check or Add Landru Keys" will allow you to check which Landru Design license keys are installed and to add additional keys as-needed. "Remove Landru Keys" will allow you remove Landru Design license keys.
2) "Resource Folder Names..." will allow you to specify Resource Manager folder names used to store Resources created on-the-fly or imported by the tools.

VideoScreen 4's different tools and settings are detailed in the pages that follow...

   *Please forgive any discrepancies between this manual, its illustrations, and reality. It is often easier
   to make software fixes and/or additions than it is to keep a manual current.*

VS4-Television parameters

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects.   *("Z" is the distance from the drawing's ground plane to the bottom of the Plug-In Object instance.)*

TV Type: Choices of TV types: "Flat Panel," "CRT," and "CRT Curved."

Screen Aspect: Choices of different aspects (*presently, "4:3" and "16:9"*).

Casing: The currently-chosen television casing.

Select Casing...: Opens the Resource Selector dialog, allowing you to choose a television model of the given Screen Aspect. *(These casings do not resize dynamically. If you desire to use a casing not in this list, you can create your own, as detailed on pages 37-40.)*

Brand and **Model:** The brand and model of the television (*feedback only*).

Size: The general diagonal screen size of the television (*feedback only*).

Width (image) and **Height (image):** Width and Height of the television's screen (*feedback only*).

Tilt: Tilt angle for television model.   Positive values tilt the top of the screen away from the viewer and negatives tilt it toward the viewer. *(Only enabled if "Add Adjustable Stand" type is NOT toggled on.)*

Weight: The weight of the television. If the television model being used includes appropriate weight information, this field will be automatically populated with a default value.

Hanging Point: Hanging support options used by Braceworks®: "Top," "Middle," and "Bottom."

Wattage: The amount of power required by the television. If the television model being used includes appropriate power information, this field will be automatically populated with a default value.

Show Coverage Zone: Draws the viewing area for the screen based on the screen size.   Toggling this will enable different adjustable settings. Text, including user-definable labels, is controlled using the "Text Options" dialog. *(See page 36 for more information.)*

These six settings are enabled when you click the "Show Coverage Zone" toggle:

Zone Reference: Reference options for coverage area calculations - the screen's width, height, or diagonal measurement.

Max. Horiz. Angle: The maximum side-to-side viewing angle for the screen, relative to dead-on.

Max. Vert. Angle: The maximum viewing viewing angle for the screen, from the top of the screen to the "Viewing Height," used to determine the minimum optimal viewing distance from the screen.

Viewing Height: The viewing height reference for the "Max. Vert. Angle."

Near Multiplier and **Far Multiplier:** The multipliers of the reference dimension to determine the extents of the Near and Far Coverage Zones and will display the maximum optimal viewing distance(s) for the screen. If the "Far" value is larger than "Near," both zones will be drawn. Otherwise, only "Near" will be drawn.

Screen Image: The image currently applied to the television's screen.

Edit Screen Image...: Opens the "Edit Screen Image" dialog, allowing you to switch and manipulate the image currently applied to the television's screen. This dialog also provides the means for enabling the Vision® software system to recognize appropriate surfaces for video previsualization. *(See page 35 for more information.)*

Adjustable Stand: Options for creating an adjustable floor stand: "None," "Plate Stand," and "Pipe and Base." *(Only enabled if a "Flat Panel" type is chosen.)*

Pole Height: Choices of stock heights for the stand poles - including a "Custom" option. *(Only enabled if an "Adjustable Stand" option other than "None" is chosen.)*

Custom Height: The custom height of the stand pole(s). *(Only enabled if if an "Adjustable Stand" option other than "None" is chosen and the "Custom" "Pole Height" is chosen.)*

Casing Height: The measurement from the base of the stand to the bottom of the screen case. *(Only if an "Adjustable Stand" option other than "None" is chosen.)*

Circuit Number: The number of the circuit used to power the television.

Circuit Name: The name of the circuit used to power the television.

Source: The signal source for the television.

Drive Line: The drive line used to provide the signal for the television.

Input: The television's signal input to be used.

Frame Rate: The television's frame rate.

Resolution: The television's resolution.

VS4-Television parameters, continued...

Location: Information about the location of the television in the project *(such as "Breakout #13").*

Position: Information about the position of the television in the project *(such as "DSR").*

Unit: The unit number or designator for the television.

Purpose: Information about the intended purpose of the television *(such as "DSR Reinforcement").*

Vendor: The vendor for the television.

Cost: The cost of the television. *(Number only.)*

Note: Any general notes.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of text elements. *(See page 36 for more information.)*

Default Text Position: Returns text to its default location. *(Only enabled if text has been inserted.)*

Parts Classes...: Opens the "Parts Classes" dialog, used to assign the different elements comprising the *VS4-Television* model to different Classes. *(See page 36 for more information.)*

Update: Forces the *VS4-Television* object to regenerate.

VS4-Television Build: The build number of the *VS4-Television* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" is disabled.

VS4-Projection parameters

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects. *("Z" is the distance from your drawing's "floor" (in most instances, the drawing's ground plane) to the bottom of the screen border or, in the case of "Roll-Up Cases, to the bottom of the Case.)*

Screen Type: General format choices: " Front Projector," "Rear Projector," and "LED." *("Front Projector" and "Rear Projector" are for projection screens. "LED" simply hides all of the projection parameters and creates a basic screen.)*

Aspect: Choices of screen aspects:

1) If "4:3," "3:4," "16:9," "9:16," "special landscape," or "special portrait" is chosen, the "Stock Size" parameter (below) will be revealed and will give you a list of stock screen sizes from which to choose.

2) If "4:3 custom," "3:4 custom," "16:9 custom," "9:16 custom," "5:4 custom," "4:5 custom," "1:1.89 custom," or "1.89:1 custom" is chosen, entering either a Width or a Height will cause *VS4-Projection* to calculate the other value, based on the chosen aspect.

3) If "rect. all custom dimensions" is chosen, you can enter both a Width and a Height. *VS4-Projection* will then calculate and display the resulting aspect.

4) If "round custom" is chosen, the "Diameter (Image)" parameter will be revealed.

Stock Size: Stock 4:3, 16:9, or Special screen sizes.

Height (image) and **Width (image):** The Height and Width of the screen (not including border or frame). Depending on the "Screen Aspect" mode, these parameters will either be "feed-back only" or will be editable.

If you have chosen one of the projection types (Front or Rear) and the screen is square or round or the screen and projector orientations don't match (such as stock screen in portrait orientation and the projector being landscape), the "Aspect" drop-down list (below) will then be enabled, this one containing possible aspect ratios FOR THE SCREEN'S PROJECTOR. VS4-Projection will place the projector based on filling the screen 100% - and will account for any image overshoot. See "Independent Aspect" and "Aspect" on page 15 for more information.

Diagonal (calc): The calculated diagonal measurement of the screen. *(Hidden if of the "Round Custom" aspect is chosen above.)*

Frame: Options for the screen's frame:

1) "No Frame:" Only the image area of the screen will be created.

2) "Frame:" A frame with thickness will be created.

3) "Border Only:" A simple "flat" border will be created.

Top, **Bottom**, **Left**, and **Right** widths**:** The widths of the frame or border. *(Only enabled if either the "Frame" or "Border Only" "Frame" option is chosen. "Top" is replaced by "Whole" if the screen is round.)*

Depth: The thickness of the screen frame. *(Only enabled if the "Frame" "Frame" option is chosen.)*

Edge: The distance between the screen's projection surface and the front face of the screen's frame. *(Only enabled if the "Frame" "Frame" option is chosen.)*

Tab-Tensioned Sides: Creates tab-tensioned side borders. *(Only enabled if the "Border Only" "Frame" option and either the "Roll-Down Case" or "Roll-Up Case" "Screen Support" are chosen.)*

Tilt: Sets the tilt of the screen, in degrees. Positive values tilt the top of the screen away from the viewer and negatives tilt it toward the viewer. *("Tilt" will be disabled if a "Screen Support" other than "None" is selected.)*

Total Clearance: The total vertical height of screen (floor to top of screen, border, dress kit valence, etc.), taking into account "Tilt."

Weight: The weight of the screen.

Brand and **Model:** The brand and model of the screen.

Location: The location of the screen in the project *(such as "Arena").*

Position: The position of the screen in the project *(such as "SL Run-Off").*

Unit: The unit number or designator for the screen.

Purpose: Information about the intended purpose of the screen *(such as "SL IMAG").*

Vendor: The vendor for the screen.

Cost: The cost of the screen. *(Number only.)*

Show Centerline: Displays the screen centerline, perpendicular to the screen's viewing surface.

VS4-Projection parameters, continued...

Show Screen Zoom Range: Shows a graphical representation of potential screen placement based on projector's zoom range. *(Only enabled if a zoom lens is chosen.)*

Show Coverage Zone: Draws the viewing area for the screen based on the screen size.   Toggling this will enable different adjustable settings. Text, including user-definable labels, is controlled using the "Text Options" dialog. *(See page 36 for more information.)*

These six parameters are enabled when you click the "Show Coverage Zone" toggle:

> **Zone Reference:** Reference options for coverage area calculations - the screen's width, height, or diagonal measurement.

> **Max. Horiz. Angle:** The maximum side-to-side viewing angle for the screen, relative to dead-on.

> **Max. Vert. Angle:** The maximum viewing viewing angle for the screen, from the top of the screen to the "Viewing Height," used to determine the minimum optimal viewing distance from the screen.

> **Viewing Height:** The viewing height reference for the "Max. Vert. Angle."

> **Near Multiplier** and **Far Multiplier:** The multipliers of the reference dimension to determine the extents of the Near and Far Coverage Zones and will display the maximum optimal viewing distance(s) for the screen. If the "Far" value is larger than "Near," both zones will be drawn. Otherwise, only "Near" will be drawn.

Screen Support: Options for screen support: "None," "Goalpost Legs," "Tripod," "Roll-Down Case," and "Roll-Up Case." The "Goalpost Legs" option is similar to commercial Fastfold® systems. The "Tripod" option constructs portable classroom-style "roll-up"-type arrangements. The feet for both options and the bottom of the dress kit will be placed on the Plug-In Object's ground. *(See "Floor Height" on page 16 for more information.)*

Show Feet: Options to show Both, Front, Back, or no Goalpost Leg feet. *(Enabled if "Goalpost Legs" "Screen Support" is chosen.)*

Depth: The Depth of the Roll-Up or Roll-Down Case. *(Enabled if "Roll-Down Case" or "Roll-Up Case" "Screen Support" is chosen.)*

Motor: Designates the end of the Roll-Down or Roll-Up Case that will be expanded to show the presence of a screen motor ("None," "Left," or "Right"). *(Enabled if "Roll-Down Case" or "Roll-Up Case" "Screen Support" is chosen.)*

Opening: Designates the front-to-back position of the screen opening in a Roll-Down or Roll-Up Case ("Back," "Center," or "Front"). *(Enabled if "Roll-Down Case" or "Roll-Up Case" "Screen Support" is chosen.)*

Add Dress Kit: Creates dress kit drapery and hardware. *(Enabled if either "Goalpost Legs" or "Tripod." "Screen Support" are chosen.)*

Color: Standard dress kit curtain color options ("Black," "Gray," "Red," "Green," and "Blue"). *(Enabled if either "Goalpost Legs" or "Tripod." "Screen Support" and "Add Dress Kit" are chosen.)*

Left Leg Width and **Right Leg Width:** The width of the dress kit drape (the leg) on the left and/or right sides of the screen. *(Enabled if "Goalpost Legs" "Screen Support" and "Add Dress Kit" are chosen.)*

Valence Height: The height of the dress kit piece above the screen (the valence). *(Enabled if "Goalpost Legs" "Screen Support" and "Add Dress Kit" are chosen.)*

For each of these three dimensions, if a dimension less than the border width is entered, that element (either of the legs and/or the valence) will not be created.

Border Overlap: The amount of overlap of the Dress Kit drapery over the screen's border. *(Enabled if "Goalpost Legs" "Screen Support" and "Add Dress Kit" are chosen. The tool will not allow an overlap distance less than "0.")*

Pleat Width and **Pleat Depth:** The reference width and depth of one of the pleat sections of the dress kit curtain.

Hide Screen: Hides the screen geometry while still drawing the projector and projection cone. *(For users projecting onto scenery or other "non-screen" surfaces.)*

Screen Image: The image currently applied to the screen.

Edit Screen Image...: Opens the "Edit Screen Image" dialog, allowing you to switch and manipulate the image currently applied to the screen. This dialog also provides the means for enabling the Vision® software system to recognize appropriate surfaces for video previsualization. *(See page 35 for more information.)*

Show Projector: Shows the projector. *(Only enabled for "Front Projector" and "Rear Projector" types.)*

Show Projection Cone: Shows the projection cone. *(Only enabled for "Front Projector" and "Rear Projector" types.)*

VS4-Projection parameters, continued...

Projector: The currently-chosen projector.

Select Projector...: Opens the Resource Selector dialog, allowing you to choose a projector. *(Only enabled if either "Show Projector" or "Show Projection Cone" is toggled on. Projectors with "-Side" in their name will alert VS4-Projection that a Portrait-oriented projector is being specified. If you desire to use a projector not in this list, you can create your own, as detailed on pages 37-40.)*

Brand and **Model:** The brand and model of the projector. If the projector model being used includes appropriate brand and model information, these fields will be automatically populated with default values.

Weight: The weight of a single projector. If the projector model being used includes appropriate weight information, this field will be automatically populated with a default value.

Wattage: The amount of power required for a single projector. If the projector model being used includes appropriate power information, this field will be automatically populated with a default value.

Independent Aspect: Allows projection calculations for a projector having a different aspect than the screen. *(Only enabled for "Front Projector" and "Rear Projector" types - if the screen and projector orientation match and the screen is not square or round. If enabled but NOT toggled, VS4-Projection assumes screen and projector aspects match. Either way, VS4-Projection will calculate projection distance required to fill the screen 100% and will account for any image overshoot.)*

Aspect: Different projector aspects from which to choose. *(See the above note under "Width (image)" and "Height (image)." Enabled if the screen and projector aspects don't match, if the screen if the screen is square or round, or if "Independent Aspect" (above) is toggled on.)*

L/R Shift: Enter a dimension to shift the projector(s) side-to-side relative to the screen. This parameter will respond correctly if the "Distance" "Place Based On" parameter is chosen. *(Only enabled if either "Show Projector" or "Show Cone" is toggled on.)*

Horiz. Offset Angle: The calculated horizontal angle the projector is offset from the screen's center.

Horiz. Offset Perc: The calculated horizontal offset from the screen's center, shown as a percentage.

Point at Screen Center: Keeps the projector(s) pointed at the center of the screen if it(they) is(are) shifted using "L/R Shift." *(Only available if "L/R Shift" is not equal to 0 and "Show Projector" is toggled on.)*

Tilt: Sets projector tilting relative to the horizontal plane. *(Only available when "Show Projector" is toggled on.)*

Place Based On: Options for placing projectors:

   1) "Lens:" Enter a lens value and *VS4-Projection* calculates the projection distance and determines projector placement.

   2) "Distance:" Enter a distance or drag the projector using Control Points and *VS4-Projection* calculates an appropriate lens value.

Proj. Distance (Straight): The distance from the projector's reference (ie. lens center or front feet) to the screen relative to an angle perpendicular to the screen. *(Only editable if the "Distance" "Place Based On" option is chosen.)*

Proj. Distance (Actual): The actual 3D distance from the projector's reference (ie. lens center or front feet) to the screen's center.

Lens: Standard projector lens options, including zoom and Custom lenses. If the "Lens" "Place Based On" option is chosen, this parameter will be a pop-up list of stock lenses. If the "Distance" "Place Based On" option is chosen, this parameter will display "Custom" and "Zoom Factor" will display the suggested lens.

Zoom Factor: The specific lens zoom value. *(Only enabled if a zoom or "Custom" lens is chosen and the "Lens" "Place Based On" option is chosen .)*

   *The stock lenses listed are based on manufacturers' stated distance-to-width ratios only. Because actual lens performance varies between manufacturers, you may have to select a different lens from our list or use "Custom" and a specific "Zoom Factor" to reflect the true performance of the particular lens you are using. **It is important to consider VS4-Projection's projector placement calculations as estimates only.***

Model: Information regarding the projector's lens model.

VS4-Projection parameters, continued...

Show Projector Zoom Range: Shows a graphical representation of the lens' zoom range - and, therefore, potential projector placement. *(Only enabled if a zoom lens is chosen.)*

Show Cone Zoom Range: Shows a graphical representation of potential projector cone lines. *(Only enabled if a zoom lens is chosen.)*

Vertical Position: "Modes" for placing projectors vertically *(Only available when either "Show Projector" or "Show Projection Cone" is selected.)*:

    1) "Screen Center:" Center of the projector lens is aligned with the screen center.

    2) "Align to Top:" The top of the projector body is aligned with the top of the screen border.

    3) "Align to Bottom" The bottom of the projector body is aligned with the bottom of the screen border.

    4) "Stand:" The projector is placed on a specified stand. *(Enables the "Stand Model" drop-down list.)*

    5) "Floor" The bottom of the projector body is placed on the PIO's ground.

    6) "Rigged:" The projector is placed using a rigging trim height. *(Enables the "Trim" parameter.)*

    7) "Mounted:" The projector's placement is relative to a structure like truss, ceiling, or pipe. *(Enables the "Floor Height," "Structure Trim" and "Drop Distance" parameters.)*

    8) "Specific Shift:" The projector is shifted vertically relative to the screen center, as measured from the center of the projector lens. *(Enables the "Vertical Shift" parameter.)*

Vertical Shift: Only shown if Vertical Position values of "Stand," "Floor," or "Specific Shift" are chosen. For the first 2, this is the difference between the Floor Height and where the Stand or Projector is to be placed. For the last, it is the difference between the screen center and the center of the projector.

Stand: The currently-chosen stand (scaffolding, AV cart, Safelock stand, table, etc.).

Select Stand...: Opens the Resource Selector dialog, allowing you to choose a projector stand. The chosen stand is placed on the PIO's ground. *(See "Floor Height," below, and following pages for more information. If you desire to use a stand not in this list, you can create your own, as detailed on pages 37-40.)*

Floor Height: Sets the Plug-In Object's "Floor" relative to the drawing's Ground Plane - so that options like "Rigged," "Stand" "Floor," and "Folding Legs" work correctly. *(Only revealed if "Goalpost Legs," "Tripod," "Rigged," "Mounted," "Stand," or "Floor" is selected.)*

L/R Shift and **F/B Shift:** Shifts the projector's stand side-to-side or front-to-back, relative to the projector. *(Enabled only if the "Vertical Position" is "Stand.")*

"Floor Height"allows the user to do things like have a VS4-Projection object placed on a stage with the stage floor at a different "Z" value than the drawing's ground plane. For example, for a screen mounted on folding legs that raise it 48" from its "floor" - but that is placed on a 36" stage (that is measured up from the Ground Plane) the VS4-Projection object would have a "Z" value of "48"" and a "Floor Height" value of "36"." This would place both the screen legs AND the projector stand on the 36" stage. By giving "Vertical Shift" a value of "-36"," the projector stand could be placed on the Ground Plane and the legs would still be placed properly on the stage.

Trim (bottom): The height at which to place the projector, as measured from the PIO's ground (see *"Floor Height"*) to the bottom of the projector body. *(Only enabled if the"Mounted" "Vertical Position" is chosen.)*

Structure Trim: The measurement from the PIO's ground Ground (see *"Floor Height"*) to the bottom of a structure on which the projector is to be mounted. *(Only enabled if the "Mounted" "Vertical Position" is chosen.)*

Drop Distance: The distance between the bottom of a structure (truss, ceiling, pipe, etc.) and the top of the projector body. *(Only enabled if the "Mounted" "Vertical Position" is chosen.)*

Vert. Offset Angle: The calculated vertical angle the projector is offset from the screen's center.

Vert. Offset Perc: The calculated vertical offset from the screen's center, shown as a percentage.

Multiple Projector: Options for showing more than one projector: "None" *(single projector)*, "Stacked," and "Side-By-Side."

Horiz. Space: The distance between the projector bodies if the "Side-By-Side" "Multiple Projector" option is chosen.

Offset Distance: The offset distance between screen and the second projector, relative to the first. Positive values will move the projector farther from the screen; negative, closer. *(Only enabled if "Side-By-Side" "Multiple Projector" is chosen.)*

VS4-Projection parameters, continued...

The following 7 fields are identical for each of 2 potential projectors. Those for Projector 2 are only enabled if "Stacked" or "Side-By-Side" "Multiple Projector" is chosen.

Circuit Number: The number of the circuit used to power the projector.

Circuit Name: The name of the circuit used to power the projector.

Source: The signal source for the projector.

Drive Line: The drive line used to provide the signal for the projector.

Input: The projector's signal input to be used.

Frame Rate: The projector's frame rate.

Resolution: The projector's resolution.

Location: Information about the position of the projector(s) *(such as "Arena")*.

Position: Information about the position of the projector(s) *(such as "Back-Stage Left")*.

Projector 1 Unit and **Projector 1 Unit:** The unit number(s) or designator(s) for the projector(s).

Vendor: The vendor for the projector(s).

Cost: The cost of the projector(s). *(Number only.)*

Note: Any general notes.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of *VS4-Projection* text. Text that can be displayed includes screen information, projection distances, Coverage Zone notes, projector notes, and lens information *(See page 36 for more information.)*

Default Text Positions: Returns text to its default location. *(Only enabled if text has been inserted.)*

Parts Classes...: Opens the "Parts Classes" dialog, used to assign the different elements comprising the *VS4-Projection* model to different Classes.. *(See page 36 for more information.)*

Update: Forces the *VS4-Projection* object to regenerate.

VS4-Projection Build: The build number of the *VS4-Projection* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" and "Distributed Weight" are disabled.

VS4-Blended Screen and **VS4-Blended Projector** (introduction)

VS4-Blended Screen and VS4-Blended Projector work a little differently than their suite mates. Whereas the others insert single-element models into your drawings, these two are actually used to insert multiple entities. The *VS4-Blended Screen* Plug-In Object Icon you click in your Workspace inserts the screen model (*just like inserting the "VS4-Television," "VS4-LED," and "VS4-Projection" models*). Another step inserts the projectors for the screens.

To use *VS4-Blended Screen*:

1) Click the *VS4-Blended Screen* icon in the tool palette to which you added it earlier. A ghost image of the tool's default screen will appear in your drawing. Click in your drawing to place the *VS4-Blended Screen* object. Rotate the screen to the desired angle and click again to set the angle *(like placing Vectorworks® Symbols)*. If an initial settings dialog box appears, make adjustments and click "OK" in that box.

2) With the newly-placed screen object selected, use the Object Information Palette to make adjustments *(such as a screen name, screen size, projector specifications, number of screen areas)*. If the Shape tab is not in the forefront of the Object Information Palette, click it to make it so.

3) Click the large "Insert Projectors" button at the bottom of the Object Information Palette. *VS4-Blended Screen* will place independent "child" projectors that are associated with ("connected to") the screen. The projectors are built using the *VS4-Blended Projector* Plug-In Object - and display their own settings in the Object Information Palette. The majority of the projectors' settings are fed by the *VS4-Blended Screen* "parent" object. Many of the settings can be changed on a projector-by-projector basis.

VS4-Blended Screen's and *VS4-Blended Projector*'s parameter settings are detailed in the pages that follow...

VS4-Blended Screen parameters

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects. *("Z" is the distance from your drawing's "floor" (in most instances, the drawing's ground plane) to the bottom of the screen border.)*

**Screen Type:** General format choices: "Rear Projector" or "Front Projector."

Curved: Creates a curved (arc) screen (as opposed to flat).

Name: The name for the inserted "parent" screen and the "child" projectors. This is how the Plug-In Object knows which projector models to control.

Width (image): The width of the screen (not including border or frame). If the screen is curved, this is the actual length of the arc. *(See illustration below.)*

Straight Width: The "chord" of a curved screen (not including border or frame). *(See illustration below. Only enabled if "Curved" is toggled on.)*

Curve Depth: The "depth" of a curved screen (not including border or frame). *(See illustration below. Only enabled if "Curved" is toggled on.)*
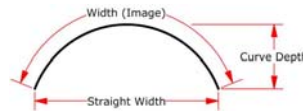
Curve Radius: The radius of a curved screen. *(Only enabled if "Curved" is toggled on.)*

Height (image): The height of the screen (not including border or frame).

Size (pixels): The total screen size, in pixels.

> *Consider "Pixel" dimensions (Screen Size and Overlap) to be estimates only. Confirm all settings on-site with screen processing equipment.*

Aspect (calc): The resulting aspect ratio of the screen.

Frame: Three options for the screen's frame:
1) "No Frame:" Only the image area of the screen will be created.
2) "Frame:" A frame with thickness will be created.
3) "Border Only:" A simple "flat" border will be created.

Border Widths (**Top**, **Bottom**, **Left**, and **Right**)**:** The widths of the frame or border. *(Only enabled if either the "Frame" or "Border Only" "Frame" option is chosen.)*

Depth: The thickness of the screen frame. *(Only enabled if either the "Frame" "Frame" option is chosen.)*

Edge: The distance between the screen's projection surface and the front face of the screen's frame. *(Only enabled if the "Frame" "Frame" option is chosen.)*

Tab-Tensioned Sides: Creates tab-tensioned side borders. *(Only enabled if the "Border Only" "Frame" option and the "Roll-Down Case" "Screen Support" are chosen.)*

Tilt: Sets the tilt of the screen, in degrees. Positive values tilt the top of the screen away from the viewer and negatives tilt it toward the viewer. *("Tilt" will be disabled if a "Screen Support" other than "None" is selected.)*

Total Clearance: The total vertical height of screen (floor to top of screen, border, dress kit valence, etc.), taking into account "Tilt."

Weight: The weight of the screen.

Brand and **Model:** The brand and model of the screen.

Location: The location of the screen in the project *(such as "Arena")*.

Position: The position of the screen in the project *(such as "Upstage Edge")*.

Unit: The unit number or designator for the screen.

Purpose: Information about the intended purpose of the screen *(such as "US Background")*.

Vendor: The vendor for the screen.

Cost: The cost of the screen. *(Number only.)*

VS4-Blended Screen parameters, continued...

Show Coverage Zone: Draws the viewing area for the screen based on the screen size. Toggling this will enable different adjustable settings. Text, including user-definable labels, is controlled using the "Text Options" dialog. *(See page 36 for more information.)*

These four parameters are enabled when you click the "Show Coverage Zone" toggle:

> **Zone Reference:** Reference options for coverage area calculations - the screen's width, height, or diagonal measurement.
>
> **Max. Horiz. Angle:** The maximum side-to-side viewing angle for the screen, relative to dead-on.
>
> **Max. Vert. Angle:** The maximum viewing viewing angle for the screen, from the top of the screen to the "Viewing Height," used to determine the minimum optimal viewing distance from the screen.
>
> **Viewing Height:** The viewing height reference for the "Max. Vert. Angle."
>
> **Near Multiplier** and **Far Multiplier:** The multipliers of the reference dimension to determine the extents of the Near and Far Coverage Zones and will display the maximum optimal viewing distance(s) for the screen. If the "Far" value is larger than "Near," both zones will be drawn. Otherwise, only "Near" will be drawn.

Screen Support: Options for screen support: "None," "Goalpost Legs," "Tripod," or "Roll-Down Case" The "Goalpost" option is similar to commercial Fastfold® systems. The "Tripod" option constructs class-room-style "roll-up"-type arrangements. The feet for both options and the bottom of the dress kit will be placed on the Plug-In Object's ground. *(See "Floor Height," on page 22 for more information.)*

Show Feet: Options to show Both, Front, Back, or no Goalpost Leg feet. *(Enabled if "Goalpost Legs" "Screen Support" is chosen.)*

Depth: The Depth of the Roll-Down Case. *(Enabled if "Roll-Down Case" "Screen Support" is chosen.)*

Motor: Designates the end of the Roll-Down or Roll-Up Case that will be expanded to show the presence of a screen motor ("None," "Left," or "Right"). *(Enabled if "Roll-Down Case" "Screen Support" is chosen.)*

Opening: Designates the front-to-back position of the screen opening in a Roll-Down Case ("Back," "Center," or "Front"). *(Enabled if "Roll-Down Case" "Screen Support" is chosen.)*

Add Dress Kit: Creates dress kit drapery and hardware. *(Enabled if either "Goalpost Legs" or "Tripod." "Screen Support" are chosen.)*

Color: Standard dress kit curtain color options ("Black," "Gray," "Red," "Green," or "Blue"). *(Enabled if either "Goalpost" or "Tripod." "Screen Legs" and "Add Dress Kit"are chosen.)*

Left Leg Width and **Right Leg Width:** The width of the dress kit drape (the leg) on the left and right sides of the screen. *(Enabled if "Goalpost Legs" "Screen Support" and "Add Dress Kit"are chosen.)*

Valence Height: The height of the dress kit piece above the screen (the valence)**.** *(Enabled if "Goalpost Legs" "Screen Support" and "Add Dress Kit"are chosen.)*

For each of these three dimensions, if a dimension less than the border width is entered, that element (either of the legs and/or the valence) will not be created.

Border Overlap: The amount of overlap of the Dress Kit drapery over the screen's border. *(Enabled if "Goalpost Legs" "Screen Support" and "Add Dress Kit"are chosen. The tool will not allow an overlap distance less than"0.")*

Pleat Width and **Pleat Depth:** The reference width and depth of one of the pleat sections of the dress kit curtain.

Screen Image: The image currently applied to the screen.

Edit Screen Image...: Opens the "Edit Screen Image" dialog, allowing you to switch and manipulate the image currently applied to the screen. This dialog also provides the means for enabling the Vision® software system to recognize appropriate surfaces for video previsualization. *(See page 33 for more information.)*

Projector: The currently-chosen projector.

Select Projector...: Opens the Resource Selector dialog, allowing you to choose a projector. *(Only enabled if either "Show Projector" or "Show Projection Cone" is toggled on. Projectors with "-Side" in their name will alert VS4-Blended Screen that a Portrait-oriented projector is being specified. If you desire to use a projector not in this list, you can create your own, as detailed on pages 37-40.)*

Brand and **Model:** The brand and model of the projector. If the projector model being used includes appropriate brand and model information, these fields will be automatically populated with default values.

VS4-Blended Screen parameters, continued...

Weight: The weight of a single projector. If the projector model being used includes appropriate weight information, this field will be automatically populated with a default value.

Wattage: The amount of power required for a single projector. If the projector model being used includes appropriate power information, this field will be automatically populated with a default value.

Aspect: Selects the aspect ratio of the projectors being used with the screen.

Resolution: Selects the pixel resolution of the projectors being used with the screen. Different resolution sets are revealed based on the aspect chosen.

Overshoot %: Total amount of projection overshoot (top AND bottom) that is to be discarded when using fewer "narrower" aspect projectors to get a certain pixel blend. Adjust this value to get the desired blend value. *(See the Overlap values below.)*

> *For example, a user might have a 40'x15' screen and wish to use 2, 4x3 (1400x1050) projectors with a 266-pixel blend area. An Overshoot value of 10.05 would produce that.*

Tilt: Sets projector tilting relative to the horizontal plane.

Place Based On: Options for placing projectors:

> 1) Lens: Enter a lens value and *VS4-Blended Screen* calculates the projection distance and determines projector placement.
>
> 2) Distance: Enter a distance and *VS4-Blended Screen* calculates an appropriate lens value.

Projection Dist.: The distance from the projectors' references (ie. lens center or front feet) to the screen. *(Only visible if the "Distance" "Place Based On" option is chosen.)*

Lens: Standard projector lens options, including zoom and Custom lenses. If the "Lens" "Place Based On" option is chosen, this parameter will be a pop-up list of stock lenses. If the "Distance" "Place Based On" option is chosen, this parameter will display the value estimated by *VS4-Blended Screen*.

Zoom factor: Lets you enter a specific in a specific lens zoom value. *(Only visible if the "Lens" "Place Based On" option is chosen and enabled if a zoom or "Custom" lens is chosen.)*

> *The stock lenses listed are based on manufacturers' stated distance-to-width ratios only. Because actual lens performance varies between manufacturers, you may have to select a different lens from our list or use "Custom" and a specific "Zoom Factor" to reflect the true performance of the particular lens you are using.* **It is important to consider VS4-Blended Screen's projector placement calculations as estimates only.**

Model: Information regarding the projectors' lens model.

Vertical Position: "Modes" for placing projectors vertically *(Only available when either "Show Projector" or "Show Projection Cone" is selected.)*:

> 1) Screen Center: Center of the projector lens is aligned with the screen center.
>
> 2) Align to Top: The top of the projector body is aligned with the top of the screen border.
>
> 3) Align to Bottom: The bottom of the projector body is aligned with the bottom of the screen border.
>
> 4) Stand: The projector is placed on a specified stand. *(Enables the "Stand Model" drop-down list.)*
>
> 5) "Floor" The bottom of the projector body is placed on the PIO's ground.
>
> 6) Rigged: The projector is placed using a rigging trim height. *(Enables the "Trim" parameter.)*
>
> 7) Mounted: The projector's placement is relative to a structure like truss, ceiling, or pipe. *(Enables the "Floor Height," "Structure Trim" and "Drop Distance" parameters.)*
>
> 8) Specific Shift: The projector is shifted vertically relative to the screen center, as measured from the center of the projector lens. *(Enables the "Vertical Shift" parameter.)*

Vertical Shift: Only shown if Vertical Position values of "Stand," "Floor," or "Specific Shift" are chosen. For the former, this is the difference between the Floor Height and where the Stand is to be placed. For the latter, it is the difference between the screen center and the center of the projector.

Stand: The currently-chosen stand *(scaffolding, AV cart, Safelock stand, table, etc.)*.

Select Stand...: Opens the Resource Selector dialog, allowing you to choose a projector stand. The chosen stand is placed on the PIO's ground. *(See "Floor Height," below, and following pages for more information.*

VS4-Blended Screen parameters, continued...

Floor Height: Sets the Plug-In Object's "Floor" relative to the drawing's Ground Plane - so that options like "Rigged," "Stand" "Floor," and "Folding Legs" work correctly. *(Only revealed if "Goalpost Legs," "Rigged," "Mounted," "Stand," or "Floor" is selected.)*

> *A note about the above two parameters: "Floor Height" allows the user to do things like have a Blended Screen object placed on a stage with the stage floor at a different "Z" value than the drawing's ground plane. For example, for a screen mounted on folding legs that raise it 48" from its "floor" - but that is placed on a 36" stage (that is measured up from the Ground Plane) the Blended Screen object would have a "Z" value of "48"" and a "Floor Height" value of "36"." This would place both the screen legs AND the projector's stand on the 36" stage. By giving "Vertical Shift" a value of "-36"," the projectors' stands could be placed on the Ground Plane and the legs would still be placed properly on the stage.*

Trim (bottom): The height at which to place the projector, as measured from the PIO's ground *(see "Floor Height")* to the bottom of the projector body.

Structure Trim: The measurement from the PIO's ground Ground (see *"Floor Height"*) to the bottom of a structure on which the projector is to be mounted. *(Only enabled if the "Mounted" "Vertical Position" is chosen.)*

Drop Distance: The distance between the bottom of a structure (truss, ceiling, pipe, etc.) and the top of the projector body. *(Only enabled if the "Mounted" "Vertical Position" is chosen.)*

Multiple Projector: Options for showing more than one projector per area: "None" *(single projector)*, "Stacked," and "Side-By-Side."

Horiz. Space: The distance between the projector bodies if the "Side-By-Side" "Multiple Projector" option is chosen.

Area Horiz. Count: The number of areas or divisions into which the screen is being divided. If you enter a quantity that will not fill the screen, the lowest quantity possible will be entered automatically.

Area Width and **Area Height:** The individual width and height of the areas.

Area Spacing: The distance between side-by-side areas' projectors, measured on projector lens centers.

Overlap (Meas.): The amount of area overlap, measured in "ruler" dimensions.

Overlap (Pixels): The amount of area overlap, measured in pixels.

Overlap (%): The amount of area overlap in terms of a percentage of an individual projection area.

> *Entering a value in one of the "Overlaps" will adjust the other two appropriately. VS4-Blended Screen will not let you enter Overlap values that would not allow the screen to be fully-filled. If you desire larger Overlap/blend areas, increase the **Area Horiz. Count** value.*

Blend Reference: The projection "starting place" and direction if Overlap settings are entered that result in unused pixels: Center *(out to both ends)*, Left *(to right)*, or Right *(to left)*.

Show Projection Cones: Hides or shows the projection cones. Though set by *VS4-Blended Screen*, this is "per-instance" specific for each projector.

Vendor: The vendor for the projectors.

Cost: The cost of the projectors. *(Number only.)*

Note: Any general notes.

Insert Projectors: Causes *VS4-Blended Screen* to insert multiple *VS4-Blended Projector* models, using the parameter settings above.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of *VS4-Blended Screen* image and/or Coverage Zone text.

Default Text Positions: Returns text to its default location. *(Only enabled if text has been inserted.)*

Parts Classes...: Opens the "Parts Classes" dialog, used to assign the different elements comprising the *VS4-Blended Screen* model to different Classes..

Update: Forces the *VS4-Blended Screen* object to regenerate.

VS4-Blended Screen Build: The build number of the *VS4-Blended Screen* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" and "Distributed Weight" are disabled.

VS4-Blended Projector parameters

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects.

> *Do not change any of the above settings. The VS4-Blended Screen object controlling the projectors will do this automatically.*

Screen Name: The name for the inserted "parent" screen to which the "child" projector belongs

Screen Width and **Screen Height:** The width and height of the "parent" screen *(not including border or frame)*.

Area Number: The "parent" screen's division or area to which the selected projector is assigned.

Ideal Projector Placement: The distance from the edge of the screen to the projector, measured parallel to the "parent" screen and relative to the projector's lens center.

> *A reminder: Because of the multitude of variables that go into placing projectors, it is important to consider VS4-Blended Projector's projector placement dimensions as estimates only.*

Format Type: General format type: "Rear Projector" or "Front Projector."

Show Projection Cone: Hides or shows the projection cone. Setting assigned by "parent" screen but can be changed on a per-projector basis.

Projector: The currently-chosen projector.

Select Projector...: Opens the Resource Selector dialog, allowing you to choose a projector. *(Projectors with "-Side" in their name will alert VS4-Blended Projector that a Portrait-oriented projector is being specified. If you desire to use a projector not in this list, you can create your own, as detailed on pages 37-40.)*

Brand and **Model:** The brand and model of the projector. If the projector model being used includes appropriate brand and model information, these fields will be automatically populated with default values.

Weight: The weight of a single projector. If the projector model being used includes appropriate weight information, this field will be automatically populated with a default value.

Wattage: The amount of power required for a single projector. If the projector model being used includes appropriate power information, this field will be automatically populated with a default value.

Aspect: The aspect ratio of the projector.

Resolution: The pixel resolution of the projector.

Overshoot Perc.: Total amount of projection overshoot (top AND bottom) that is to be discarded when using fewer "narrower" aspect projectors to get a certain pixel blend.

Width (area) and **Height (area):** The width and height of the projected area.

Diagonal (area): The diagonal measurement of the projected area.

Show Centerline (area): Displays the projector's area's centerline, perpendicular to the viewing surface.

L/R Shift: Enter a dimension to shift the projector(s) side-to-side relative to its projection area. This parameter will respond correctly if the "Distance" "Place Based On" parameter is chosen.

Horiz. Offset Angle: The calculated horizontal angle the projector is offset from its area's center.

Horiz. Offset Perc: The calculated horizontal offset from the projector's area's center, shown as a percentage.

Point at Screen Center: To keep the projector(s) pointed at the center of the projector's area if it(they) is(are) shifted using "L/R Shift." *(Only available if "L/R Shift" is not equal to 0.)*

Tilt: The projector's tilt angle.

Place Based On: Options for placing projectors:
- "Lens:" Enter a lens value and *VS4-Blended Projector* calculates the projection distance and determines projector placement.
- "Distance:" Enter a distance or drag the projector using Control Points and *VS4-Blended Projector* calculates an appropriate lens value.

Proj. Distance (Straight): The distance from the projector's reference (ie. lens center or front feet) to the screen relative to an angle perpendicular to the screen. *(Only editable if the "Distance" "Place Based On" option is chosen.)*

Proj. Distance (Actual): The actual 3D distance from the projector's reference (ie. lens center or front feet) to the screen's center.

VS4-Blended Projector parameters, continued...

Lens: Standard projector lens options, including zoom and Custom lenses. If the "Lens" "Place Based On" option is chosen, this parameter will be a pop-up list of stock lenses. If the "Distance" "Place Based On" option is chosen, this parameter will display "Custom" and "Zoom Factor" will display the suggested lens.

Zoom factor: Specific lens zoom value. *(Only enabled if a zoom or "Custom" lens is chosen and the* "Lens" "Place Based On" *option is chosen .)*

The stock lenses listed are based on manufacturers' stated distance-to-width ratios only. Because actual lens performance varies between manufacturers, you may have to select a different lens from our list or use "Custom" and a specific "Zoom Factor" to reflect the true performance of the particular lens you are using. **It is important to consider VS4-Blended Projector's projector placement calculations as estimates only.**

Model: Information regarding the projector's lens model.

Show Zoom Range: Shows a graphical representation of the lens' zoom range - and, therefore potential projector placement. *(Only enabled if a zoom lens is chosen.)*

Vertical Position: "Modes" for placing projectors vertically:
  1) "Screen Center:" Center of the projector lens is aligned with the screen center.
  2) "Align to Top:" The top of the projector body is aligned with the top of the screen border.
  3) "Align to Bottom:" The bottom of the projector body is aligned with the bottom of the screen border.
  4) "Stand:" The projector is placed on a specified stand. *(Enables the "Stand Model" drop-down list.)*
  5) "Floor" The bottom of the projector body is placed on the PIO's ground.
  6) "Rigged:" The projector is placed using a rigging trim height. *(Enables the "Trim" parameter.)*
  7) "Mounted:" The projector's placement is relative to a structure like truss, ceiling, or pipe. *(Enables the "Floor Height," "Structure Trim" and "Drop Distance" parameters.)*
  8) "Specific Shift:" The projector is shifted vertically relative to the screen center, as measured from the center of the projector lens. *(Enables the "Vertical Shift" parameter.)*

Vertical Shift: Only shown if Vertical Position values of "Stand," "Floor," or "Specific Shift" are chosen. For the former, this is the difference between the Floor Height and where the Stand is to be placed. For the latter, it is the difference between the screen center and the center of the projector.

Stand: The currently-chosen stand (scaffolding, AV cart, Safelock stand, table, etc.).

Select Stand...: Opens the Resource Selector dialog, allowing you to choose a projector stand. The chosen stand is placed on the PIO's ground. *(See "Floor Height," below, and following pages for more information. If you desire to use a stand not in this list, you can create your own, as detailed on pages 37-40.)*

Floor Height: Only revealed if "Goalpost Legs," "Tripod," "Rigged," or "Stand," or "Floor" is selected. Sets the Plug-In Object's "Floor" relative to the drawing's Ground Plane - so that options like "Rigged," "Stand," "Floor," and "Folding Legs" work correctly.

L/R Shift & **F/B Shift:** Shifts the projector's stand side-to-side or front-to-back, relative to the projector. *(Enabled only if the "Vertical Position" is "Stand.")*

"Floor Height"allows the user to do things like have a VS4-Blended Screen object placed on a stage with the stage floor at a different "Z" value than the drawing's ground plane and have the associated VS4-Blended Projector objects compensate for that.

Trim (bottom): The height at which to place the projector, as measured from the PIO's ground (see *"Floor Height"*) to the bottom of the projector body.

Structure Trim: The measurement from the PIO's ground Ground (see *"Floor Height"*) to the bottom of the structure on which the projector is to be mounted. *(Only enabled if the "Mounted" "Vertical Position" is chosen.)*

Drop Distance: The distance between the bottom of the structure (truss, ceiling, pipe, etc.) and the top of the projector body. *(Only enabled if the "Mounted" "Vertical Position" is chosen.)*

Vert. Offset Angle: The calculated vertical angle the projector is offset from its area's center.

Vert. Offset Perc: The calculated vertical offset from the projector's area's center, shown as a percentage.

Horiz. Space: This is the distance between the projector bodies, if the "Side-By-Side" Multiple Projector format is chosen.

VS4-Blended Projector parameters, continued...
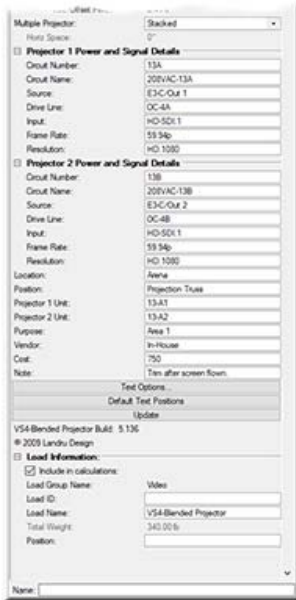
Multiple Projector: Options for showing more than one projector per area: "None" *(single projector)*, "Stacked," and "Side-By-Side."

> *The following 7 fields are identical for each of 2 potential projectors. Those for Projector 2 are only enabled if "Stacked" or "Side-By-Side" "Multiple Projector" is chosen.*

Circuit Number: The number of the circuit used to power the projector.

Circuit Name: The name of the circuit used to power the projector.

Source: The signal source for the projector.

Drive Line: The drive line used to provide the signal for the projector.

Input: The projector's signal input to be used.

Frame Rate: The projector's frame rate.

Resolution: The projector's resolution.

Location: Information about the location of the projector *(such as "Arena")*.

Position: Information about the position of the projector *(such as "Projection Truss")*.

Projector 1 Unit and **Projector 1 Unit:** The unit number(s) or designator(s) for the projector(s).

Purpose: Information about the intended purpose of the projector. *(Defaults to Area Number when initially inserted.)*

Vendor: The vendor for the projector(s).

Cost: The cost of the projector(s). *(Number only.)*

Note: Any general notes.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of VS4-Blended Projector text. Text that can be displayed includes projection distances, projector notes, and lens information

> *The lens information, text color, ID visibilities, and lens information placement are adjustable independently for each VS4-Blended Projector instance.*

Default Text Positions: Returns text to its default location. *(Only enabled if text has been inserted.)*

Update: Forces the VS4-Blended Projector object to regenerate.

VS4-Blended Projector Build: The build number of the *VS4-Blended Projector* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" is disabled.

VS4-LED parameters *("Tile Flat" and "Module Counts and Spacing" shown)*

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects.

Module Shape: Individual module shape choices: "Tile Flat," "Tile Cap," "Disk Flat," " Disk Cap," "Tube," and "Dome."

– Choose "Tile Flat" for devices with rectangular-shaped modules, like panels, MiPIXs®, and PixelLines®.

– Choose "Tile Cap" for devices with rectangular-shaped modules with frosted caps, like iColor Tile® .

– Choose "Disk Flat" for devices with round-shaped modules, like SoftLED® .

– Choose "Disk Cap" for devices with round-shaped modules with frosted caps, like ColourBlocks®.

– Choose "Tube" for devices like VersaTubes® or LCs® .

– Choose "Dome" for devices with round-shaped modules, like ColourWebs® .

Remember that choosing the dome shape, one of the cap shapes, or the tube shape adds a SIGNIFICANT amount of rendering and object regeneration time. There are also limits in module counts, beyond which Vectorworks® will not render images. Choosing one of the flat shapes might give you similar results, but with higher limits.

Length: The length of an individual tube in the array. *(Only available if a "Tube" "Module Shape" is chosen.)*

Width: The width of an individual tile, dome, or tube in the array.

Height: The height of an individual tile in the array. *(Only available if a "Tile" "Module Shape" is chosen.)*

Back Width: The width of an individual tube's back plate. *(Only available if a "Tube" "Module Shape" is chosen.)*

Tube Orientation: The orientation of the tubes in the array, either Vertical or Horizontal. *(Only available if a "Tube" "Module Shape" is chosen.)*

Brand and **Model:** The brand and model of the module.

Build Array Based On: "Modes" for how *VS4-LED* constructs arrays:

1) Module Counts and Spacing: You input horizontal and vertical module counts and the horizontal and vertical spacing between the modules' centers. *VS4-LED* will calculate overall array dimensions.

Horizontal Count and **Vertical Count:** The horizontal and vertical module counts for modules in the array.

Add Half Modules: Adds a row or column of half-height or half-width tiles along the top, bottom, left, or right edge of the array. *(Only available if the "Tile Flat" "Module Shape" is chosen.)*

Module Total: The calculated total number of full modules in the array.

Half-Module Total: The calculated total number of half modules in the array. *(Only available if the "Tile Flat" "Module Shape" is chosen.)*

Horizontal Spacing and **Vertical Spacing:** The horizontal and vertical spacing between modules, measured from module centers.

Width (Calc.) and **Height (Calc.):** The calculated over-all width and height of the array.

Pixels Per Module (H) and **Pixels Per Module (V):** The number of pixels in the horizontal and vertical lines in a full-size module.

Array Size (Pixels): The calculated array size in terms of pixels *(Pixels Per Module x Module count).*

Raster Information: Information about the usable raster of the array.

Array Aspect: The calculated array aspect NOT INCLUDING STRUCTURE OR INSET DIMENSIONS *(Width:Height).*

Secondary Units: Options of additional commonly-used Imperial and Metric dimension units to be displayed in the OIP and/or appropriate text elements.

Array Size (Secondary Units): The calculated array size in terms of secondary units *(Width x Height).*

Base Structure: Different structures for either arrays or individual modules.

1) "Blocks:" Individual block-shaped bases for each of the modules, similar to panels, MiPIX® modules or VersaTubes®.

2) "Frame:" A single frame for the array, similar to MiPIX® frames.

3) "Curtain:" A single black background for the array, similar to SoftLED® .

4) "Web:" Webbing between modules, similar to ColourWeb® .

5) "Vert. Strips" and "Horiz. Strips:" Columns or rows, similar to LC® or MiSTRIP®.

6) "None:" No structures are created. Only LED modules are shown.

VS4-LED parameters *("Tile Flat" and "Module Counts and Spacing")*, continued...

Width and **Height:** The width and height depth of either individual blocks or strips. *(Appears if a "Base Structure" of "Blocks," "Vert. Strips," or "Horiz. Strips" is chosen.)*

Depth: The depth of either individual blocks, strips, or the array frame. *(Appears if a "Base Structure" of "Blocks," "Frame," "Vert. Strips," or "Horiz. Strips" is chosen.)*

Side Edge Miter: Options for mitering the left and or right end vertical edges of the module bases 45°, resulting in more seamless curved and corner arrays. *(Enabled if a "Base Structure" of "Blocks," "Frame," "Vert. Strips," or "Horiz. Strips" is chosen.)*

Single Module Wattage: The wattage of a single module in the array.

Total Array Wattage: The total wattage of the array.

> *If the Single Module wattage is entered or the module count is changed, the Total Array Wattage will be calculated. If the Total Array Wattage is entered, the Single Module Wattage will be calculated.*

Weights: Related weight parameters and calculated values.

> **Reference:** The reference options used to calculate array weights, "Single Module" and "All Modules." Selecting one will allow values for that parameter to be entered and will make the other a calculated value.

> **Single Module:** The weight of an individual whole module in the array. *(Only enabled if the "Single Module" "Reference" is selected. If "All Modules" is selected, this is a calculated value.)*

> **Half-Module:** The weight of an individual half module in the array. *(Only enabled if the "Single Module" "Reference" is selected. If "All Modules" is selected, this is a calculated value.)*

> **All Modules:** The total weight of the array modules (not including hardware). *(Only enabled if the "All Modules" "Reference" is selected. If "Single Module" is selected, this is a calculated value.)*

>> *For example:*

>> *Using a VS4-LED instance to represent a large LED wall, module dimensions (above) would represent the size of a given tile in that wall; "Build Array Based On" "Module Counts and Spacing" would be selected (above); and "Single Module" (here) would be selected. Entering the count values (above) would "build" the wall and entering the weight of a single module would result in the overall wall weight to be calculated (below) based on those counts.*

>> *Using a VS4-LED instance to represent a single tile in an array, module dimensions (above) would represent the size of the pixels or nodes within that tile. The array dimensions (above) would be those of the one tile and "All Modules" (here) would be selected and the "All Modules" weight would be the weight of that one tile.*

> **Hardware:** The weight of any/all rigging and/or mounting hardware for the array.

> **Total:** The calculated total weight of the array, including hardware.

> **Distributed:** The calculated distributed weight of the array, including hardware.

Tilt: The tilt angle of the entire array, in degrees. Positive values tilt the top of the array away from the viewer and negatives tilt it toward the viewer.

Simple 3D: Draws a simple single-plane screen representative of the array instead of detailed LED nodes.

Show Coverage Zone: Draws the viewing area for the screen based on the array size. Toggling this will enable different adjustable settings. Text, including user-definable labels, is controlled using the "Text Options" dialog.

> These six parameters are enabled when you click the "Show Coverage Zone" toggle:

>> **Zone Reference:** Reference options for coverage area calculations - the screen's width, height, or diagonal measurement.

>> **Max. Horiz. Angle:** The maximum side-to-side viewing angle for the screen, relative to dead-on.

>> **Max. Vert. Angle:** The maximum viewing viewing angle for the screen, from the top of the screen to the "Viewing Height," used to determine the minimum optimal viewing distance from the screen.

>> **Viewing Height:** The viewing height reference for the "Max. Vert. Angle."

>> **Near Multiplier** and **Far Multiplier**: The multipliers of the reference dimension to determine the extents of the Near and Far Coverage Zones and will display the maximum optimal viewing distance(s) for the screen. If the "Far" value is larger than "Near," both zones will be drawn. Otherwise, only "Near" will be drawn.

VS4-LED parameters *("Tile Flat" and "Module Counts and Spacing")*, continued...

Array Image: The image currently applied to the array.

Edit Array Image...: Opens the "Edit Array Image" dialog to allow you to switch and manipulate the image currently applied to the array. This dialog also provides the means for enabling the Vision® software system to recognize appropriate surfaces for video previsualization.. *(See page 35 for more information.)*

Circuit Number: The number of the circuit used to power the module/array.

Circuit Name: The name of the circuit used to power the module/array.

Source: The signal source for the module/array.

Drive Line: The drive line used to provide the signal for the module/array.

Input: The module/array's processor's signal input to be used.

Frame Rate: The module/array's frame rate.

Resolution: The module/array's resolution.

Location: Information about the location of the module/array *(such as "Arena")*.

Position: Information about the position of the module/array *(such as "US Edge")*.

Unit: The unit number or designator for the module/array.

Purpose: Information about the intended purpose of the module/array *(like "US Scenic")*.

Row and **Column:** When using a *VS4-LED* instance to represent a single tile in an array, the location of that tile within an array. *(Only available when horizontal and vertical module counts are both "1.")*

Vendor: The vendor for the module/array.

Cost: The cost of the module/array. *(Number only.)*

Note: Any general notes.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of VS4-LED text. Text that can be displayed includes array dimensions and module counts. *(See page 36 for more information.)*

Default Text Positions: Returns text to its default location. *(Only enabled if text has been inserted.)*

Parts Classes...: Opens the "Parts Classes" dialog, used to assign the different elements comprising the *VS4-LED* model to different Classes. *(See page 36 for more information.)*

Update: Forces the *VS4-LED* object to regenerate.

VS4-LED Build: The build number of the *VS4-LED* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" and "Distributed Weight" are disabled.

VS4-LED parameters *("Dome" and "Overall Dimensions and Spacing" shown)*

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects..

Module Shape: Individual module shape choices: "Tile Flat," "Tile Cap," "Disk Flat," " Disk Cap," "Tube," and "Dome."

1) Choose "Tile Flat" for devices with rectangular-shaped modules, like panels, MiPIXs®, and PixelLines®.

2) Choose "Tile Cap" for devices with rectangular-shaped modules with frosted caps, like iColor Tile® .

3) Choose "Disk Flat" for devices with round-shaped modules, like SoftLED® .

4) Choose "Disk Cap" for devices with round-shaped modules with frosted caps, like ColourBlocks®.

5) Choose "Tube" for devices like VersaTubes® or LCs® .

6) Choose "Dome" for devices with round-shaped modules, like ColourWebs® .

Remember that choosing the dome shape, one of the cap shapes, or the tube shape adds a SIGNIFICANT amount of rendering and object regeneration time. There are also limits in module counts, beyond which Vectorworks® will not render images. Choosing one of the flat shapes might give you similar results, but with higher limits.

Length: The length of an individual tube in the array. *(Only available if a "Tube" "Module Shape" is chosen.)*

Width: The width of an individual tile, dome, or tube in the array.

Height: The height of an individual tile in the array. *(Only available if a "Tile" "Module Shape" is chosen.)*

Back Width: The width of an individual tube's back plate. *(Only available if a "Tube" "Module Shape" is chosen.)*

Tube Orientation: The orientation of the tubes in the array, either Vertical or Horizontal. *(Only available if a "Tube" "Module Shape" is chosen.)*

Brand and **Model:** The brand and model of the module.

Build Array Based On: "Modes" for how *VS4-LED* constructs arrays:

1) Module Counts and Spacing: You input horizontal and vertical module counts and the horizontal and vertical spacing between the modules' centers. VS4-LED will calculate overall array dimensions.

2) Overall Dimensions and Spacing: You input the overall array dimensions and the horizontal and vertical spacing between the modules' centers. *VS4-LED* will calculate horizontal and vertical module counts.

3) Overall Dimensions and Module Counts: You input the overall array dimensions and the horizontal and vertical module counts. VS4-LED will calculate the horizontal and vertical spacing between the modules' centers.

Array Width and **Array Height:** The overall width and height of the array. *(Appears if "Overall Dimensions and Spacing" or "Overall Dimensions and Module Counts" mode is chosen.)*

Horizontal Spacing and **Vertical Spacing:** The horizontal and vertical spacing between modules, measured from module centers.

H. Count (Calc.) and **V. Count (Calc.):** The horizontal and vertical module counts for the array - calculated by VS4-LED.

Add Half Modules: Adds a row or column of half-height or half-width tiles along the top, bottom, left, or right edge of the array. *(Only available if the "Tile Flat" "Module Shape" is chosen.)*

Module Total: The calculated total number of full modules in the array.

Half-Module Total: The calculated total number of half modules in the array. *(Only available if the "Tile Flat" "Module Shape" is chosen.)*

Pixels Per Module (H) and **Pixels Per Module (V):** The number of pixels in the horizontal and vertical lines in the module.

Array Size (Pixels): The calculated array size in terms of pixels (Pixels Per Module x Module count).

Raster Information: Information about the usable raster of the array.

Array Aspect: The calculated array aspect NOT INCLUDING STRUCTURE OR INSET DIMENSIONS (Width:Height).

Secondary Units: Options of additional commonly-used Imperial and Metric dimension units to be displayed in the OIP and/or appropriate text elements.

Array Size (Secondary Units): The calculated array size in terms of secondary units (Width x Height).

Base Structure: Different structures for either arrays or individual modules.

1) "Blocks:" Individual block-shaped bases for each of the modules, similar to panels, MiPIX® modules or VersaTubes®.

2) "Frame:" A single frame for the array, similar to MiPIX® frames.

3) "Curtain:" A single black background for the array, similar to SoftLED® .

4) "Web:" Webbing between modules, similar to ColourWeb® .

5) "Vert. Strips" and "Horiz. Strips:" Columns or rows, similar to LC® or MiSTRIP®.

6) "None:" No structures are created. Only LED modules are shown.

VS4-LED parameters ("Dome" and "Overall Dimensions and Spacing"), continued...

Webbing Width: The width of the webbing between modules. *(Only appears if a "Web" "Base Structure"is chosen.)*

Horizontal Inset and **Vertical Inset:** The amount of horizontal and vertical space between the LED modules and the horizontal and vertical edges of the array, as defined by overall dimensions. *(Only appear if "Frame," "Curtain," "Web," "Vert. Strips," or "Horiz. Strips" "Base Structure" is chosen.)*

Pleat Width and **Pleat Depth:** Parameters that change the look of the 2D representation of either curtain or webbing. *(Appear only if "Curtain" or "Web" Base Structure is chosen and tilt is 0.)*

Single Module Wattage: The wattage of a single module in the array.

Total Array Wattage: The total wattage of the array.

> *If the Single Module wattage is entered or the module count is changed, the Total Array Wattage will be calculated. If the Total Array Wattage is entered, the Single Module Wattage will be calculated.*

Weights: Related weight parameters and calculated values.

    Reference: The reference options used to calculate array weights, "Single Module" and "All Modules." Selecting one will allow values for that parameter to be entered and will make the other a calculated value

    Single Module: The weight of an individual module in the array. *(Only enabled if the "Single Module" "Reference" is selected. If "All Modules" is selected, this is a calculated value.)*

    Half-Module: The weight of an individual half module in the array. *(Only enabled if the "Single Module" "Reference" is selected. If "All Modules" is selected, this is a calculated value.)*

    All Modules: The total weight of the array modules (not including hardware). *(Only enabled if the "All Modules" "Reference" is selected. If "Single Module" is selected, this is a calculated value.)*

> *For example:*
>
> > *Using a VS4-LED instance to represent a large LED wall, module dimensions (above) would represent the size of a given tile in that wall; "Build Array Based On" "Module Counts and Spacing" would be selected (above); and "Single Module" (here) would be selected. Entering the count values (above) would "build" the wall and entering the weight of a single module would result in the overall wall weight to be calculated (below) based on those counts.*
> >
> > *Using a VS4-LED instance to represent a single tile in an array, module dimensions (above) would represent the size of the pixels or nodes within that tile. The array dimensions (above) would be those of the one tile and "All Modules" (here) would be selected and the "All Modules" weight would be the weight of that one tile.*

    Hardware: The weight of any/all rigging and/or mounting hardware for the array.

    Total: The calculated total weight of the array, including hardware.

    Distributed: The calculated distributed weight of the array, including hardware.

Tilt: The tilt angle of the entire array, in degrees. Positive values tilt the top of the array away from the viewer and negatives tilt it toward the viewer.

Simple 3D: Draws a simple single-plane screen representative of the array instead of detailed LED nodes.

Show Coverage Zone: Draws the viewing area for the screen based on the array size.   Toggling this will enable different adjustable settings. Text, including user-definable labels, is controlled using the "Text Options" dialog.

    These six parameters are enabled when you click the "Show Coverage Zone" toggle:

    Zone Reference: Reference options for coverage area calculations - the screen's width, height, or diagonal measurement.

    Max. Horiz. Angle: The maximum side-to-side viewing angle for the screen, relative to dead-on.

    Max. Vert. Angle: The maximum viewing angle for the screen, from the top of the screen to the "Viewing Height," used to determine the minimum optimal viewing distance from the screen.

    Viewing Height: The viewing height reference for the "Max. Vert. Angle."

    Near Multiplier and Far Multiplier: The multipliers of the reference dimension to determine the extents of the Near and Far Coverage Zones and will display the maximum optimal viewing distance(s) for the screen. If the "Far" value is larger than "Near," both zones will be drawn. Otherwise, only "Near" will be drawn.

VS4-LED parameters *("Dome" and "Overall Dimensions and Spacing")*, continued...

Array Image: The image currently applied to the array.

Edit Array Image...: Opens the "Edit Array Image" dialog to allow you to switch and manipulate the image currently applied to the array. This dialog also provides the means for enabling the Vision® software system to recognize appropriate surfaces for video previsualization. *(See page 35 for more information.)*

Circuit Number: The number of the circuit used to power the module/array.

Circuit Name: The name of the circuit used to power the module/array.

Source: The signal source for the module/array.

Drive Line: The drive line used to provide the signal for the module/array.

Input: The module/array's processor's signal input to be used.

Frame Rate: The module/array's frame rate.

Resolution: The module/array's resolution.

Location: Information about the location of the module/array *(such as "Retro Stage")*.

Position: Information about the position of the module/array *(such as "Upstage")*.

Unit: The unit number or designator for the module/array.

Purpose: Information about the intended purpose of the module/array *(like "Blow-Through")*.

Row and **Column:** When using a *VS4-LED* instance to represent a single tile in an array, the location of that tile within an array. *(Only available when horizontal and vertical module counts are both "1.")*

Vendor: The vendor for the module/array.

Cost: The cost of the module/array. *(Number only.)*

Note: Any general notes.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of VS4-LED text. Text that can be displayed includes array dimensions and module counts. *(See page 36 for more information .)*

Default Text Positions: Returns text to its default location. *(Only enabled if text has been inserted.)*
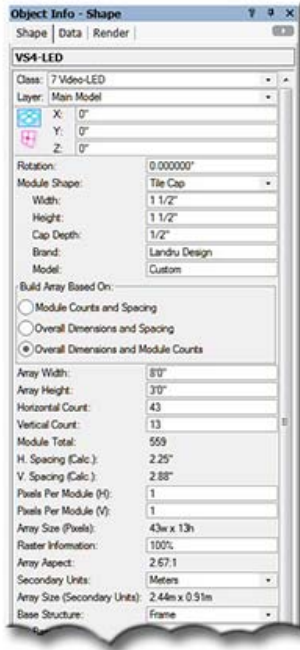
Parts Classes...: Opens the "Parts Classes" dialog, used to assign the different elements comprising the VS4-LED model to different Classes. *(See page 36 for more information.)*

Update: Forces the *VS4-LED* object to regenerate.

VS4-LED Build: The build number of the *VS4-LED* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" and "Distributed Weight" are disabled.

VS4-LED parameters *("Tile Cap" and "Overall Dimensions and Module Counts" shown)*

Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects.

Module Shape: Individual module shape choices: "Tile Flat," "Tile Cap," "Disk Flat," " Disk Cap," "Tube," and "Dome."

1) Choose "Tile Flat" for devices with rectangular-shaped modules, like panels, MiPIXs®, and PixelLines®.

2) Choose "Tile Cap" for devices with rectangular-shaped modules with frosted caps, like iColor Tile® .

3) Choose "Disk Flat" for devices with round-shaped modules, like SoftLED® .

4) Choose "Disk Cap" for devices with round-shaped modules with frosted caps, like ColourBlocks®.

5) Choose "Tube" for devices like VersaTubes® or LCs® .

6) Choose "Dome" for devices with round-shaped modules, like ColourWebs® .

Remember that choosing the dome shape, one of the cap shapes, or the tube shape adds a SIGNIFICANT amount of rendering and object regeneration time. There are also limits in module counts, beyond which Vectorworks® will not render images. Choosing one of the flat shapes might give you similar results, but with higher limits.

Length: The length of an individual tube in the array. *(Only available if a "Tube" "Module Shape" is chosen.)*

Width: The width of an individual tile, dome, or tube in the array.

Height: The height of an individual tile in the array. *(Only available if a "Tile" "Module Shape" is chosen.)*

Back Width: The width of an individual tube's back plate. *(Only available if a "Tube" "Module Shape" is chosen.)*

Tube Orientation: The orientation of the tubes in the array, either Vertical or Horizontal. *(Only available if a "Tube" "Module Shape" is chosen.)*

Cap Depth: The depth of the module cap. *(Only available if a "Tile Cap" or "Disk Cap" Module Shape is chosen.)*

Brand and **Model:** The brand and model of the module.

Build Array Based On: "Modes" for how *VS4-LED* constructs arrays:

1) Module Counts and Spacing: You input horizontal and vertical module counts and the horizontal and vertical spacing between the modules' centers. VS4-LED will calculate overall array dimensions.

2) Overall Dimensions and Spacing: You input the overall array dimensions and the horizontal and vertical spacing between the modules' centers. VS4-LED will calculate horizontal and vertical module counts.

3) Overall Dimensions and Module Counts: You input the overall array dimensions and the horizontal and vertical module counts. *VS4-LED* will calculate the horizontal and vertical spacing between the modules' centers.

Array Width and **Array Height:** The over-all width and height of the array.

Horizontal Count and **Vertical Count:** The horizontal and vertical module counts for the array.

Add Half Modules: Adds a row or column of half-height or half-width tiles along the top, bottom, left, or right edge of the array. *(Only available if the "Tile Flat" "Module Shape" is chosen.)*

Module Total: The calculated total module count for the array.

Half-Module Total: The calculated total number of half modules in the array. *(Only available if the "Tile Flat" "Module Shape" is chosen.)*

H. Spacing (Calc.) and **V. Spacing (Calc):** The horizontal and vertical spacing between modules, Calculated by *VS4-LED* and measured from module centers.

Pixels Per Module (H) and **Pixels Per Module (V):** The number of pixels in the horizontal and vertical lines in the module.

Array Size (Pixels): The calculated array size in terms of pixels *(Pixels Per Module x Module count)*.

Raster Information: Information about the usable raster of the array.

Array Aspect: The calculated array aspect NOT INCLUDING STRUCTURE OR INSET DIMENSIONS *(Width:Height)*.
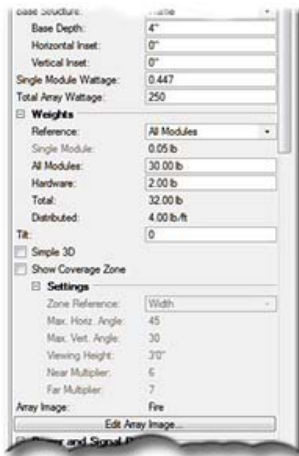
Secondary Units: Options of additional commonly-used Imperial and Metric dimension units to be displayed in the OIP and/or appropriate text elements.

Array Size (Secondary Units): The calculated array size in terms of secondary units *(Width x Height)*.

Base Structure: Different structures for either arrays or individual modules.

1) "Blocks:" Individual block-shaped bases for each of the modules, similar to panels, MiPIX® modules or VersaTubes®.

2) "Frame:" A single frame for the array, similar to MiPIX® frames.

3) "Curtain:" A single black background for the array, similar to SoftLED® .

4) "Web:" Webbing between modules, similar to ColourWeb® .

5) "Vert. Strips" and "Horiz. Strips:" Columns or rows, similar to LC® or MiSTRIP®.

6) "None:" No structures are created. Only LED modules are shown.

VS4-LED parameters *("Tile Cap" and "Overall Dimensions and Module Counts"), continued...*

Depth: The depth of either individual blocks, strips, or the array frame. *(Appears if a "Base Structure" of "Blocks," "Frame," "Vert. Strips," or "Horiz. Strips" is chosen.)*

Side Edge Miter: Options for mitering the left and or right end vertical edges of the module bases 45°, resulting in more seamless curved and corner arrays. *(Enabled if a "Base Structure" of "Blocks," "Frame," "Vert. Strips," or "Horiz. Strips" is chosen.)*

Horizontal Inset and **Vertical Inset:** The amount of horizontal and vertical space between the horizontal and vertical edges of the array, as defined by overall dimensions. *(Appear if "Frame, " "Curtain," "Web," "Vert. Strips," or "Horiz. Strips" Base Structure is chosen.)*

Single Module Wattage: The wattage of a single module in the array.

Total Array Wattage: The total wattage of the array.

If the Single Module wattage is entered or the module count is changed, the Total Array Wattage will be calculated. If the Total Array Wattage is entered, the Single Module Wattage will be calculated.

Weights: Related weight parameters and calculated values.

    Reference: The reference options used to calculate array weights, "Single Module" and "All Modules." Selecting one will allow values for that parameter to be entered and will make the other a calculated value**.**

    Single Module: The weight of an individual module in the array. (Only enabled if the "Single Module" "Reference" is selected. If "All Modules" is selected, this is a calculated value.)

    Half-Module: The weight of an individual half module in the array. *(Only enabled if the "Single Module" "Reference" is selected. If "All Modules" is selected, this is a calculated value.)*

    All Modules: The total weight of the array modules (not including hardware). *(Only enabled if the "All Modules" "Reference" is selected. If "Single Module" is selected, this is a calculated value.)*

    For example:

        Using a VS4-LED instance to represent a large LED wall, module dimensions (above) would represent the size of a given tile in that wall; "Build Array Based On" "Module Counts and Spacing" would be selected (above); and "Single Module" (here) would be selected. Entering the count values (above) would "build" the wall and entering the weight of a single module would result in the overall wall weight to be calculated (below) based on those counts.

        Using a VS4-LED instance to represent a single tile in an array, module dimensions (above) would represent the size of the pixels or nodes within that tile. The array dimensions (above) would be those of the one tile and "All Modules" (here) would be selected and the "All Modules" weight would be the weight of that one tile.

    Hardware: The weight of any/all rigging and/or mounting hardware for the array.

    Total: The calculated total weight of the array, including hardware.

    Distributed: The calculated distributed weight of the array, including hardware.

Tilt: The tilt angle of the entire array, in degrees. Positive values tilt the top of the array away from the viewer and negatives tilt it toward the viewer.

Simple 3D: Draws a simple single-plane screen representative of the array instead of detailed LED nodes.

Show Coverage Zone: Draws the viewing area for the screen based on the array size. Toggling this will enable different adjustable settings. Text, including user-definable labels, is controlled using the "Text Options" dialog.

VS4-LED parameters *("Tile Cap" and "Overall Dimensions and Module Counts"), continued...*

These six parameters are enabled when you click the "Show Coverage Zone" toggle:

Zone Reference: Reference options for coverage area calculations - the screen's width, height, or diagonal measurement.

Max. Horiz. Angle: The maximum side-to-side viewing angle for the screen, relative to dead-on.

Max. Vert. Angle: The maximum viewing angle for the screen, from the top of the screen to the "Viewing Height," used to determine the minimum optimal viewing distance from the screen.

Viewing Height: The viewing height reference for the "Max. Vert. Angle."

Near Multiplier and Far Multiplier: The multipliers of the reference dimension to determine the extents of the Near and Far Coverage Zones and will display the maximum optimal viewing distance(s) for the screen. If the "Far" value is larger than "Near," both zones will be drawn. Otherwise, only "Near" will be drawn.

Array Image: The image currently applied to the array.

Edit Array Image...: Opens the "Edit Array Image" dialog to allow you to switch and manipulate the image currently applied to the array. This dialog also provides the means for enabling the Vision® software system to recognize appropriate surfaces for video previsualization,

Circuit Number: The number of the circuit used to power the module/array.

Circuit Name: The name of the circuit used to power the module/array.

Source: The signal source for the module/array.

Drive Line: The drive line used to provide the signal for the module/array.

Input: The module/array's processor's signal input to be used**.**

Frame Rate: The module/array's frame rate.

Resolution: The module/array's resolution.

Location: Information about the location of the module/array *(such as "Stage")*.

Position: Information about the position of the module/array *(such as "Drum Riser-DS Face)*.

Unit: The unit number or designator for the module/array.

Purpose: Information about the intended purpose of the module/array *(like "Scenic")*.

Row and **Column:** When using a *VS4-LED* instance to represent a single tile in an array, the location of that tile within an array. *(Only available when horizontal and vertical module counts are both "1.")*

Vendor: The vendor for the module/array.

Cost: The cost of the module/array. *(Number only.)*

Note: Any general notes.

Text Options...: Opens the "Text Options" dialog to allow you to show or hide text and change attributes of *VS4-LED* text. Text that can be displayed includes array dimensions and module counts

**Default Text Positions:** Returns text to its default location. *(Only enabled if text has been inserted.)*

Parts Classes...: Opens the "Parts Classes" dialog, used to assign the different elements comprising the *VS4-LED* model to different Classes.

Update: Forces the *VS4-LED* object to regenerate.

VS4-LED Build: The build number of the *VS4-LED* Plug-In Object code.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, "Total Weight" and "Distributed Weight" are disabled.

Edit Screen Image / Edit Array Image dialog
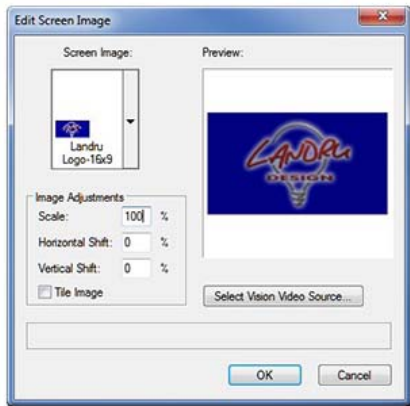
Screen Image: Renderworks® textures available as images for screens or arrays. Included are textures that are in the current file, any textures in any files placed in the /Libraries/Defaults/Video Screen/Screen Images folder (found in your User or main Vectorworks® application folder), and in the on-line Service Select library. To use custom screen images, simply add appropriate textures to your drawing file or to files residing in the above folder. *(See pages 37-40 for more information on adding custom images.)*

Preview: The preview window of what your selected image should look like on the selected VideoScreen 4 object. The aspect of the object in the window will match the screen or array aspect of the selected object in your drawing.

Note: If you're applying am image to an LED array built from the dome shape, one of the cap shapes, or the tube shape, the Preview will probably not match reality. Be prepared for some trial-and-error with those shapes.

Scale: The size of the image. 100% matches the image's width to the screen or array's width.

Horizontal Shift: Sets the horizontal displacement of the screen image, as a percentage of the screen or array's width. Negative values move the image to the left; positive, to the right.

Vertical Shift: Sets the vertical displacement of the screen image, as a percentage of the screen or array's height. Negative values move the image down; positive, up.

Tile Image: Allows image tiling.

Select Vision Video Source...: Opens the Select Vision Video Source dialog to enable the Vision® software system to recognize appropriate surfaces for video previsualization.

Select Vision Video Source dialog

Below are settings used to enable Vision® software system to recognize appropriate surfaces for video previsualization. The video source can be either a video file or a video capture device.
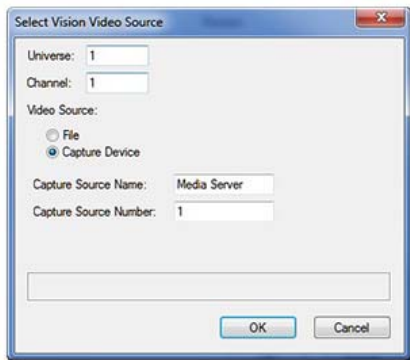
Universe and Channel: Specifies the dmx universe and address that controls the video.

Video Source: Select either a video file or capture device as the video source.

If "File" is selected:
     Video Filename: Displays the name of the selected video file.
   **Select File...:** Opens the operating system file selection dialog box enabling you to locate and to select a video file.

If "Capture Device" is selected:
     Capture Source Name: Identifies the external video capture device with a reference name that the Vision® software system recognizes.
     Capture Source Number: Enter the number for the capture source.

Text Options dialog *(VS4-Projection shown)*
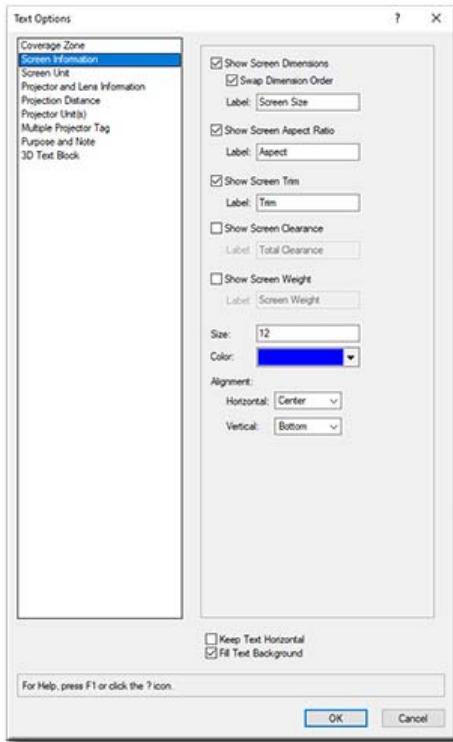
The left-hand side of the dialog offers a list of different text elements that can be displayed as part of the *VideoScreen 4* object and/or adjusted. This list will vary, depending on which type of *VideoScreen 4* object is selected.

The right-hand side of the dialog displays adjustments that can be made to the text element selected in the left-hand side. Depending on other object settings, some text options may be grayed out.

Using VS4-Projection's "Screen Information" as an example...

Show Screen Dimensions: Shows screen dimensions.
Swap Dimension Order: Changes the dimension order from Height x Width to Width x Height.
Label: Label to precede the screen dimensions. *(Leave blank if no label is desired.)*
Show Aspect Ratio: Shows the screen's aspect ratio.
Label: Label to precede the aspect ratio. *(Leave blank if no label is desired.)*
Show Screen Trim: Shows the screen's trim dimension, as measured from the ground plane.
Label: Label to precede the trim dimension. *(Leave blank if no label is desired.)*
Show Screen Clearance: Shows the total screen vertical clearance in addition to the image dimensions.
Label: Label to precede the total clearance. *(Leave blank if no label is desired.)*
Show Screen Weight: Shows the screen's weight.
Label: Label to precede the screen weight. *(Leave blank if no label is desired.)*
**Size:** The size of the text element, in points.
Color: The color of the text element using the Vectorworks® Color Picker.
Horizontal and Vertical Alignment: Options for setting text alignment and justification.
Keep Text Horizontal: Keeps text horizontal, regardless of the *VideoScreen 4* object's rotation angle.
Fill Text Background: Makes text background opaque.

Parts Classes dialog *(VS4-Projection shown)*
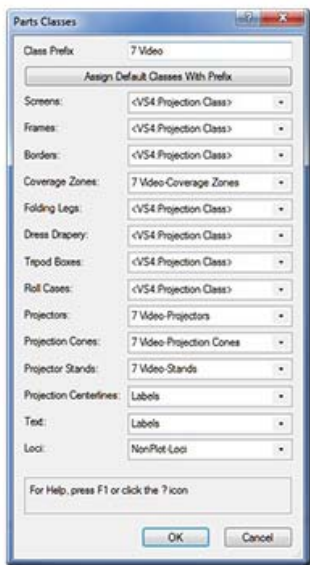
Class Prefix: The prefix that will be applied to each suggested Class generated if the "Assign Default Classes With Prefix" button is clicked.
Use Standard Classes: Populates each of the Class Pop-Ups with suggested Class names, each (except for "Loci") with the prefix as entered in the "Class Prefix" box.
Screens, Frames, Borders, etc.: The Class to which the given part is assigned. Existing Classes can be chosen or new Classes can be created on-the-fly. "<VS4:Projection Class>" signifies that the individual part is simply using the given object's overall Class. By-default, "Loci" are assigned to the "NonPlot-Loci" Class and all other parts are assigned to the object's overall Class.

In the example to the left...

Screens, Frames, Borders, Folding Legs, Dress Drapery, Tripod Boxes, and Roll Cases are using the VS4-Projection object's overall Class.
Coverage Zones, Projectors, Projection Cones, Projector Stands, and Loci are all assigning the given parts to Classes generated by clicking the "Assign Default Classes With Prefix" button.
Projection Centerlines and Text are assigning elements to a custom Class.

The other *VideoScreen 4* objects' "Parts Classes" dialogs are identical in functionality.

Custom Content

When you initially installed the *VideoScreen 4* suite, you copied a set of folders into ".../Libraries/" *(or, this was done for you)*. Those folders contain Vectorworks® files holding the different resources the *VideoScreen 4* tools use to create the different objects in your models.

This folder contains the image textures used by all of the tools:
/Defaults/Video Screen/Screen Images

These folders contain the casing models used by VS4-Television:
/Defaults/Video Screen/Casings CRT 4-3
/Defaults/Video Screen/Casings CRT 16-9
/Defaults/Video Screen/Casings CRT Curved 4-3
/Defaults/Video Screen/Casings Flat 4-3
/Defaults/Video Screen/Casings Flat 16-9

This folder contains the projector models used by *VS4-Projection*, *VS4-Blended Screen*, and *VS4-Blended Projector*:
/Defaults/Video Screen/Projector Models

This folder contains the stand models used by *VS4-Projection*, *VS4-Blended Screen*, and *VS4-Blended Projector*:
/Defaults/Video Screen/Stand Models

The contents of the Vectorworks® files in those folders *(including Favorites, Premium Libraries, Vectorworks® Libraries, User Libraries, and Workgroup Libraries),* in addition to resources found the current file in-use, determine the contents of the different dialog and Resource Selector pop-ups.

The ramifications for the user who creates custom resources are significant. Adding custom images, television casings, projectors, and stands for immediate and future use is as simple as creating the textures and/or models and adding the Vectorworks® files that contain them to the appropriate folder(s). The tools will "see" the added files along with the provided stock files.

Using the custom resources is as simple as selecting them from the appropriate pop-up.

A few notes:

For all resources:
Your resources must be in the same Vectorworks® version as the drawing in which you are working. (For example, if you're working in Vectorworks®2024, you can't use resources that are in Vectorworks®2023 or 2022 files.)

Custom Content, continued...

For Screen Images:

In-general, create Renderworks® textures like you would for any other 3D object. When you create the Screen Image texture, though, make sure that the "Constant" or "Glow" option under "Reflectivity" in the "Edit Texture" dialog is chosen. If you forget, the VideoScreen 4 tools will do it for you.

For Television, Projector, and Stand Models:

The different models that the VideoScreen 4 tools use are Hybrid Vectorworks® Symbols with the "__VS-ModData" record attached in their Symbol definitions. This record MUST be attached to the definition for any Symbol you wish to add and not to specific Symbol geometry. For each Symbol definition, information must be entered into various record fields:

For Television Casings:

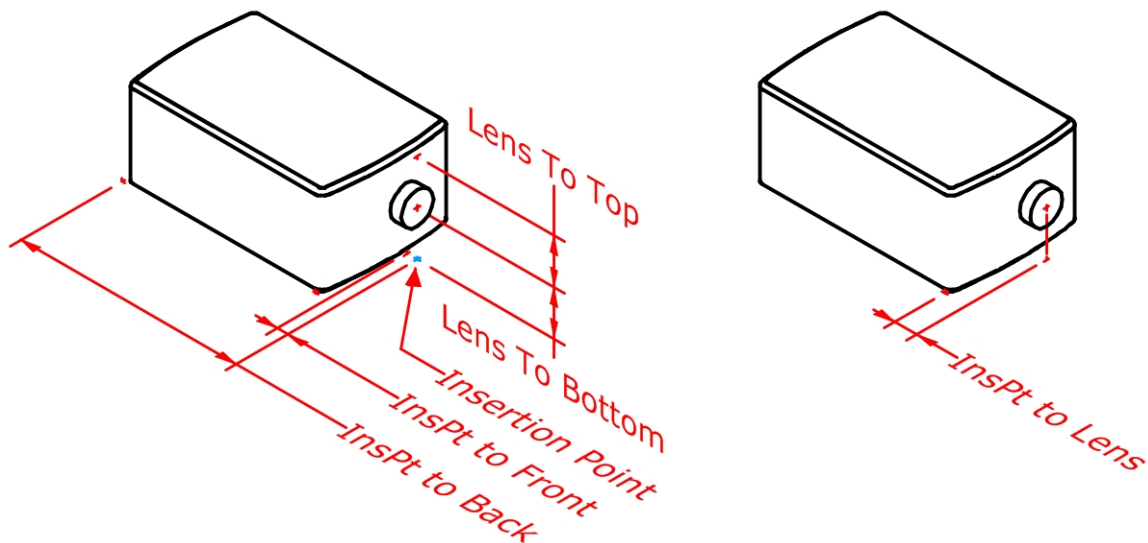For each _VS4 Television_ instance, the tool places a casing Symbol and then creates the screen/image on-the-fly.

A television casing Symbol should be created so that it "sits" on the ground plane facing "down-screen" and, in 2D, the Insertion Point is the bottom center of where the screen/image should be inserted. Note that this means that the front face of the casing Symbol might not be in-line with the Symbol's Insertion Point - if, for-example, the screen/image is recessed into the case. The only fields in a television's "__VS-ModData" record that matter are "type," "diagonal," "height from floor," "width," "height," "tilt," and "Weight." "Type" MUST contain the word "TV." "Height from floor" is the vertical measurement from the Symbol's ground plane to where you want the bottom of the screen/image to be inserted. "Width" and "height" are the width and height of the screen/image that should be created to go into the model. "Tilt" is the tilt angle of the screen/image that should be created.
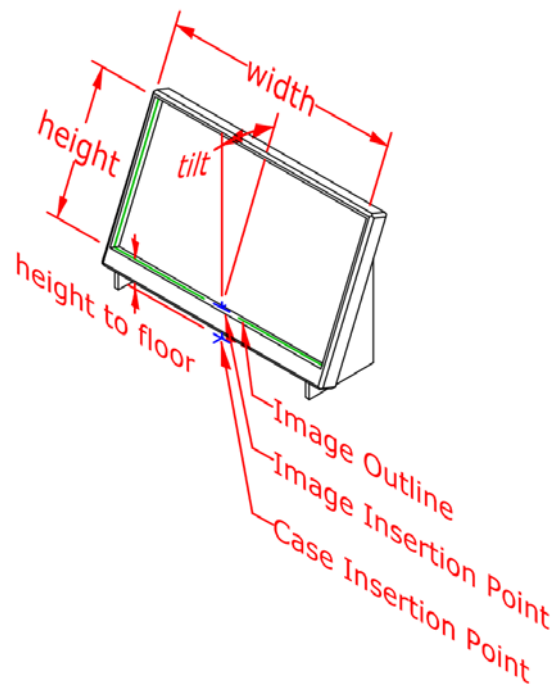
For Projectors:

> For each *VS4 Projection, VS4 Blended Screen*, and *VS4 Blended Projector* instance, the tool places one or more projector Symbols, a Stand Symbol (if the "Stand" "Vertical Position" is chosen) and then draws the rest of the instance geometry on-the-fly.

> A projector Symbol should be created so that it "sits" on the ground plane pointing "upscreen" (or, "downscreen" for projectors including "mirror" lenses). In terms of the "X" position, the Insertion Point should coincide with the center of the lens. In terms of the "Y" position, the Insertion Point should coincide with reference the given manufacturer uses for projection calculations - usually, either the front of the lens or the projector's front feet. The only fields in a projector's "__VS-ModData" record that matter are "type," "Sub Type," "Lens To Top," "Lens to Bottom," InsPt To Back," "InsPt to Front," "InsPt to Lens," and "Weight." "Type" MUST contain the word "PROJECTOR." "Sub Type" must contain "Mirror-Above" or "Mirror-Below" for projectors using mirror lenses. ("Above" and "Below" specify whether the image projection is intended to be above or below the projector body.) "Lens To Bottom" should contain the vertical measurement from the Symbol's ground plane to the center of the projector's lens. "Lens To Top" should contain the vertical measurement from the projector's lens to the top of the projector's body. "InsPt To Back" should contain the horizontal measurement from the projector's lens to the back end of the projector's body. "InsPt To Front" should contain the horizontal measurement from the projector's lens to the front end of the projector's body. If object geometry, such as a cage, extends further out than the lens, this measurement will be to the "further-out" point and will be NEGATIVE. If the given manufacturer's projection calculation reference is the center of the lens, "InsPt to Lens" should be "0." If the given projector manufacturer uses another reference, such as the projector's front feet, the "InsPt to Lens" value should be the distance from the front of the lens to that point.

For Stands:

For each *VS4 Projection*, *VS4 Blended Screen*, and *VS4 Blended Projector* instance, the tool places one or more projector Symbols, a Stand Symbol (if the "Stand" "Vertical Position" is chosen), and then draws the rest of the instance geometry on-the-fly.

A Stand Symbol should be created so that its feet "sit" on the ground plane and the Insertion Point is the 2D center of the stand. For stand Symbols, the only two fields in a stand's "__VS-ModData" record that matter are "type" and "height from floor." "Type" MUST contain the word "STAND" and "height from floor" should contain the vertical measurement from the Symbol's ground plane to the height at which you'd want projectors placed - probably, the top surface of the stand.
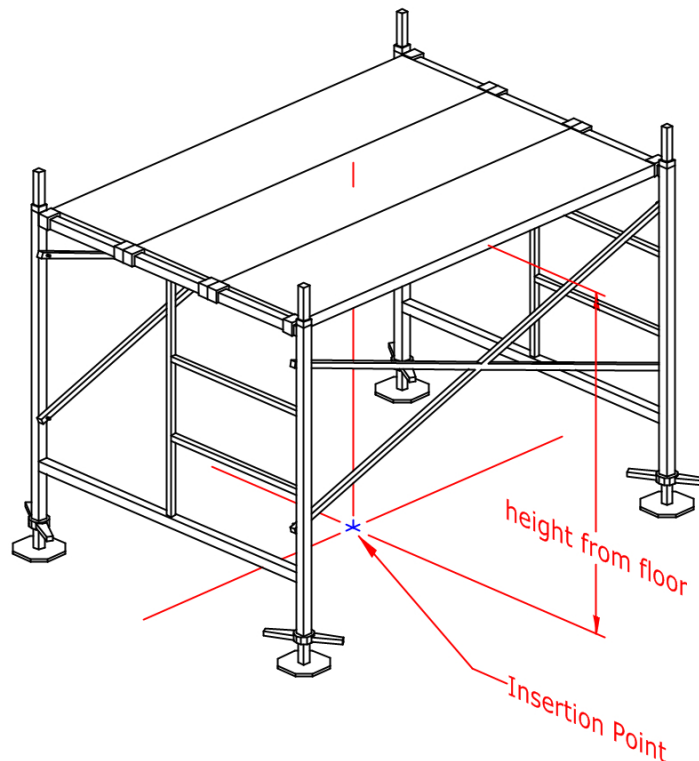
View this YouTube movie to walk through the custom resource building process step-by-step: http://www.youtube.com/watch?v=ceP2MOpkGMI.

Also, for any of these items, taking a look at how the stock models have been created will be a big help in clearing up any confusion, here.

Sources of Screen Image Content

Free Digital Photos:
http://www.freedigitalphotos.net

Chris Hammond:
Christopher.hammond@me.com

Landmark Vistas:
http://www.landmarkvistas.com

C. Andrew Dunning/Landru Design:
http://www.landrudesign.com

NASA:
http://hubblesite.org/
http://mediaarchive.ksc.nasa.gov/index.cfm
http://www.nasa.gov/mission_pages/station/multimedia/index.html
http://grin.hq.nasa.gov/
http://www.nasaimages.org/
http://visibleearth.nasa.gov/

PD Photo.org:
http://www.pdphoto.org

Public Domain Pictures:
http://www.publicdomainpictures.net