

GV Live

How to Configure the ARC (Aspect Ratio Converter)



Version History

| Date | Version | Release by | Reason for Changes |
|------------|---------|------------|--------------------|
| 14/05/2019 | 1.0 | J Metcalf | Initial release |
| 26/02/2021 | 1.1 | J Metcalf | Rebrand |

Introduction

Alchemist Live offers a comprehensive ARC (Aspect Ratio Converter). Aspect ratio conversion describes the act of changing the ratio between the horizontal and vertical sizes of an image. This is performed to enhance and optimise the viewing experience on different video displays.

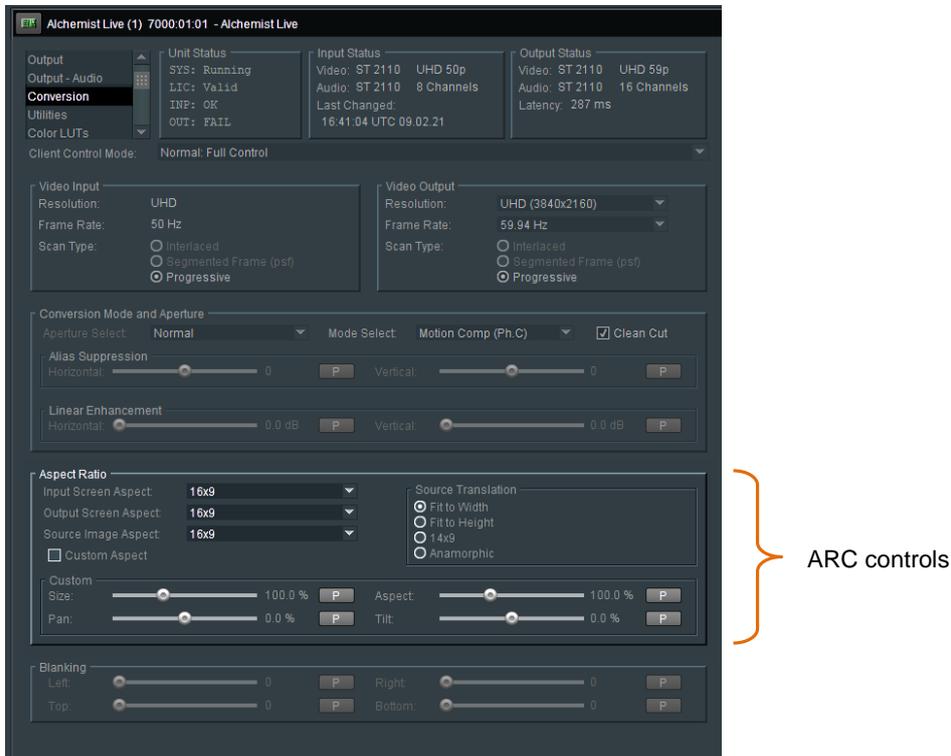
Alchemist Live provides the user with a step by step walkthrough to create the desired aspect ratio in the converted file or full manual control of the four parameters required to define an aspect ratio conversion.

There are many typical conversions which do not require any special ARC configuration. This is generally when the source and output aspect ratio are equivalent. For example, SD (4x3) to SD (4x3), or HD (16x9) to HD (16x9).

In the case of up-conversion (SD to HD), or down-conversion (HD to SD), care should be taken to ensure that the correct aspect ratio parameters are configured in the user profile to ensure the desired aspect ratio is achieved in the output file.

ARC Controls

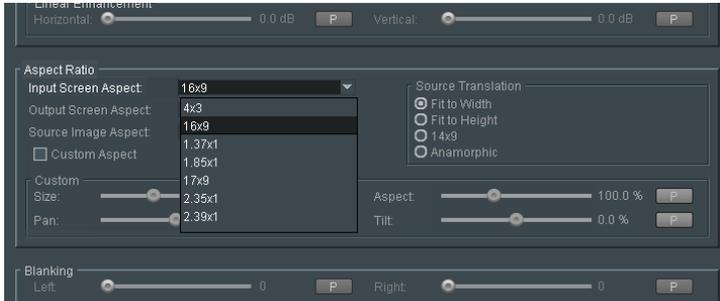
ARC controls can be found in the Alchemist Live Conversion tab:



1. Input Screen Aspect

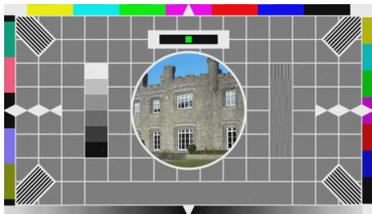
This control allows the user to describe the input screen aspect or input raster aspect ratio. Typically SD content has a native aspect ratio of 4x3 and HD content has a native aspect ratio of 16x9.

It is important to understand that the **Input Screen Aspect** parameters describe the video raster, not the shape of the program content.

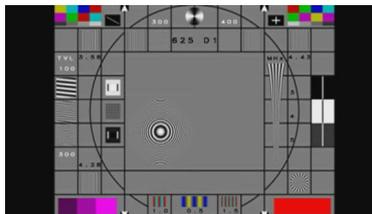


Also included are controls to describe several popular widescreen aspect ratios.

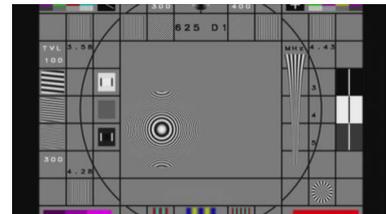
1.1 Examples of 16x9 Screen Aspect



A 16:9 image carried in a 16:9 Display.

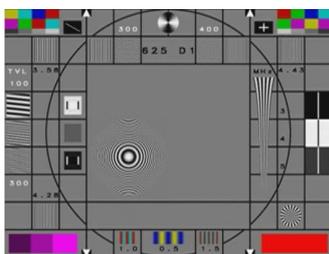


A 4:3 image pillarboxed in a 16:9 Display

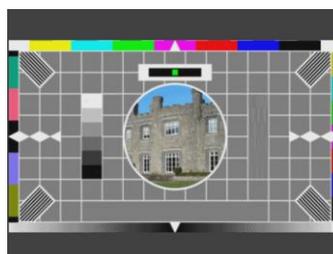


A 14:9 image carried in a 16:9 Display

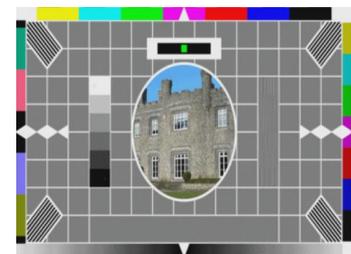
1.2 Examples of 4x3 Screen Aspect



A 4:3 image in a 4:3 Display



A 16:9 image letterboxed in a 4:3 Display

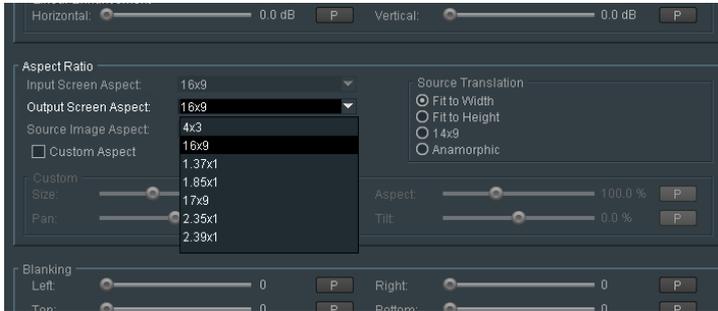


A 16:9 anamorphic image in a 4:3 Display

2. Output Screen Aspect

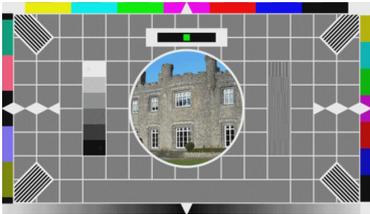
This control allows the user to describe the output screen aspect or output raster aspect. Typically SD content has a native aspect ratio of 4x3 and HD content has a native aspect ratio of 16x9.

It is important to understand that the **Output Screen Aspect** parameters describe the video raster, not the shape of the program content.

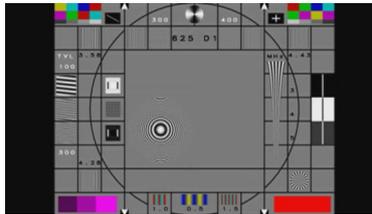


Also included are controls to describe several popular wide screen aspect ratios.

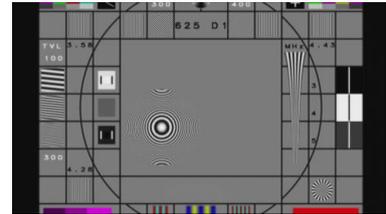
2.1 Examples of 16x9 Screen Aspect



A 16x9 image carried in a 16x9 Display

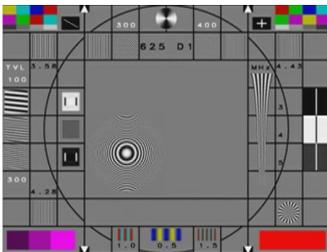


A 4x3 image pillarboxed in a 16x9 Display

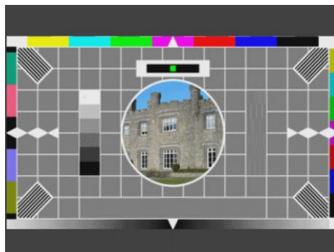


A 14x9 image carried in a 16x9 Display

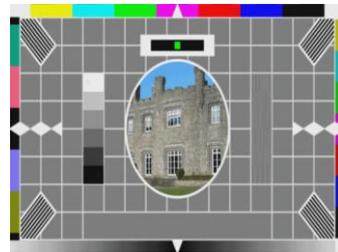
2.2 Examples of 4:3 Screen Aspect



A 4x3 image in a 4x3 Display



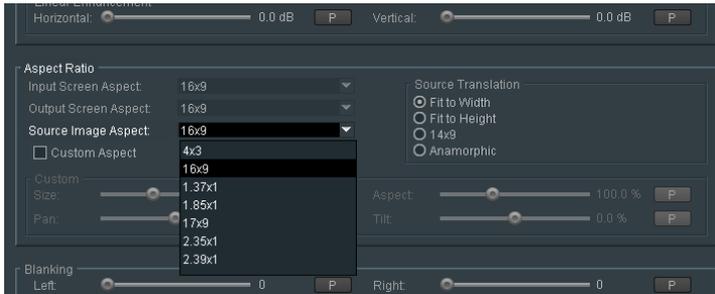
A 16x9 image letterboxed in a 4x3 Display



A 16x9 anamorphic image in a 4x3 Display

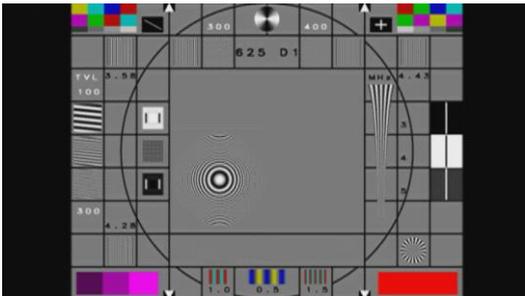
3. Source Image Aspect

This control allows the user to describe the aspect ratio of the source file video content.

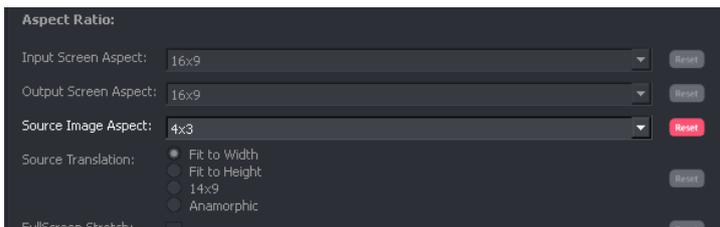


As well as the usual television aspect ratios, also included are controls to describe several popular cinema wide-screen aspect ratios.

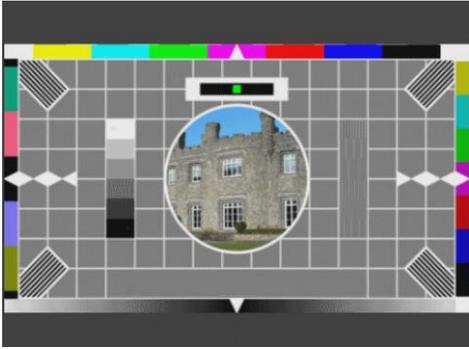
3.1 Example of Pillarboxed 4x3 source image, in a 16x9 Screen



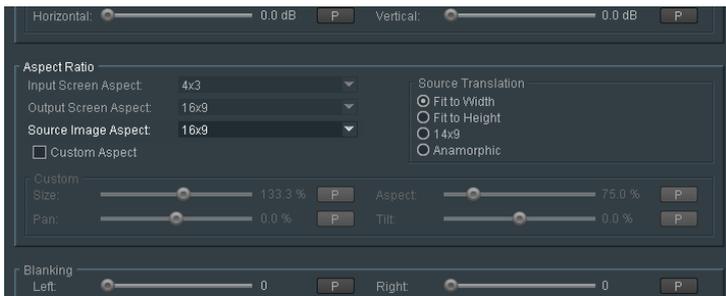
In this case, the **Source Image Aspect** should be set to: **4x3**



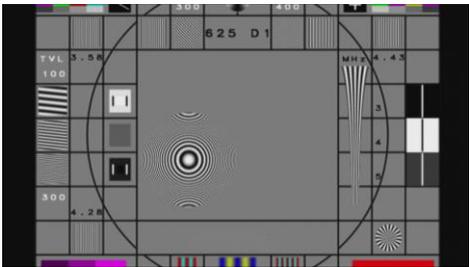
3.2 Example of Letterboxed 16x9 image, in a 4x3 Screen input.



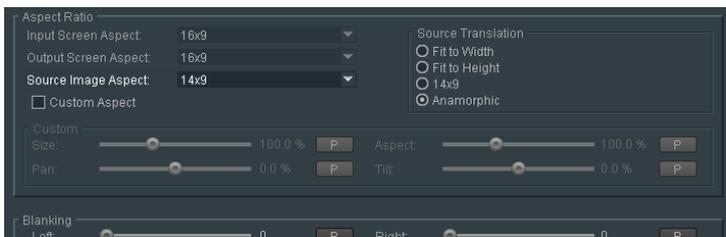
In this case, the **Source Image Aspect** should be set to: **16x9**



3.3 Example of Pillarboxed 14x9 image, in a 16x9 Screen

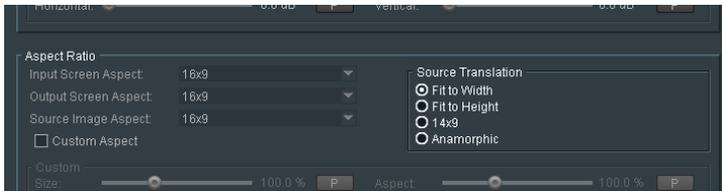


In this case, the **Source Image Aspect** should be set to: **14x9**



4. Source Translation

In circumstances where a conversion process has input and output aspect ratios that do not match, there are often several solutions available. It will be the case that some form of compromise is necessary. This will be in the form of either cropped source content, or visible black bars in the output picture, or making the output picture anamorphic.



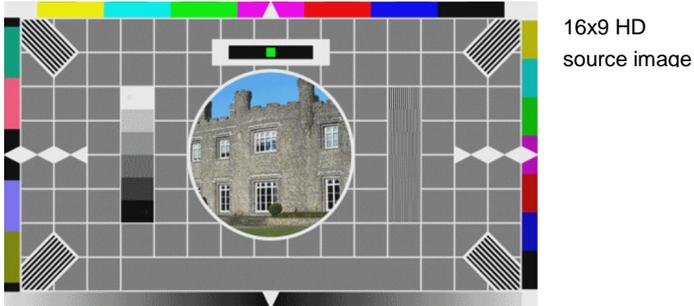
This control allows the user to describe how the output image will be displayed with respect to the output screen.

4.1 Fit to Width

When set, **Fit to Width** ensures that the output video image is scaled to maximum horizontal width whilst maintaining the source aspect ratio.

4.1.1 Example of down-conversion Fit to Width translation

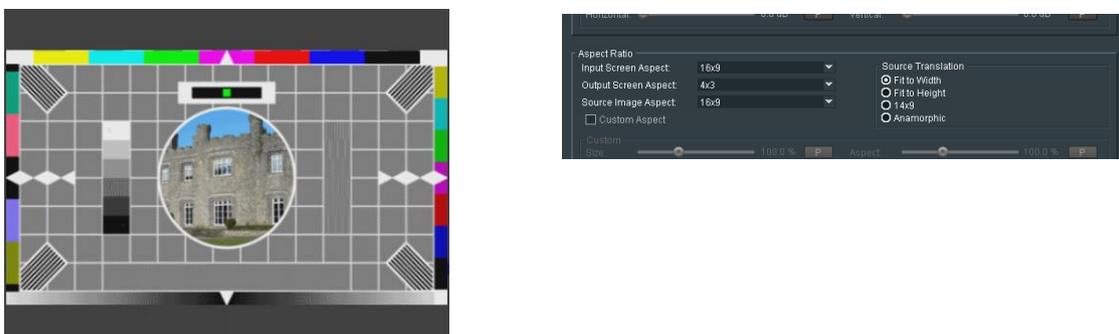
Consider a down conversion process that converts a 16x9 full frame image to SD.



It is important that the other ARC controls are correctly set:

- **Input Screen Aspect** set to: 16x9
- **Output Screen Aspect** set to: 4x3
- **Source Image Aspect** set to: 16x9

Assuming that the output display aspect ratio is 4x3, setting the **Source Translation** to **Fit to Width** will ensure the output 4x3 display will carry the source picture as 16x9 letterbox.



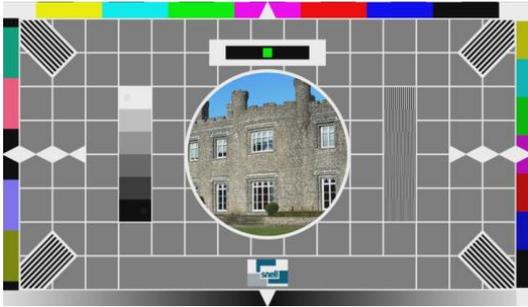
Note that the output picture maintains the same aspect ratio as the source. The circle in the source remains a circle in the output image.

4.2 Fit to Height

When set, **Fit to Height** ensures that the output video image is scaled to maximum vertical height whilst maintaining the source aspect ratio.

4.2.1 Example of down-conversion Fit to Height translation

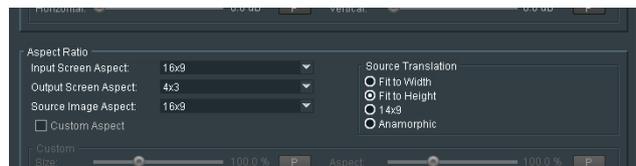
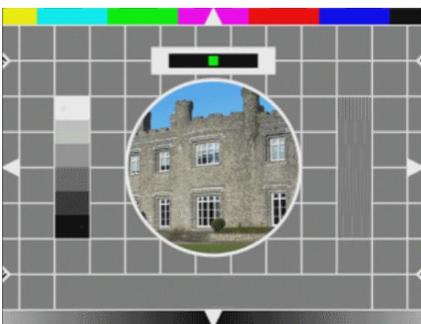
Consider a down conversion process that converts a 16x9 full frame image to SD.



It is important that the other ARC controls are correctly set:

- **Input Screen Aspect** set to: 16x9
- **Output Screen Aspect** set to: 4x3
- **Source Image Aspect** set to: 16x9

Assuming that the output display aspect ratio is 4x3, setting the **Source Translation** to **Fit to Height** will ensure the output 4x3 Screen will carry the converted picture as a 4x3 center crop:



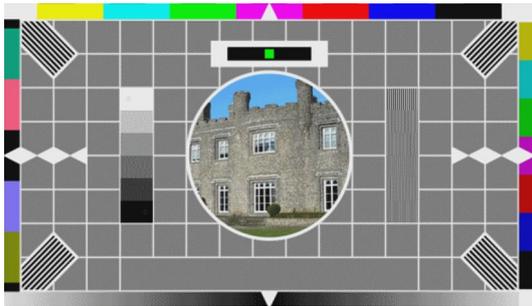
Note that the output picture maintains the same aspect ratio as the source. The circle in the source image remains a circle in the output image.

4.3 14x9

In circumstances where either SD 4x3 content is up-converted to HD, or when 16x9 HD content is down-converted to SD, a user may choose to display the image as 14x9.

4.3.1 Example of down-conversion 14x9 translation

Consider an HD source with a full frame 16x9 image that is to be down-converted to SD.

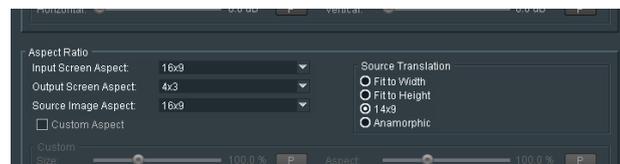
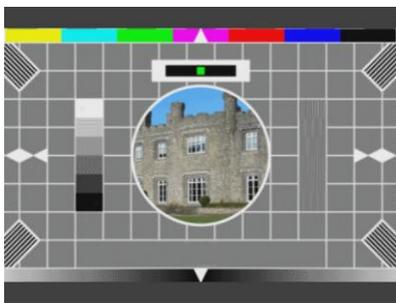


HD 16x9 source image

It is important that the other ARC controls are correctly set:

- **Input Screen Aspect** set to: 16x9
- **Output Screen Aspect** set to: 4x3
- **Source image Aspect** set to: 16x9

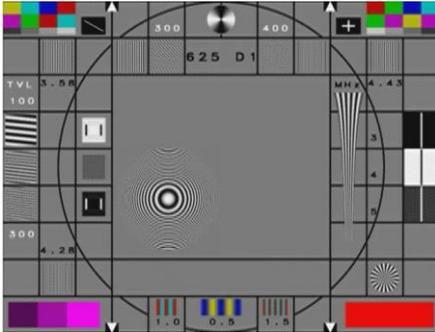
Setting the control **Source Translation** to **14x9** will resize the picture as shown below:



Note that a slight side-crop has been necessary to achieve this conversion and that the source aspect ratio has been preserved. 14x9, in this example, offers a compromise when the user is keen to minimise the black bars top and bottom.

4.3.2 Example of up-conversion 14x9 translation

Consider an SD source with a full frame 4:3 image that is to be up-converted to HD 16x9 display.

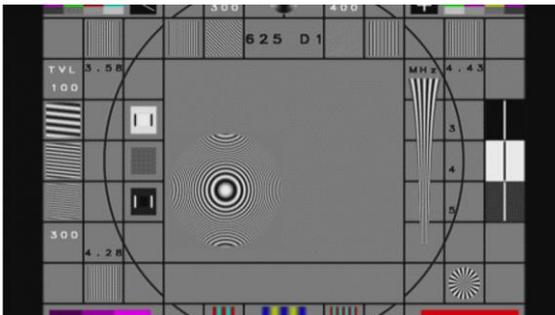


SD 4x3 source image

It is important that the other ARC controls are correctly set:

- **Input Screen Aspect** set to: 4x3
- **Output Screen Aspect** set to: 16x9
- **Source image Aspect** set to: 4x3

Setting the control **Source Translation** to **14x9** will resize the picture to be a 14x9 image, pillarboxed into the 16x9 screen.



Note that a slight top/bottom crop has been necessary to achieve this conversion and that the source aspect ratio has been preserved.

14x9 in this example offers a compromise when the user's preference is to minimise the black bars left and right.

4.4 Anamorphic

This control is applicable when either handling anamorphic source content, or when producing output content with an anamorphic aspect ratio.

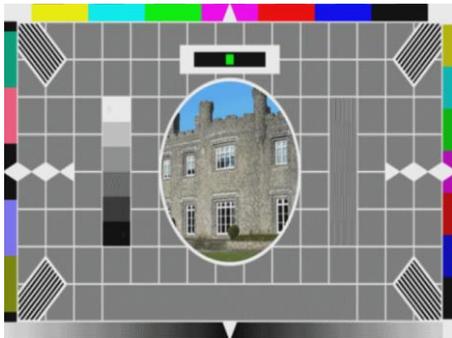
The anamorphic method of carrying video content is typically only applicable in the SD domain.

When used in conjunction with the other ARC controls, the ARC can be configured to:

- Effectively un-squeeze anamorphic source content as part of an up-conversion process.
- Produce anamorphic content as part of a down-conversion process.

4.4.1 Example of SD Anamorphic to HD

Consider an anamorphic SD source.



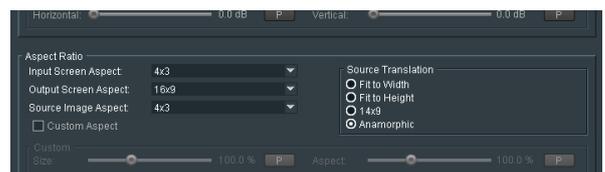
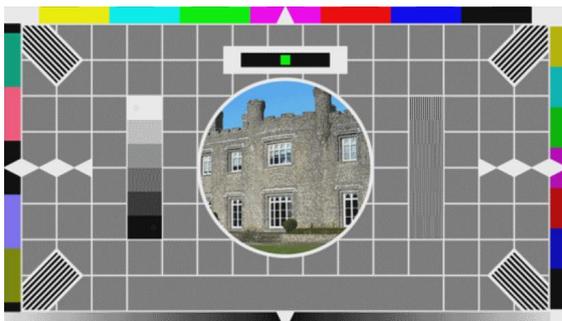
Part of the up-conversion process to HD should be to un-squeeze the anamorphic source picture so that the output displays a full 16x9 image.

It is important that the other ARC controls are correctly set:

- **Input Screen Aspect** set to: 4x3
- **Output Screen Aspect** set to: 16x9
- **Source Image Aspect** set to: 4x3

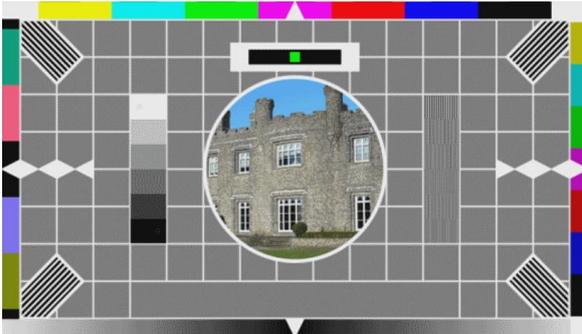
Source Translation should be set to: **Anamorphic**.

The HD output will now be a full frame 16x9 image with no black bars, no cropping and with the same aspect ratio as the original image before it was projected anamorphically.



4.4.2 Example of HD to SD Anamorphic

Consider a full frame 16x9 source picture.



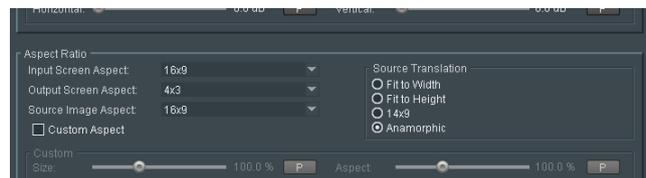
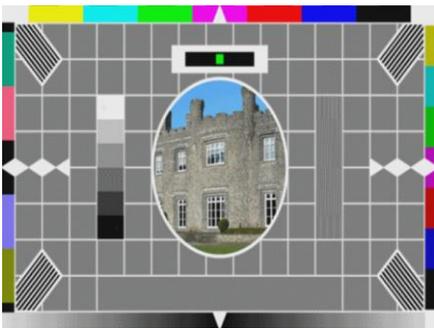
This source file is required to be down-converted to SD with an anamorphic projection.

It is important that the other ARC controls are correctly set:

- **Input Screen Aspect** set to: 16x9
- **Output Screen Aspect** set to: 4x3
- **Source Image Aspect** set to: 16x9

Source Translation set to: **Anamorphic**.

The SD output will now be a 4x3 display carrying an anamorphic image.



5. Custom Controls

The **Custom** controls allow an Operator to set an ARC configuration that is not offered by the standard controls. This maybe because a source file is encountered that has a non-standard aspect ratio i.e. it's not 4x3 or 16x9. Or there may be a requirement to produce a file that has a non-standard aspect ratio.

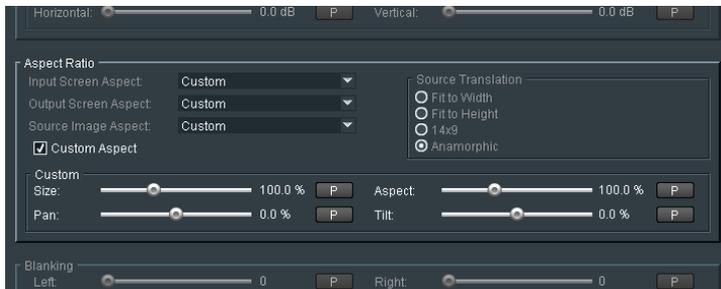
It is also possible to specify a 'standard' aspect ratio conversion using the standard controls and then tweak the aspect ratio conversion using the custom controls. A typical example might be when the user wants to apply minor overscan due to missing top and bottom lines of the source image.



5.1 Custom

Default **Custom** setting is *disabled*. When **Custom** is disabled, the custom controls are deactivated and appear greyed-out (as shown above).

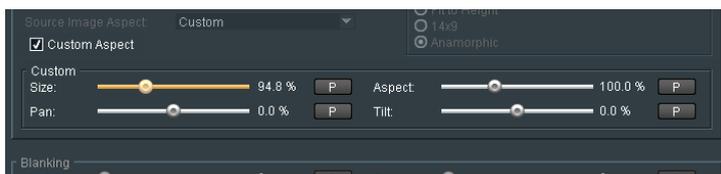
Enabling this box will make the custom controls active.



5.2 Size

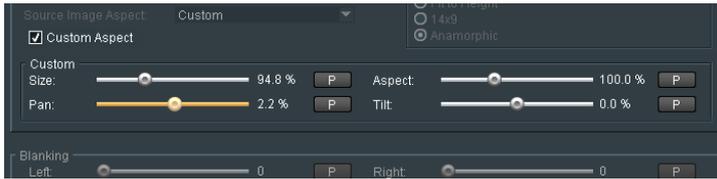
This adjusts the size of the whole image. Both vertical and horizontal size change together while maintaining the aspect ratio of the image.

The range of control is from 50% to 200% in 0.1% increments and default is 100%.



5.3 Pan

This adjusts the horizontal position of the output image. The range of control is $\pm 75\%$ in 0.1% increments. Default is 0%.



5.4 Aspect

This adjusts the horizontal size of the image, allowing the shape (aspect ratio) of the output image to be changed. The range of control is from -50% to 200% in 0.1% increments and default is 100%.

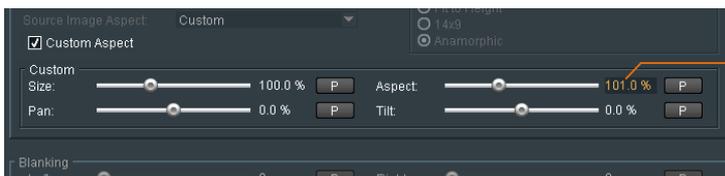


5.5 Tilt

This adjusts the vertical position of the output image. The range of control is $\pm 75\%$ in 0.1% increments.



Note: as an alternative to using the slider controls, a user can enter specific values for the four controls Size, Asp, Pan and Tilt, by selecting the value parameter and typing a specific value with the keyboard. Alternatively minor step adjustments can be made using the left and right cursors.



Type specific value