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EnGage

Engage Multiple Output “Video Wall” Guide™

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Summary

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Summary	This document provides an overview of the EnGage Multiple Output player and instructions on its use.
Reference	Multiple Screen Video Guide.docx

Revisions

Date	Version	Description
23/04/2013	V1.2	Updated wording and physical connections matrix.
24/10/2011	V1.1	Updated details and screenshots to reflect EnGage R6 changes.
28/10/2011	V1.0	Initial release.

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Introduction

There are many different designs available when using multiple screens, also known as a “video walls”. This guide will discuss the various options and limitations of using a multiple screen setup. There are many decisions that must be made prior to setting up the programming and the creation of the content that will run within this program.

This guide assumes a basic working knowledge of content Programming within EnGage. For the purpose of this guide, a single player is used to provide video outputs to two or more screens. This multiple output player is not the standard EnGage player as it has special hardware capable of providing up to 8 video outputs and has been specifically designed to play back high resolution videos over multiple screens.

The multiple output player is not a standard desktop PC. It has been designed with high end CPU’s a large amount of RAM, solid state drives and high end videos cards to be able to play back very high resolution and simulations videos. This hardware, although very powerful, still has playback limitations. Throughout this guide the hardware is referred to as “resources”. These resources have a maximum capability and planning should be done to avoid overrunning the resources of the hardware and compromising video playback quality.

Testing of the content playback is the single most important detail in this guide. Content creation is more of an art rather than a science and playback quality will heavily depend on the content and programming. The only way to know for sure that the content will playback at the desired quality is to test it on the exact same hardware (player and screens) that the content is destined for. This may require a testing or lab setup but this is essential for knowing that the content will play properly since there are so many factors that determine the playback quality.

The only way to know for sure that the content will playback at the desired quality is to test it on the exact same hardware (player and screens) that the content is destined for.



NOTE: The only way to know for sure that the content will playback at the desired quality is to test it on the exact same hardware (player and screens) that the content is destined for.

Planning

When building a multiple screen setup, some planning is required prior to starting any programming or content creation. How many screens will be used? Will the screens be oriented in a portrait or landscape style? Will the screens be arranged side-by-side, stacked, in a rectangular video wall or have an irregular arrangement? What is the visual effect that is trying to be accomplished? Will the content span all screens, some screens or multiple assets, one on each screen? There is a large amount of variety, however understanding the end goal of the multiple screen setup is very important for moving forward with the programming and content creation.

Consider the following details:

- Visual effect that is trying to be achieved (content)
- Number of screens
- Screen size
- Screen resolution
- Screen arrangement and orientation
- Content layout (video spanning all screens, some screens or one screen)
- Layout changes
- Distances between screens and bezel correction
- Viewing distance of the audience

Hardware vs Software Solutions

For multiple screen setups, sometimes it is more effective to use hardware to take a video and span it across multiple screens. However, hardware video splitters will have less options and the setup is much more static compared to a software solution. If software is used to split video across screens there are more options for various layouts along with the option to play content across all screens, when required. If a setup is required to play video across all screens, all of the time and the option for specific videos on specific screens is not required, the hardware solution may be the right solution. Hardware “video wall” solutions may be a viable option however those solutions are not within the scope of this document.

Steps to Creating a Multiple Screen Display

1. Create the screen arrangement (screen) – in the Management tab
2. Create a screen layout – in the Studio tab
3. Create the content programming – in the Studio tab
4. Create the timetable and add the program – in the Studio tab
5. Assign the screen arrangement to the site – in the Site Assignment tab
6. Assign the timetable to the site – in the Site Assignment tab

Understanding the Limitations

- Just because a screen arrangement and programming is possible does not guarantee that the player will be able to play the content with the desired quality. The player is limited to playback quality based on the hardware resource. Multiple output players are specialized and generally

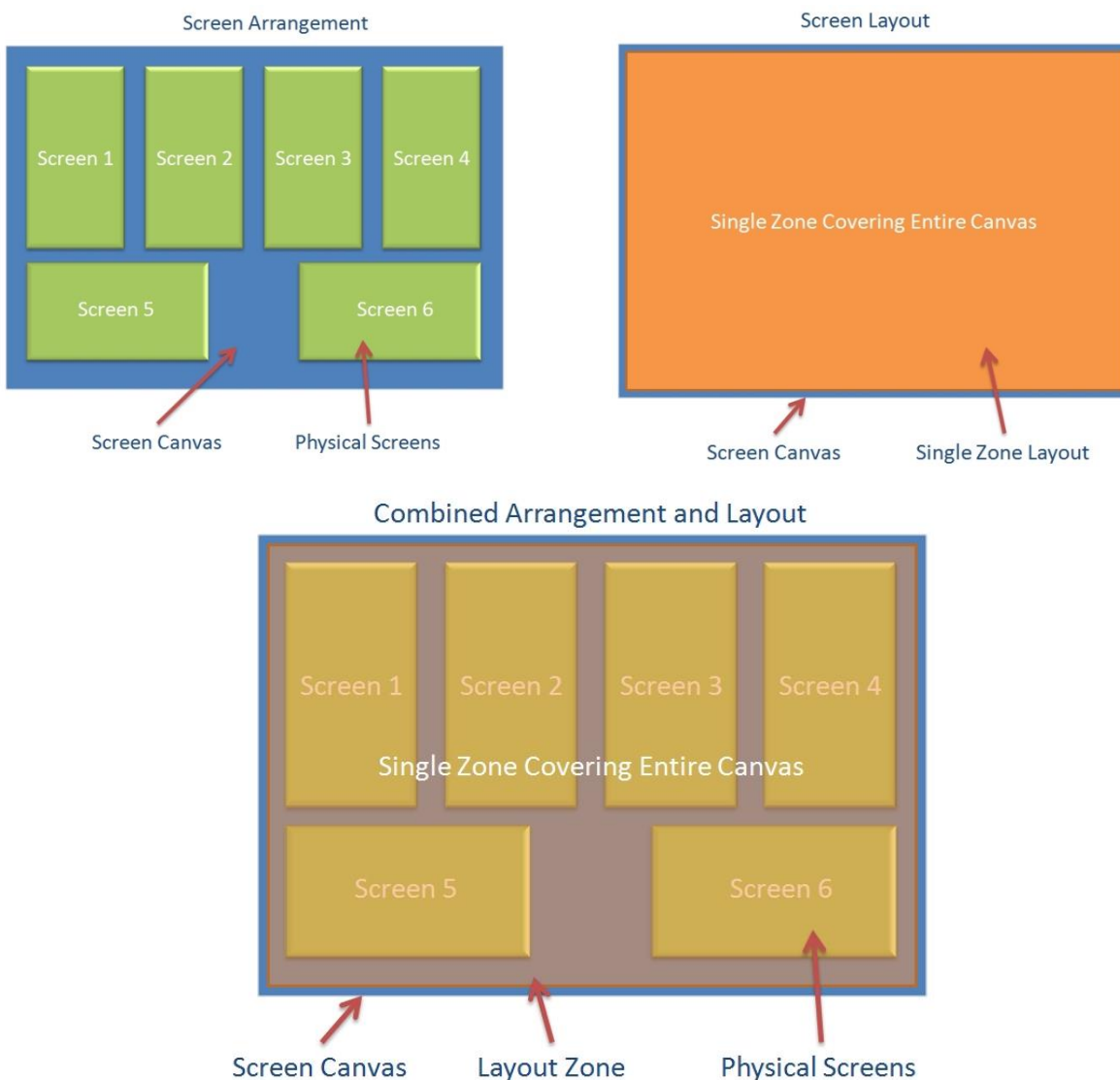
have much faster CPUs, much more RAM and higher end videos chipsets then single output EnGage players. However, they are still limited to hardware resources available to them. Playing individual 1080p content on each screen may be possible to program, but may not play back at the desired quality. Test all content and programming on a test setup prior to deploying the content to the field.

- Content play back spanning multiple screens causes more strain on hardware resource then having individual videos play back on individual screens.
- Each video playback can take advantage of a CPU core. Having more videos play then CPU cores available puts heavier strain on hardware resources.
- Screens can only be arranged in a landscape or portrait orientation. Screens arranged at an angled (diagonal) are not currently supported. To achieve this setup, create the arrangement using standard landscape and portrait arrangements and have the content rotated to the desired angle during the content production/creation.
- Using any one screen in a portrait orientation may have a significant performance impact on the player reducing the overall playback quality.

Deciding on the Screen Arrangement

The screen arrangement is not the “layout” of the content. It only defines the physical arrangement of the screens onto which the “layout” will be overlaid. The screen arrangement will almost always mimic the physical arrangement (how they’re mounted to the wall). For example a single video could span across multiple screens and depending on the arrangement and layout, only portions of the video will show on each screen. Alternatively the screen layout could have zones that fit perfectly onto the screen arrangement enabling separate content to play on each screen.

The example below shows a non-standard screen arrangement. Beside the example arrangement is the screen layout which is a single zone filling the entire canvas. Only in the areas in which screens have been defined will the video playback. The video will be “cut-out” in areas where there is a zone layout, but no screen defined.



If a media asset (video/image) is programmed to play in this single zone, the sections without the screens defined will be cut-out. Below is an example image with playback results using the above arrangement example and single zone layout.



Example Image



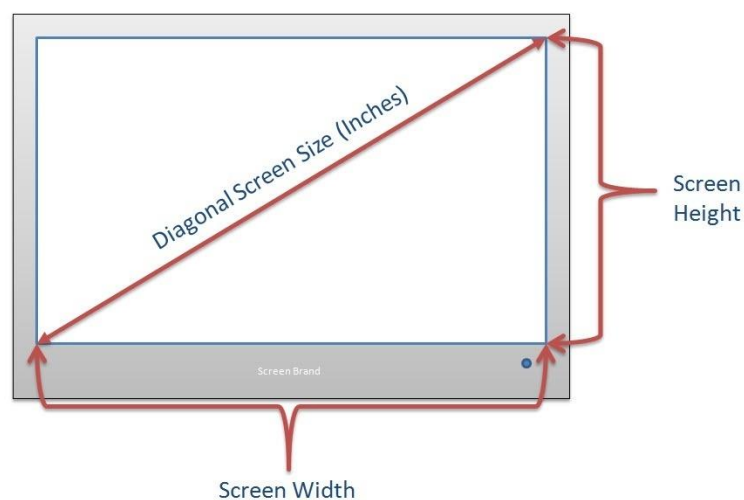
Example Image with Screen Arrangement

How to create a Multi Screen Arrangement

Before creating the multi screen arrangement, some planning will be required. The number of screens, the orientation of the screens, the physical arrangement (how they're mounted to the wall), the resolution of the screens and the size of the bezels, will all be required before proceeding.



NOTE: When referring to the width and height of a panel, this is the measurement of the “glass” of a panel, which is the inside measurement of the panel, not the total physical measurement, including the outside molding, referred to as the “bezel”.



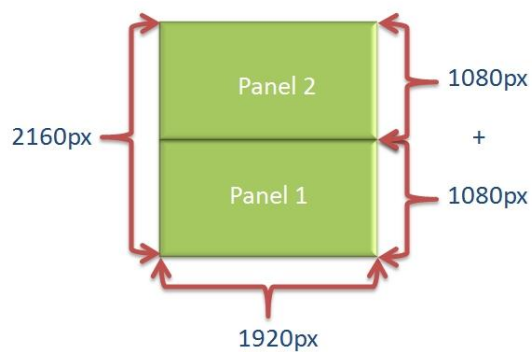
Determining the Canvas Size

The first step is to decide on the name and size of the canvas, in pixels (px). All the screens will be arranged within the canvas, so make sure the canvas is large enough to accommodate all of the screens. The canvas size cannot be altered after the screen arrangement is created.

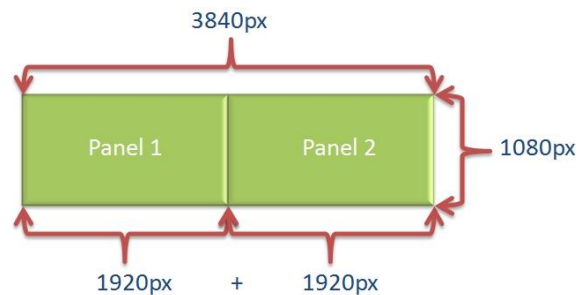
Having two screens arranged landscape; side-by-side, using a resolution of 1920x1080 (1080p), the canvas should be at least 3840 X 1080 to accommodate for horizontal resolutions of both the screens.

Having two screens arranged landscape; one on top of the other, using a resolution of 1920x1080(1080p), the canvas should be at least 1920 X 2160 to accommodate for the vertical resolution of both screens.

Knowing the resolutions of the screens is critical in determining the total canvas size.



Canvas size should be 2160 x 1920 pixels



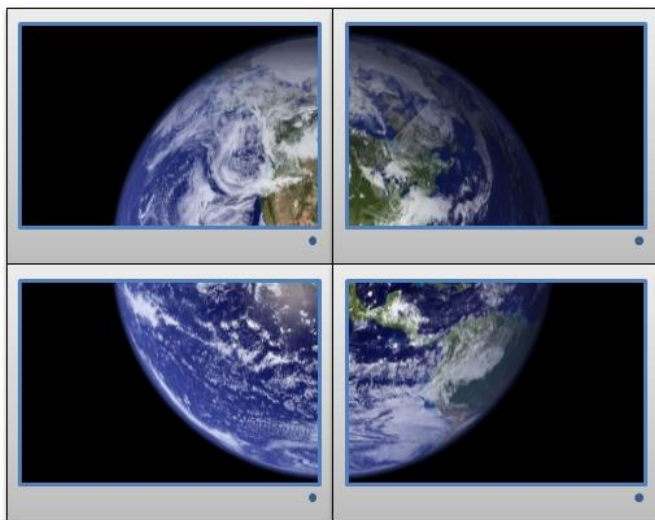
Canvas should be 3840 x 1080 pixels

Bezel Correction and Space between Screen

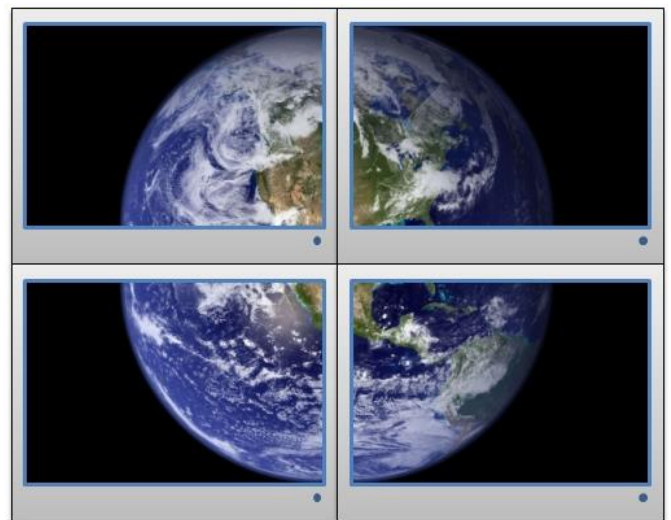
Bezel correction is the term used to accommodate for the molding around the screens glass display that holds the panel together. Every screen manufacture has different size bezel for their screens. The size of the bezel can be different on the top, bottom and sides of the screen. If the screens are arranged directly beside each other, the media will appear to “skip” the bezel region of the screen possibly distorting the media. For example, without bezel correct a round object in media, spanning multiple screens may not appear round but will have extra space making the object larger. The bezel correction can compensate for this effect by cutting out the video “behind” the bezel, causing a round object to actually appear round.



The total canvas size should also include any correction for the size of the screen bezels. Since all the measurements of the canvas are in pixels, the number of pixels used by the bezel will have to be calculated.



Arrangement with Bezel Compensation



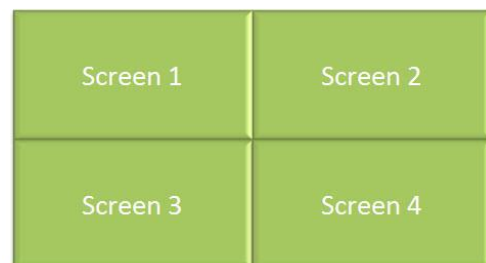
Arrangement without Bezel Compensation

Bezel Correction



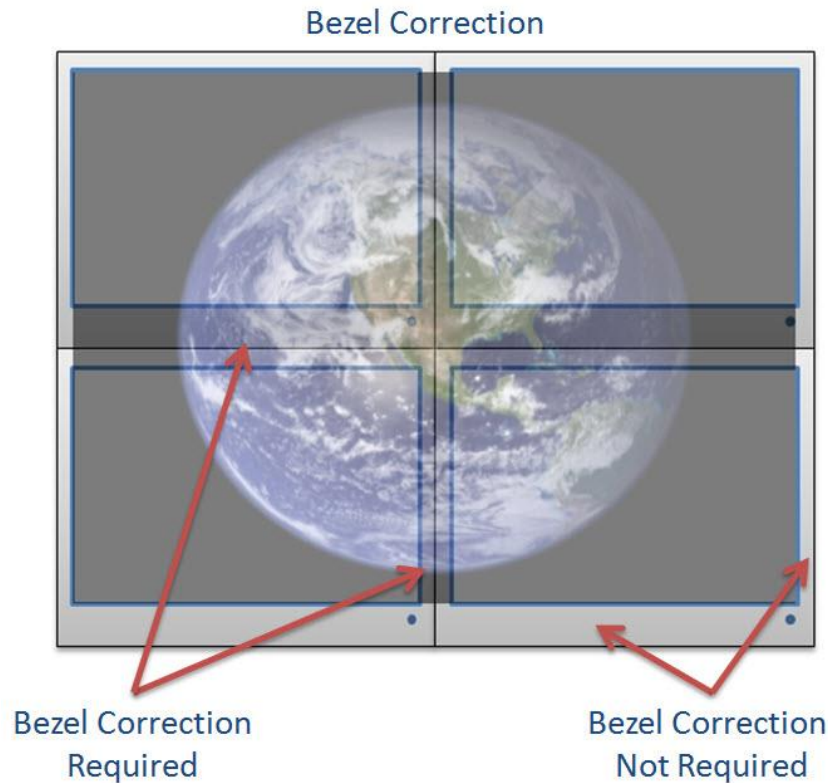
Arrangement with Bezel Correction

No Bezel Correction



Arrangement without Bezel Correction

Bezel correction is only required on the “inside” portions of the screens as the content will usually not extend past the outside portion of the screens into the outside bezel.



To add Bezel correction, add spaces between the screens that are the same size as the bezel converted to pixels rather than inches.

Calculating the Bezel size in Pixels

To calculate bezel correction in the horizontal direction, consider the following:

Let the width of the screen (glass) be X inches.

Let the resolution of the screen in the horizontal direction is W pixels.

Let the bezel size is B inches.

The number of pixels in one inch of screen is $N = W/X$.

The bezel width in pixels = $N * B = W * B / X$

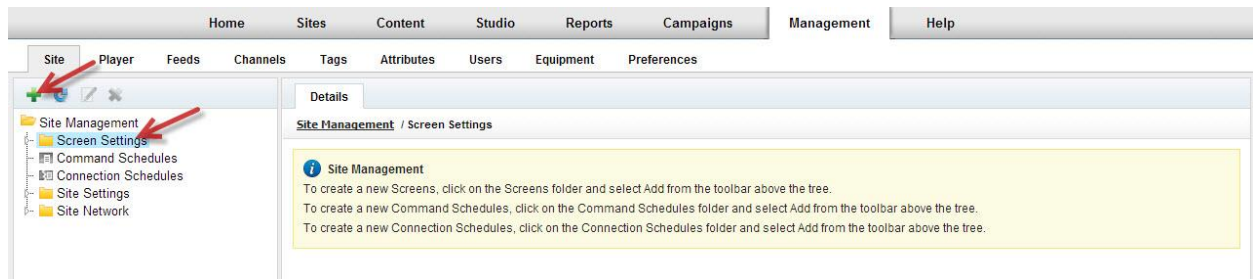
In words, bezel correction in pixels = (screen width in pixels) * (bezel width in inches) / screen (glass) width in inches.

Similar considerations can be undertaken for the vertical direction.

Calculating your Canvas Size

Some manual calculations will be required to determine the size of the canvas depending on the number of screens, the screen resolutions, the screen arrangement and the screen bezel sizes. Use your favourite tools (paper and pencil or a spreadsheet) to plan out the canvas size before proceeding.

Step-by-Step, creating the Screen Arrangement



Check the “Are you using a Video Wall” option. Then enter the number of screen that will be used for the multiple screen setup, the panel type (manufacture type) and height/width of the canvas, in pixels. The canvas size cannot be changed later and must be large enough to accommodate for all of your screens and the bezel correction between the screens. Click on the “Next” button to proceed to the next step.

The 'New Screen Setting' dialog box is shown with the title 'Screen Settings Wizard - Define Screens and Control'. It contains the following fields and options:

- Are you using a video wall? ☒
- How many video outputs are used?
- What model of screen are being used?
- Canvas Width Cannot be changed later
- Canvas Height Cannot be changed later

At the bottom right, there are 'Next' and 'Cancel' buttons. A red arrow points to the 'Next' button.

Enter a name for the Screen Arrangement. Add any panel control options that are required and click “Save”.

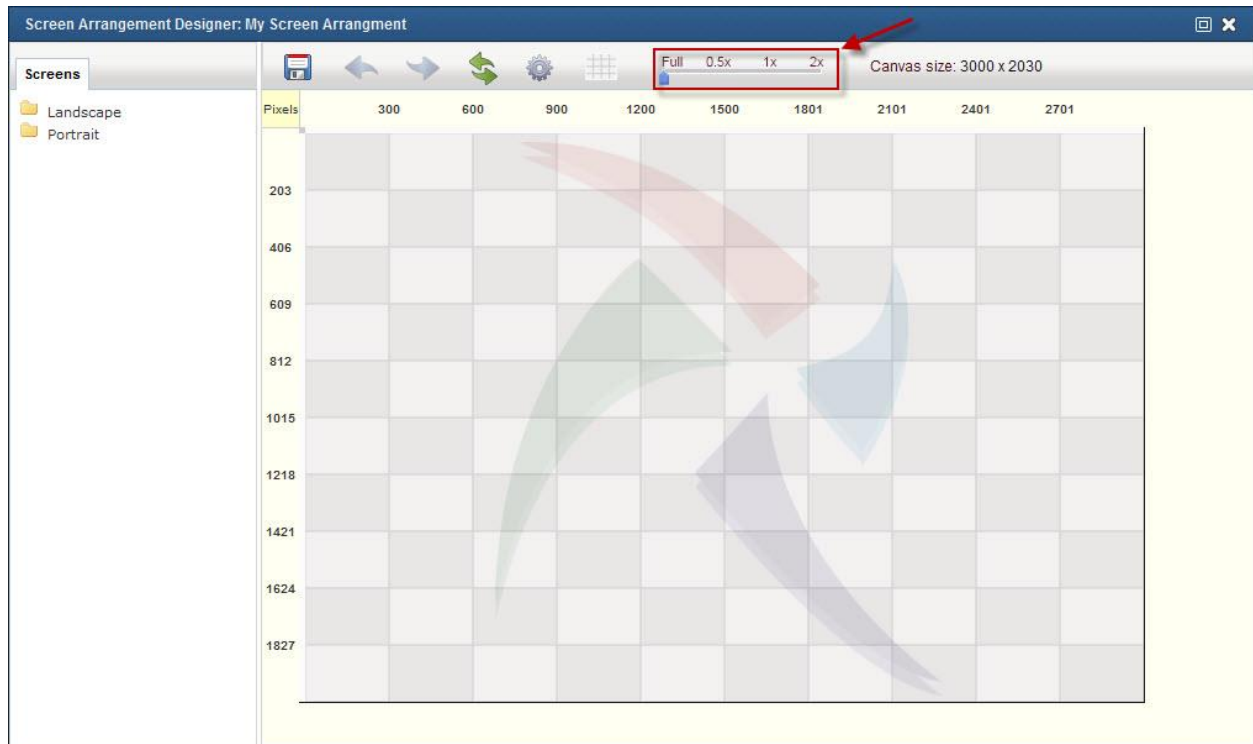
The 'New Screen Setting' dialog box is shown with the title 'New Screen Setting'. It contains the following fields and options:

- Screen Settings Name
- Screen Model
- Number of Video Outputs Layout editor used to configure screens
- Screen Control
 - Screen Control Mechanism
 - Disable OSD ☐
 - Disable Front Panel Controls ☐
 - Disable Remote Control ☐
- Picture Mode
 - Default Brightness ☐ Ignore
 - Default Contrast ☐ Ignore
 - Default Tint ☐ Ignore
 - Default Color ☐ Ignore
 - Default Sharpness ☐ Ignore
 - Default Volume ☐ Ignore

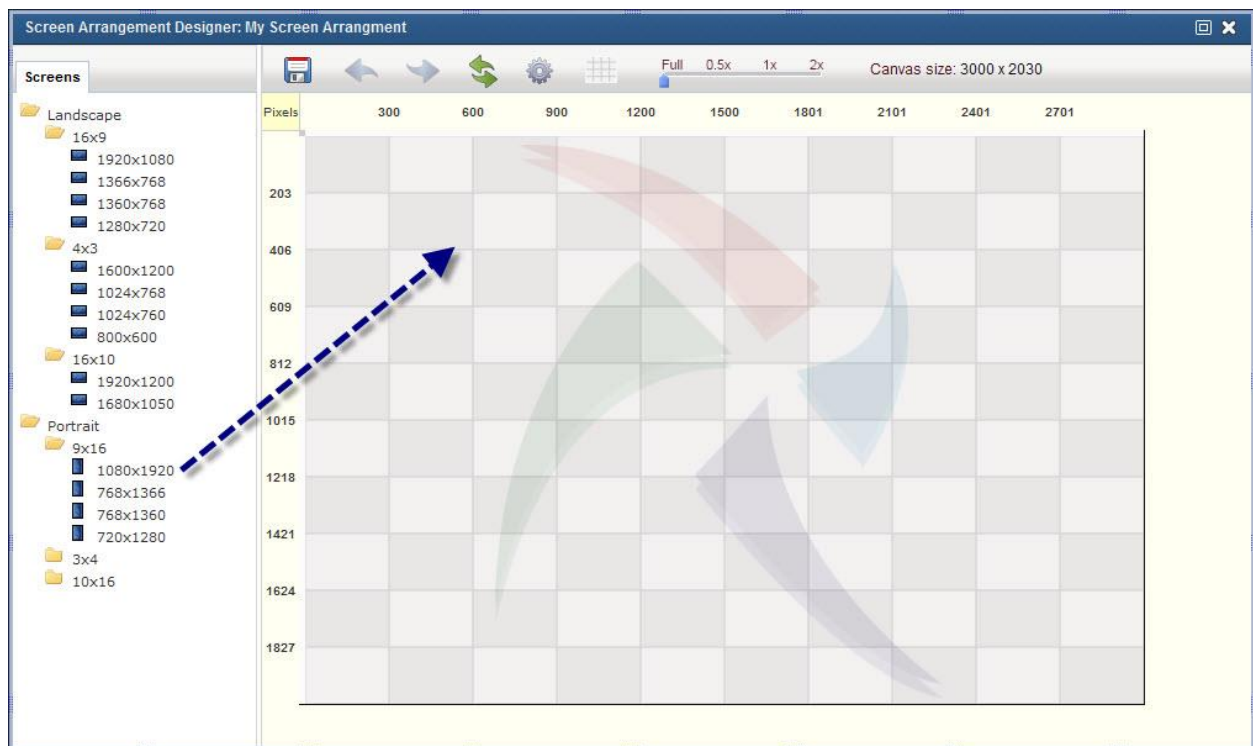
At the bottom right, there are 'Save' and 'Cancel' buttons. A red arrow points to the 'Save' button.

Select the Screen Arrangement that was created in the previous step and click on the “Layout Editor” button.

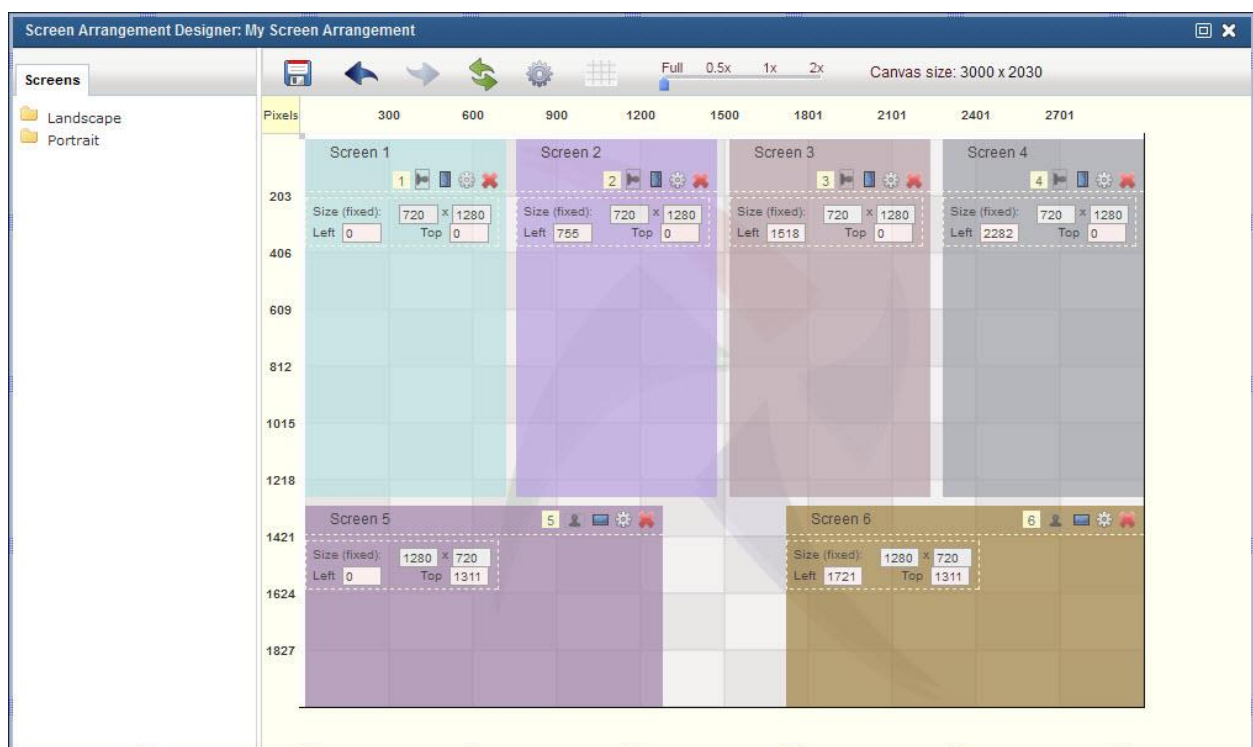
The right side of the window will be the canvas, at the dimension as defined in the previous step. The left of the window will have the screen selections that can be used on the canvas. Use the scale to zoom in or out on the canvas. It is easiest to start in “Full” view of the canvas, add your screens and then zoom in to fine-tune the location of the screens within the canvas.



Open up the Screen Folders on the left and begin dragging your screens onto the canvas. Continue dragging screens into the canvas until all the desired screens have been added. Drag the screens around the canvas to lay the screens out as required.



In the example below, a non-standard screen arrangement has been created with both portrait and landscape screens including gaps between the screens for bezel correction.

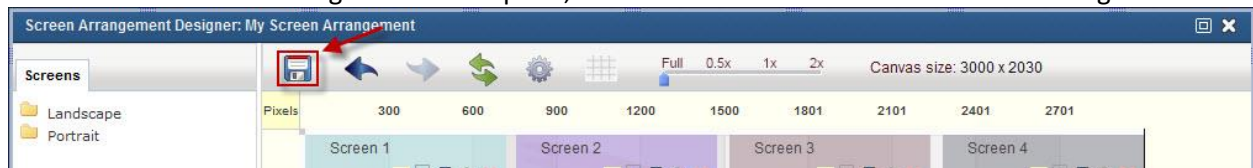


If the screens [resolutions] you're using are not available in the screen selection, use a custom screen size and define the resolution within the screen on the canvas.



Click on the “Gear” within a screen to set the details of the screen such as index, placement coordinates, screen resolution and “flip” option.

Once the Screen Arrangement is complete, click on the “Save” button to save the arrangement.

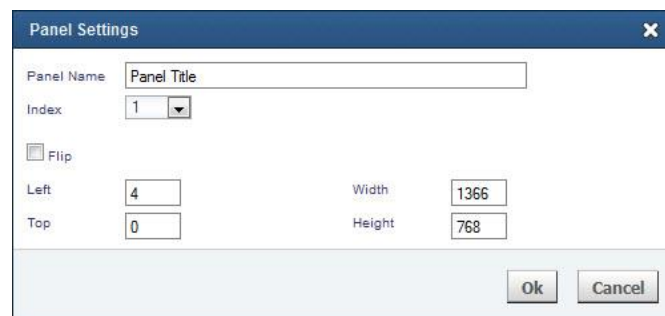


The new Screen Arrangement can then be assigned to a site in the same way a screen is assigned. Use the layout editor to create a Screen Layout that matches the screen arrangement.

The Index numbers will correspond to the video outputs on the back of the EnGage player. Changing the index numbers will alter how the screens in the arrangement are mapped to the physical video outputs on the back of the player.

Screen Options

Each screen has a number of settings:



- **Index.** The index is the screen number that corresponds to a physical video output on the player. Changing the index will change which video output the screen is connected to.
- **Flip.** The flip option enables users to invert the video 180 degrees.
- **Left/Top.** These fields define how many pixels from the left boarder of the canvas and how many pixels from the top board of the canvas, the screen is placed within the canvas. This is a good method for fine tuning the locations of the screens within the canvas. These values can also be changed by typing them directly into the screen however, if the screen is very small within the editor, the boxes to type in these values may not be available.
- **Width/Height.** These fields define the size of the screen in pixels. Only “custom” screens will have the option to change these values.

Save Arrangement

Click on the “Save Arrangement” button to save the arrangement in its current state.

Undo/Redo

The undo and redo buttons enables you to undo or redo a change to the screen arrangement. Be careful, once the arrangement is saved, the save cannot be un-done.

Reload Arrangement

The reload arrangement button will reload the currently open arrangement from the last time it was saved. Any changes from the last save will be lost.

Default Screen Options

The default screen options are used to set the screen control options for the screens in the arrangement. The options in this setting are the same settings as the screen control for a single screen. Currently, EnGage can only control/monitor one model of screen in a screen arrangement. To control and monitor the screens, they must support RS-232 screen controls and be able to “daisy-chain” the RS-232 connection between all the screens. For more details about controlling and monitoring multiple screens see the “Command Schedule” section of the User Guide which has a subsection called “Controlling Multiple Screens”.

Background Stencil

The back stencil button enables users to add an image from the content library that can be used as a background stencil over which the screens can be arranged. This feature makes arranging screens easier when a layout schematic is provided as an example arrangement.

Possible Issues and Limitations

- If a Screen Layout does not cover all portions of a Screen Arrangement, the background image will be shown in those portions during content playback. By default, the background is black.
- When creating/encoding content, be aware the most content today is recorded at a maximum resolution of 1920x1080. If this content is stretched across multiple screens it may not look as sharp as it would on a single screen because of the scaling required to span multiple screens.
- Re-encoding content to higher resolutions will not increase the quality of the content.
- Assigning a Screen Arrangement to a single output player will be have unpredictable results and is not supported.

Creating a Multiple Screen Layout

When creating a Multiple Screen layout, open a new Layout in the EnGage Studio. Click on the Studio tab, then the layout tab. Create a new layout and select the “Custom Multiple Screens” option.

Enter the height/width details using the same canvas size as the Screen Arrangement.

New Screen Layout

Name:

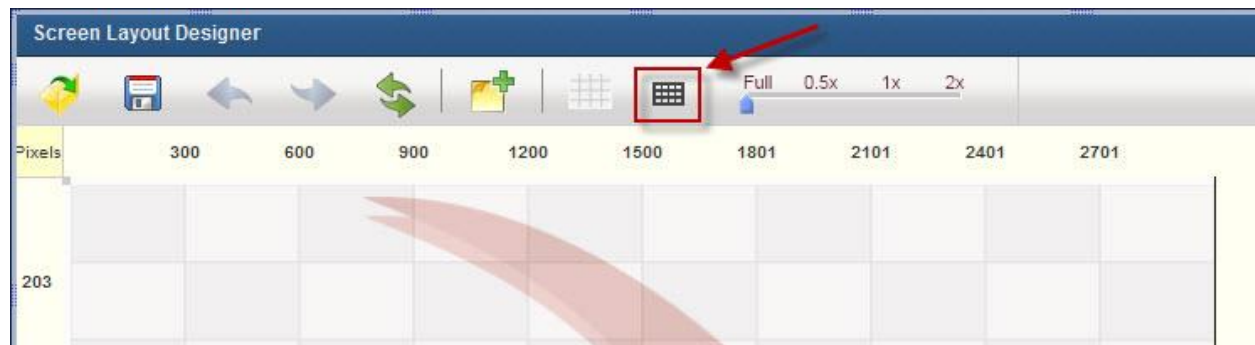
Screen type ☐ Single Screen - Absolute (Pixel)

☐ Single Screen - Relative (%)

☐ Standard Multiple Screens panels

☒ Custom Multiple Screens Canvas Size (Pixel): x

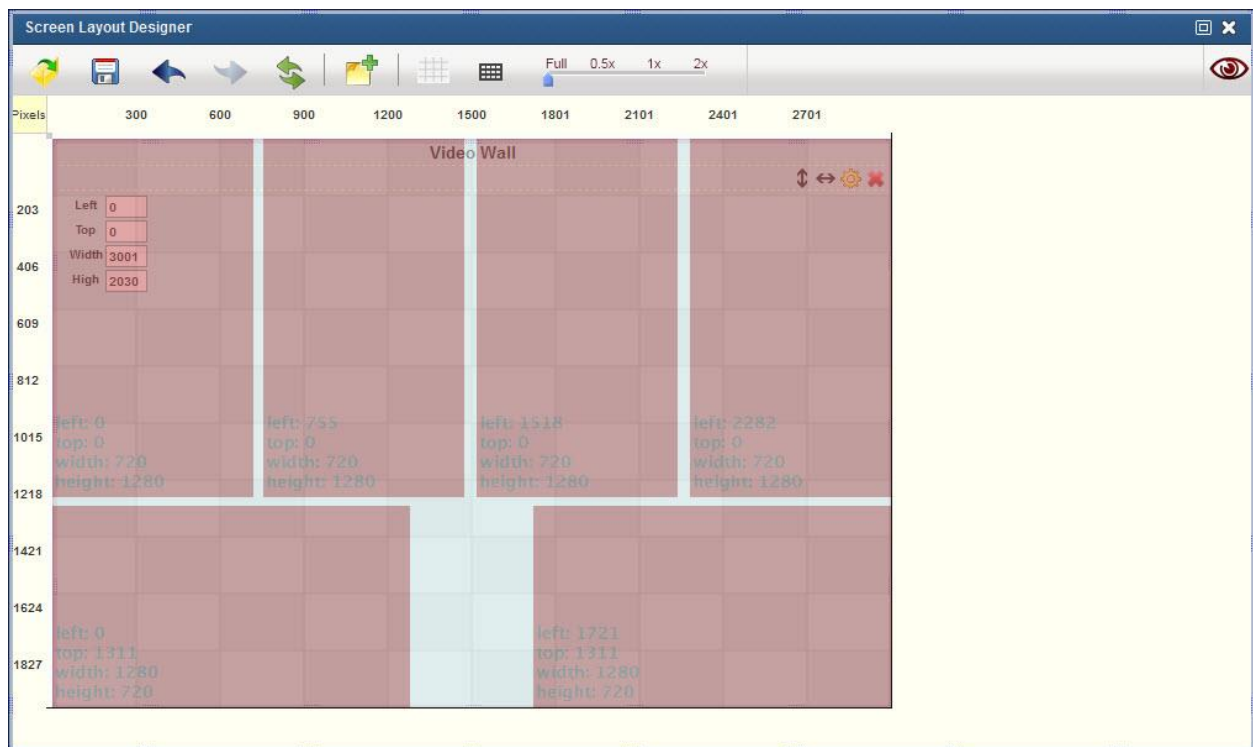
Take advantage of the layout stencil by clicking on the “Arrangement Stencil” button.



Select the Screen Arrangement that was created in the previous step. The Screen Arrangement can then be used as a stencil to create your layout. The screen location coordinates and dimensions will be shown in each screen within the stencil.



Creating a zone over the entire canvas will create what is known as a “video wall” where a single video will span all of the screens. Creating individual zones over each screen will enable you to create a playlist per screens. Try taking advantage of the “Full Screen” command in the program editor to switch between content playing on individual screens to content playing across all screens. Creating zones that cover some of the screens will enable users to have content play over some of the screens and that content may be synchronized with other layout zones covering the other screens.



Be sure to add the zones in the order in which you would like them to appear in the Program editor. The first zone added will be zone A, second zone B, etc.

Content Programming

Once the screen arrangement and layout have been created the content can then be programmed. Content programming tells the player what content to play in each of the layout zones. The content programming is also where content can be synchronized across zones. Keep in mind, a zone can be aligned with a single screen, multiple screens or all screens depending on your layout and screen arrangement. Programming content into a specific zone will scale that content to the size of the zone, even if the zone spans multiple screens.

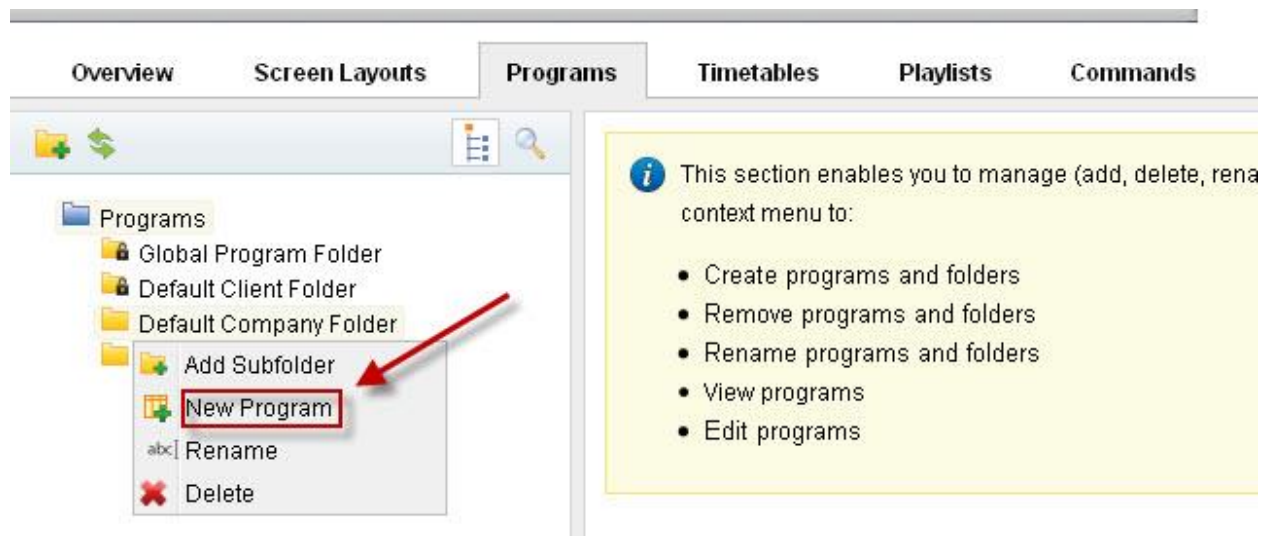
Multiple Screen Content Programming Scenarios

1. Single content asset spanning all screens (video wall).
2. Different content assets playing on each screen.
3. The same content asset playing all each screen (video tile).
4. The same or multiple content assets spanning some screens.
5. Combined scenarios.

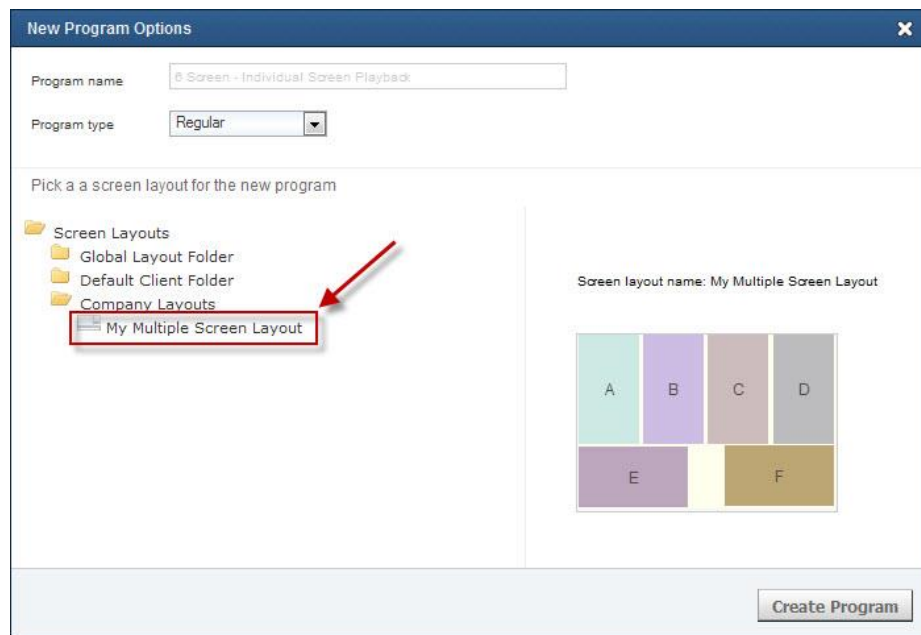


NOTE: Content transitions are not supported by the EnGage multiple output player.

No matter what the desired program model is, start by creating a new Program in the Studio section of EnGage.

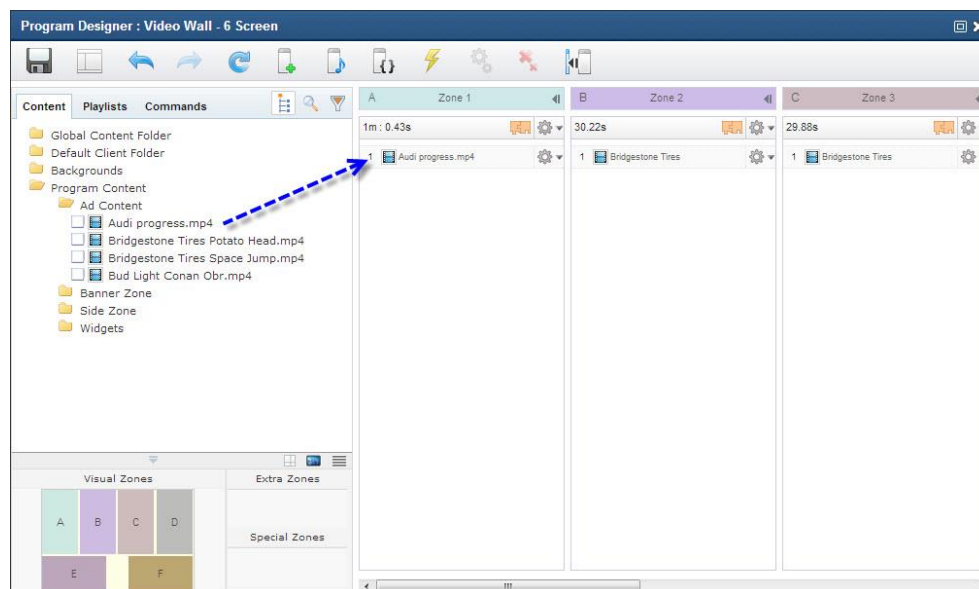


Select the Multiple Screen layout created in the previous steps.



The content programming for multiple screens is very similar to programming content for a single a screen setup but there are some subtle details that will help avoid playback quality issues.

To start programming, simply drag the content from the area on the left of the window into the zones on the right. Use the thumbnail of the layout in the bottom left corner of the window as a reference to the layout zones. Keep in mind that all content (with some exceptions when using flash) will scale to fit the size of the zone both vertically and horizontally.

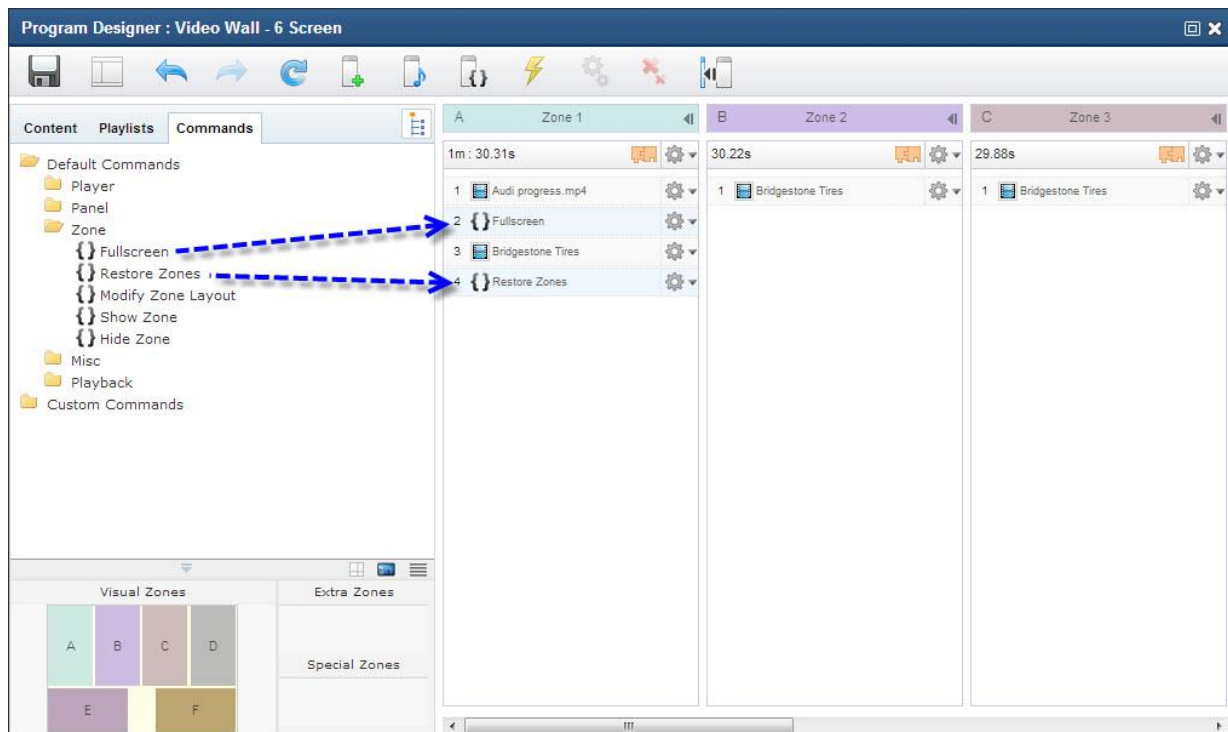


Once the content has been added to each zone, save the program and proceed to adding the program to a Timetable.

Jumping to Full Screen

If the intention of the programming is to have some content play across all screens and sometimes play content across individual or some screens, take advantage of the “Full Screen” command. Any content listed after the “Full Screen” command will play across all screens. Return to the previous layout by adding the “Restore Zone Layout” command. All other zones will effectively be paused until the “Restore Zone Layout” command is issued. Content playback will continue from the point of which it was paused in the other zones.

Add the “Full Screen” command by dragging it into a zone. The commands can be found under the Commands tab in the Default Commands->Zone folder. Content listed between the two commands will play across all screens.



Synchronizing Zones

Zone Synchronizing can be used to have two or more zones switch to a content asset at the same time. The zone synchronizing controls the beginning of the content playback; however the duration of each content playback must be managed through programming.

There is always one “Master” zone and one or more “Sync” zones. The synchronizing is controlled by the “Master” zone and controls when the other “Sync” zones will begin playing content assets.

Set the Master and Sync zones by dragging the icon that looks like a puzzle piece from one zone to another zones puzzle piece. The puzzle piece icon will then show an “M” or an “S” depending on whether it’s a Master or Sync zone.

Synchronize content by dragging the puzzle piece from a content slot in the Master zone, to a puzzle piece icon on a content slot in the Sync zone. To synchronize content in a Master zone to multiple Sync zones, repeat this process for each Sync zone.

Remove sync commands by dragging them into the trash bin icon in the tool bar.

By default, without any synchronization, each zone will play the content listed in its programming area independent from all other zones. The timing of the playback between the zones is not guaranteed. For example, if the same video is placed into the programming area of all the zones (without any synchronizing commands) the video playback may not be synchronized and will be quite noticeable on the screens. Each zone will “load” the video at slightly different rates causing the videos to start playing at slightly different times. This variance will be enough to have the videos look like they’re not quite synchronized. Using synchronized programming will “pre-load” the content in each zone and start the playback at the same moment, creating a synchronized effect.

Different types of content can be synchronized between zones, such as having an image start showing in one zone just as a video starts playing in another zone. However, since the video has an inherent length (the playback time of the video) and the image (still picture) does not, timing the playback of the image to be the same as the video must be achieved through programming. Set the duration of the image to be the same duration or slightly longer duration, then the playback duration of the video.

When a sync command is sent to a zone, it changes the playback position of that zone. For example if a Master zone commands a Sync zone to start playing slot four, once slot four has finished playing, the player will play slot five, regardless of what it was playing prior to the sync command.

To avoid having a “Sync” zone proceed to playing the next slot in the zone, use the “Jump to Track” command to change the playback position of the Sync zone. This can be used to create playback loops in Sync zones and have the Master zone change the playback position in the sync zone, taking it out of the playback loop.

Using “Jump to Track” commands are useful when only some of the content in the Master zone is synchronized with other zones. The “Sync” zone can enter a playback loop during the playback of the non-synchronized content in the Master zone to avoid playback the content that should be synchronized with the Master zone. When the Master zone does play content that is synchronized with the Sync zone, the sync command will be issued to change the playback position outside of the play loop. Using a “Jump to Track” command after the Sync zone’s synchronized content can have the Sync zone playback position go back into the playback loop.

Due to the size of the window in which the Program editor is launched, it may be difficult to drag the puzzle piece icon from one zone to another. To work around this issue, drag and drop the zones into positions that are closer to each other prior to dragging the puzzle piece icons between zones. Be sure to move the zones back into their starting position or the content will play back in the wrong layout zones.

Synchronization Rules

- A synchronization command starts the playback of content in multiple zones at the same time, but does not manage the playback durations.
- Sending a sync command to a “Sync” zone, changes the playback position of that zone.
- The Master zone controls the playback of the content in the Synchronized zone only when synchronized commands are issued. Otherwise, the zones play back content independent from other zones.
- A zone can only be a Master or Sync zone, but not both.

Best Practices

When synchronizing content between zones, avoid setting the content duration in the Sync zones to the exact same duration as the content in the Master zone. Since the EnGage player attempts to “pre-load” content, the player will pre-load the next file and then load the file a second time once the end of the Sync zone file plays. This second loading of the file puts extra strain on the player resources and can cause undesirable playback “flash” between content. Set the duration in the of the Sync zones to be 2 seconds longer then the Master zone duration to avoid this problem.

It is easiest and less complicated to program synchronized content when all the content in the Master zone is synchronized with content in the Sync zones. Avoid having content in the Master zone that is not synchronized with Sync zones.

Audio Synchronizing

Synchronizing content between two or more zones is the perception that both zones begin playback at the same time. The EnGage player attempts to minimize the variation in start times and they may appear to begin at the same moment, but there is actually a very slight delay, measured in milliseconds, between the beginning time of playback in each zone. Keeping this delay to as minimal as possible is the key to synchronized content, especially audio.

Our eye’s are less susceptible to seeing this delay then are ears are at hearing the delay. When audio is not perfectly synchronized, it is much more noticeable then video.

The key to synchronizing audio is to have only one source play the audio. If two or more videos with audio are being synchronized, mute the audio of the videos in the Sync zones.

Synchronizing audio between two or more zones it not recommended.

Scenario 1: Single Content Asset Spanning All Screens

To have a single content asset span all screens, the screen layout should span all the screens in the screen arrangement. Alternatively, a “Full Screen” command can be used to have the content span all screens while also using a layout with multiple screen zones.

If your layout spans all of the screens only one layout zone will be available for programming. If your screen layout zones cover individual screens or some of the screens, there will be a programming list for each zone created in the layout. Start by dragging appropriate content into each layout zone. Nothing will be played in a zone unless at least one media asset is added to that zone.

No synchronization commands are required for content spanning all screens as the synchronization is managed automatically by the EnGage player.



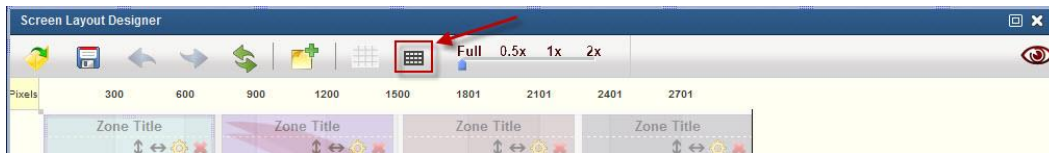
It's very common for content programming to switch between content spanning all screens and alternate layouts with content not spanning screens or spanning some screens. See the other content programming scenarios for more details.

Scenario 2: Different content assets playing on each screen

To show a different content asset (image or video) on each of the screens at the same time, there is a specific programming model that can be used. This is not the same as showing a content asset that spans all screens. Use the "Full Screen" command to switch between the individual screen layout and content spanning all screens.



To start, be sure the layout has a separate layout zone covering each screen. Use the screen arrangement stencil to align the layout zones over each screen in the screen arrangement.



Create a new Program in the Program editor within the Studio section of EnGage. Each layout zone will have its own programming area. Drag the desired content into each programming area of each zone. The content asset should be different in each zone. To have the content assets synchronized across all screens, start by designation one zone to be the Master zone. Drag the puzzle piece icon on the Master zone to the puzzle piece icons in the Sync zones. Drag the puzzle piece icon on the content assets in the Master zone to the content asset, which the Master is to be synchronized with, in the Sync zones. Continue this process of adding content to the Master and Sync zones and adding the synchronization commands.

If the Synchronization commands are not added, there is no guarantee that the content assets will show on the screens at the same time. Be sure to set the Sync zone content assets to a slightly longer duration than the Master zone to avoid flashes between asset changes.

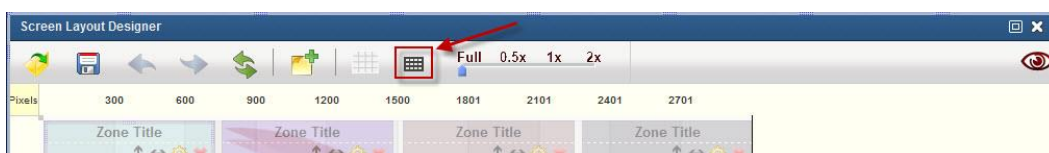
See the section of this guide labelled “Synchronizing Zones” for more information about synchronizing content between screens/zones.

Scenario 3: The same content asset playing on each screen

To show the same content asset (image or video) on all the screens at the same time, there is a specific programming model that can be used. This is not the same as showing a content asset that spans all screens. Use the “Full Screen” command to switch between the individual screen layout and content spanning all screens.



To start, be sure the layout has a separate layout zone covering each screen. Use the screen arrangement stencil to align the layout zones over each screen in the screen arrangement.



Create a new Program in the Program editor within the Studio section of EnGage. Each layout zone will have its own programming area. Drag the desired content into each programming area of each zone. The content asset should be the same in each zone. To have the content asset synchronized across all screens, start by designation one zone to be the Master zone. Drag the puzzle piece icon on the Master zone to the puzzle piece icons in the Sync zones. Drag the puzzle piece icon on the content asset in the Master zone to the same content asset in the Sync zones. Continue this process of adding content to the Master and Sync zones and adding the synchronization commands.

If the Synchronization commands are not added, there is no guarantee that the content assets will show on the screens at the same time. Be sure to set the Sync zone content assets to a slightly longer duration than the Master zone to avoid flashes between asset changes.

See the section of this guide labelled “Synchronizing Zones” for more information about synchronizing content between screens/zones.

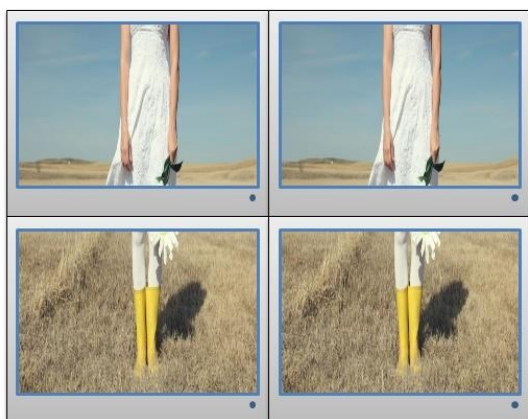
Scenario 4: Content assets spanning some screens

Programming content to span some of the screens uses a similar program method as Scenarios 2 and 3 except there will be few programming zones. If the content is different in each zone, please refer to Scenario 2. If the content is the same in each zone, refer to Scenario 3.

Be sure to use the synchronization commands if the content should change at the same time between zones. Details about synchronizing zones are also covered in Scenarios 2 and 3.

Zones that span some of the screens are usually a non-standard aspect ratio. By default, any content placed into the programming for these zones will be automatically scaled to fit the zone. To avoid having the content stretched (as in the example below), the content should be made to the same aspect ratio of the zone. If the content is made at the same aspect ratio, when the player scales the content (if required to fit the zone) the content will not appear to be stretched.

Similar to the other programming scenarios, use the “Full Screen” commands to switch between a layout that spans some screens to playing content that spans all screens.



Scenario 5: Combined Scenarios

EnGage normally supports a single screen layout and jumping to full screen playback (which is spanning all screens) within a Program. Changing the layout during the playback of a program involves modifying

the zones on-the-fly using program commands. However, layout changes can also be achieved through scheduling multiple programs in the timetable with references to different layouts.

Layout Changes during Playback

By default, EnGage programs only support a single layout but can take advantage of the “Full Screen” command. To change the layout from one multiple zone layout to another multiple zone layout, in the middle of the program playback, the “Modify Zone Layout” must be used.

For each zone that needs to be modified, add a “Modify Zone Layout” command. Within the command, select the zone index letter and the new desired coordinates of the zone. All coordinates should be set within the size of the canvas. Setting coordinates outside the canvas will have unpredictable results. To modify multiple zones, add a “Modify Zone Layout” command for each zone. All zones will maintain the z-order which was applied when creating the layout. The z-order cannot be changed in the program during playback.

To temporarily remove a zone, add a “Modify Zone Layout” command, select the index of the zone and set the zone coordinates all to zero. This will move the zone to position zero/zero and shrink the zone to zero height and zero width, effectively hiding the zone. Repeat this command for all zones which are to be hidden.

Although the zones have been modified, content will still be playing in these zones. Be sure to use the “Pause” command to pause the playback in the desired zones and setting the index on the zone which should be paused. This will avoid putting unnecessary strain on the player hardware resource and will also avoid adding content plays to the audit logs while the content cannot be seen on the screen.

It’s recommended that all the “Modify Zone Layout” and “Pause” commands be set in the same zone and all added sequentially to avoid layout change artifacts on the screen during playback. The player will attempt to execute all the commands as quickly as possible.

Use the “Restore Zones” command to revert the layout back to the originally set layout for the program.



NOTE: Using the “Restore Zone” command without a “Full Screen” command may result in a warning when publishing within EnGage. This is known issue that will be fixed in a subsequent release.

Printing out the original layout dimensions may be helpful throughout the process of adding the “Modify Zone Layout” commands for reference purposes. Click on the “[Print]” link under the “List View” in the Studio->Layout section of EnGage for a printable view of the layout.

Content Creation

Creating content for multiple screens can be less straight forward then creating content for a single screen. The resolution and aspect ratios of the content can be very non-standard and even finding applications that support these irregular resolutions can be difficult.

This section of the guide will explain the different considerations and specifications around creating content for a multiple screen scenario; however it does not cover the details of the using encoding and video production software. The specifications in this document are purely a “guide” and are not the hard rules that must be followed. Use these specifications for a starting point and modify as necessary.

When creating or encoding content, keep in mind that the quality of the video can only be as good as the original content. Re-encoding content at a higher resolution will not increase the quality and in fact may decrease the quality since the encoder will have add pixels to the video to increase the resolution.

Testing

Content creation and video encoding is not an exact science to get the optimal visual quality on the screens. The many factors of video can require “tweaking” and testing to ge bitrate t the content to play just right. Content being played back on a design computer with a single screen will have significantly different playback qualities compared to the EnGage player with multiple screens attached.



NOTE: Ultimately, the playback quality of the content will be dependent on the hardware resources of the EnGage player. Be sure to test all content on a test player prior to deploying the content onto a player in the field.

Aspect Ratio

The most important factor in having content that looks good on a multiple screen system is to have content created at the proper aspect ratio. Ideally, the content will be the same resolution and aspect ratio as the zone in which it was designed to play. By default content will be scaled to fit the zone in which it has been programmed to play. However, having the content scale to fit a zone is not necessarily a bad thing and in some case can be very helpful. Having the player scale the content more in one direction (horizontally or vertically) will cause stretching or squishing of the content which can be very noticeable on the screens. Although the content doesn’t need to be created at the same resolution as the zone, creating in at the same aspect ratio will allow it scale into the zone and avoid any vertical or horizontal stretching or squishing.

Video Bitrates

A general “rule of thumb” is 5 megabits per second, per screen on which the video will play up to 40MB/sec. Over encoding content can result in poor playback due to the player hardware straining to play back the content. Under encoding content can reduce the quality of the content and create pixilation on the screens. Determining the optimal bitrates will be a balance between the size of the file, the playback quality and the hardware resources of the player.

The bit rate of content will also be dependent on the type of content being encoded. Video content with heavily moving objects and lots of colors will need to be encoded at higher bitrates, such as a car race. Video content that has slow moving objects can be encoded at lower bitrates, such as a person talking with a static background, like a newscast.

Video Resolutions

The resolution of the content playing on a video wall will be dependent on the size of the video wall, the resolution of the zones and the distance of which the audience is viewing the screens. In the best case scenario, the content resolution should be the exact same size of the zone in which it is going to play. This will avoid any scaling of the content. However, due to the size of the videos, the resources of the player and the irregular size zones possible in multiple screen arrangements, the video resolution may need to be a different resolution than the zone.

It's also not always required to have content that is pixel-for-pixel the same size as the zone, depending on the view distance of the audience. The audience may not be able to see the difference between 720p videos vs 1080p videos, in which case encoding the content at 1080p will unnecessarily increase the file size and put extra strain on the player resources. Since 720p is easier for the player to playback compared to 1080p, the playback quality may even be better at 720p.

When content is being created that will span multiple screens, it may be required to use video editing software to combine multiple videos together to achieve the aspect ratio and resolutions required to look good on the screens. For example, having a video that spans two landscape mounted screens will be heavily stretched to fit the zone if standard 16x9 content is used. In this scenario, two videos should be combined, side-by-side, in video editing software should be used in the zone. If the two videos are encoded at 720p (720H X 1280W) then the end resolution would be 720x2560. Depending on the arrangement of the screens, videos may need to be combined to create content with the same aspect ratio as the zone. Determine the size of the videos based on the resolutions of the screens and the arrangement. Some manual calculations will be required to work out these details.

The maximum resolution that the EnGage player can play back on a dual output player is 2048 pixels in either horizontal or vertical direction. If the combined screens create a resolution larger than 2048, use 2048 as the maximum horizontal or vertical resolution and calculate the opposite resolution dimension depending on the aspect ratio. On a four output player (or greater), the dimensions increase to 8192.

Typical consumer video cameras can record video at a maximum resolution of 1920x1080. Special higher end video cameras can record video at 4,096 X 2,304, which is known as 4K. Any content required at a resolution larger than 4096px will have to be scaled up or combined with other videos to match the required resolutions.

Image Resolutions

Images can have any resolution and the player will scale the image to fit the zone in which it is programmed to play. As with video, the aspect ratio of the image should be the same as the zone otherwise stretching may occur. It's recommended that images are re-sized to properly fit the zone to avoid unnecessary player scaling in order to achieve optimal image quality. There is no practical limit to the resolution of an image, but it should not be bigger than the combined resolution of your screen layout.

Suggested Codec

Although there are many audio and video codecs that the EnGage player can play, it is a good practice to standardize on one format. ComQI suggests the following:

MPEG-4 (*.MP4)

Video: H.264 @ baseline profile, 3-5Mbps @ 23.976 fps, constant quality

Audio: AAC (LC) 128kbps 44.1Khz, 2 Channel

Best Practices

- Add an audio track even if there is no audio in the video
- Encode content without B-frames

Limitations

- Not all video encoders can output very high (greater than 1080p) resolution content. ComQi has been successful using “MPEG Stream Clip” or “Handbrake”.
- Adobe flash content is not currently supported by multiple output EnGage players
- Playing a single content asset spanning multiple screens puts more strain on hardware resources than separate videos on individual screens.

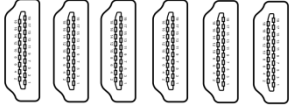

Physical Installation

The physical installation of the multiple screens will heavily depend on the scenario and the environment however here are some are tips that may be helpful.

- Label all the video cables corresponding to the order of the video outputs. After cables are run through a wall or conduit, it may be difficult to determine which cable is connected to which video output.
- Each screen will require a power outlet. Make sure there are enough power outlets and enough power (amperage) to power all the screens and video extenders, if required.
- The screens may need to be calibrated to have the same screen settings such as brightness, contrast, colour, hue, etc. How to calibrate the screens is not within the scope of this guide.
- If the Engage multiple output player is not physically mount in a close proximity to the screens the use of video extenders can be used such as the ComQi DS Vision 3000.

Video Connection Order

Depending on the model of the EnGage player, the video connectors on the back of the player will have a specific order. When the screen arrangement is created this will determine which screen in the arrangement is mapped to the physical video outputs on the player. Set the index on the screens in the screen arrangement tool to change the mapping.

Model	Output Order
RP1020	<div>2 1 4 6 5 3</div> 
RP1016 / RP1025	<div>6 2 3 1 5 4</div> 

Due to the content programming and physical arrangement of the screens, some trial and error may be required to get the screen properly connected. Be sure the label all the cables once the screens have been properly connected to the player.

Additional Notes

- In most cases where video walls are used, the viewing distance of the audience should be taken into account. Using ultra high resolution content may not be distinguishable by the viewing audience due to the distance from the video wall. Reducing the resolution may improve playback smoothness and in turn, overall playback quality.
- There may be a need to encode content in a landscape format even though the screen may be physically mounted in a portrait orientation. Portrait oriented content can be harder on player resources.