



# Memory and Performance

Animation Pro doesn't like to limit your creativity. So it doesn't impose any bounds on how many items can be added to a figure or how many figures may be added to a frame etc. Unfortunately, your iPad may not feel the same way.

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## Memory

The reality is that iPads have a limited amount of memory. Furthermore, that memory is shared between the operating system (iOS) and all of the Apps that you may have opened. So Animation Pro will only ever have access to a portion of the memory physically installed in your device.

When iOS detects that the amount of free memory is getting low, it starts sending messages to Apps asking them to release memory that they no longer need. Now Animation Pro uses more and more memory as you, the animator, add assets to an animation (e.g. figures, images, audio etc.). So Animation Pro doesn't really know what is important to you or not. So when Animation Pro receives a low memory warning from iOS, it will pass it on to you:

A screenshot of the Animation Pro application interface on an iPad. The top status bar is red, indicating a memory warning. A notification banner at the top center reads "iOS has issued a memory warning". The main workspace shows a blue grid with a red dot and a blue line. Below the grid is a large image of green leaves. At the bottom is a toolbar with various icons and sliders. A blue callout box points to the top status bar.

The title bar at the top of the screen will flash red when a memory warning is received. A notification will also be displayed.

A screenshot of the Animation Pro application interface on an iPad. The top status bar is red, indicating a memory warning. A notification banner at the top center reads "iOS has issued a memory warning". The main workspace shows a blue grid with a red dot and a blue line. Below the grid is a large image of green leaves. At the bottom is a toolbar with various icons and sliders. A blue callout box points to the top status bar.

In this case, too many high resolution images are being added to a figure.

Generally speaking, iOS will start to close other inactive Apps when memory starts to get dangerously low and this can automatically free up memory, allowing you to continue adding assets etc.

### **Please however, note:**

Some operations in Animation Pro, such as applying a blur to a large figure, can also consume a **LOT** of memory. Unlike adding images to a figure, blur operations will consume memory 'all at once' and may thus cause your device may run out of memory **immediately**. When this occurs, iOS really can't wait for Animation Pro to respond to a warning. So it will simply close Animation Pro down.

So if you start seeing memory warnings, please take it as a sign that the situation may be getting dire and that any further allocations of memory may result in Animation Pro being unceremoniously shut down. In other words, it may be time to take some preventative action, please see below.

## **Managing Memory**

There are some simple steps that you can take to alleviate memory issues:

1. Completely close down any unused Apps yourself
2. Simplify your animations, for example, by using fewer figures or smaller images
3. Reboot your device (particularly if that hasn't been done for some time)

Animation Pro 1.4 also adds a new 'Resampling' tool that may be used to reduce the memory consumed by your figures, please see the next page for details.



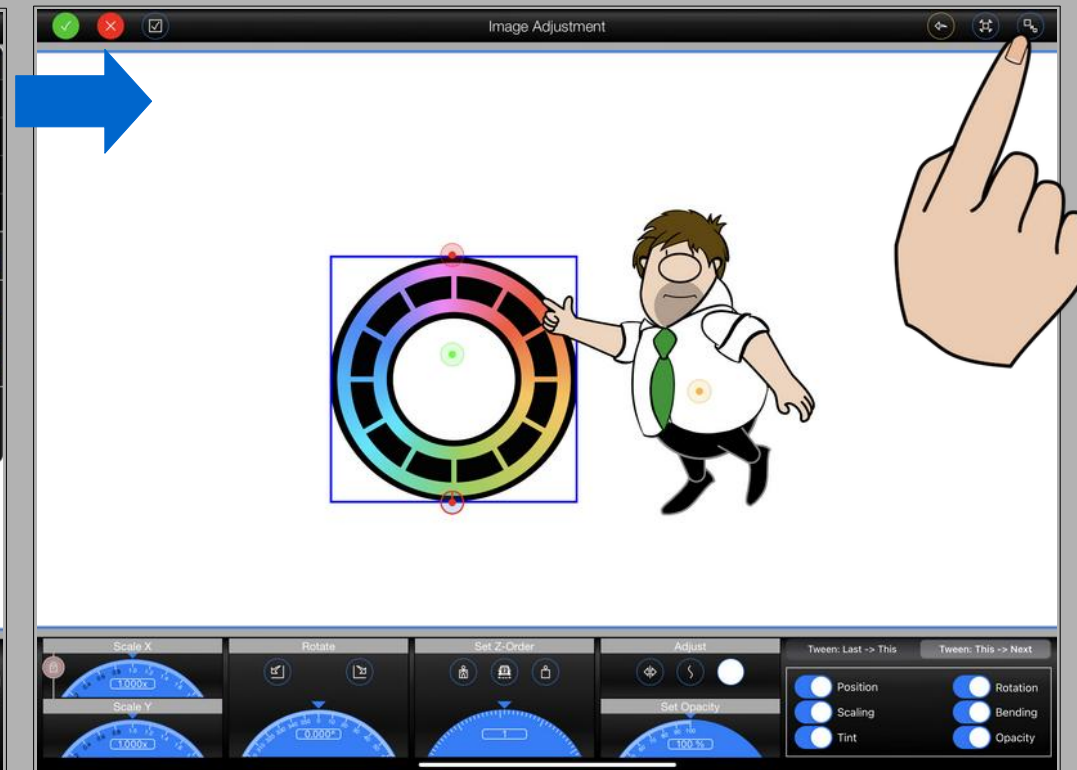
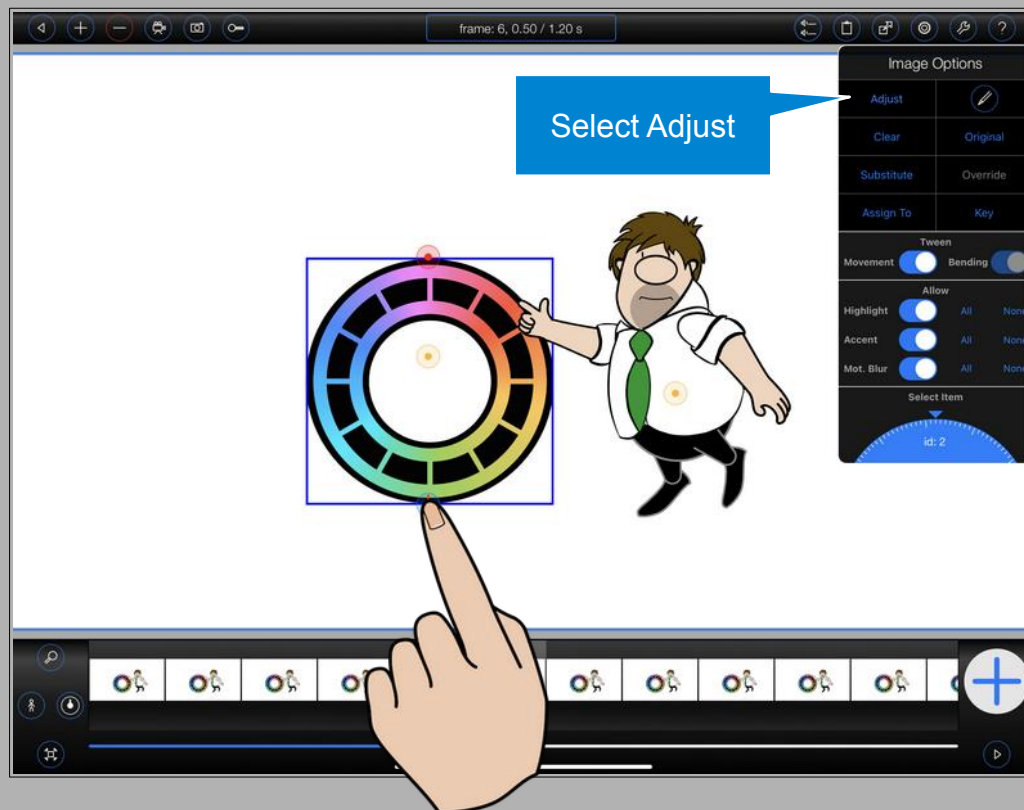
## The 'Resampling' Tool

Animation Pro 1.4 introduced a new 'Resampling' tool to the 'Item Adjustment' screen (for more information on the 'Item Adjustment' screen, please take a look at the 'Adjusting Items' topic, left). This tool, which is accessible from both the 'Figure Editor' and the main animation screen, can be used to reduce the size (resolution) of the underlying images in your figures.

### Accessing the 'Resampling' tool

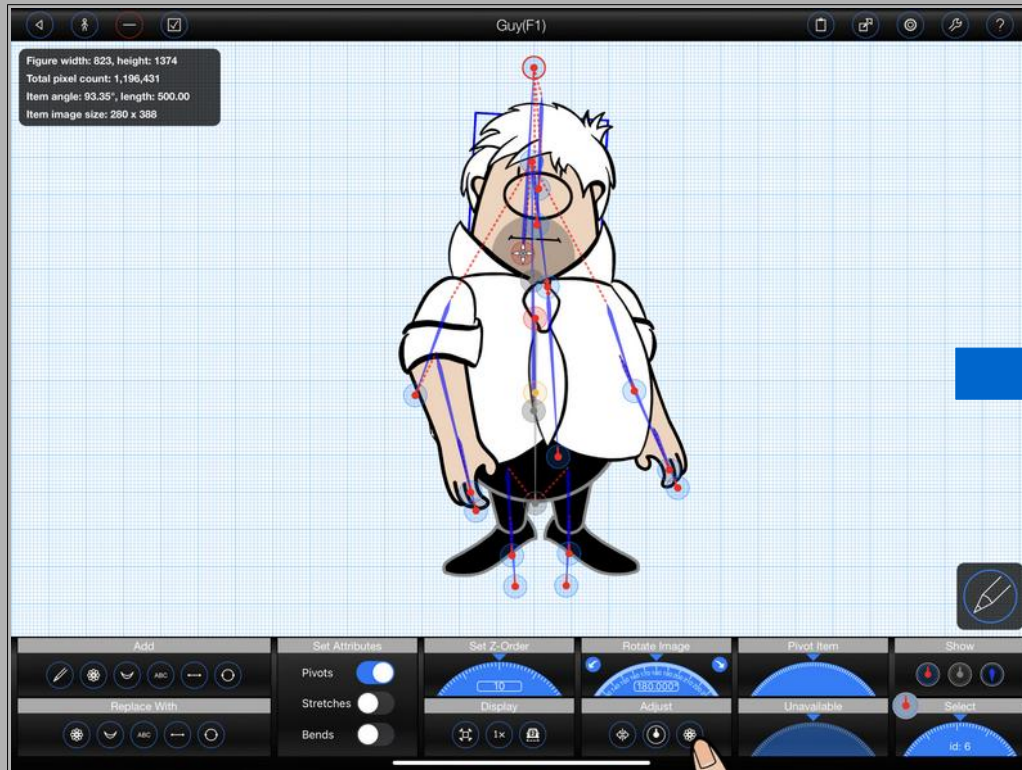
#### From the main animation screen:

1. Tap on an image item in your figure and select 'Adjust':
2. Press the 'Resample' button at the top right of the 'Item Adjustment' screen:

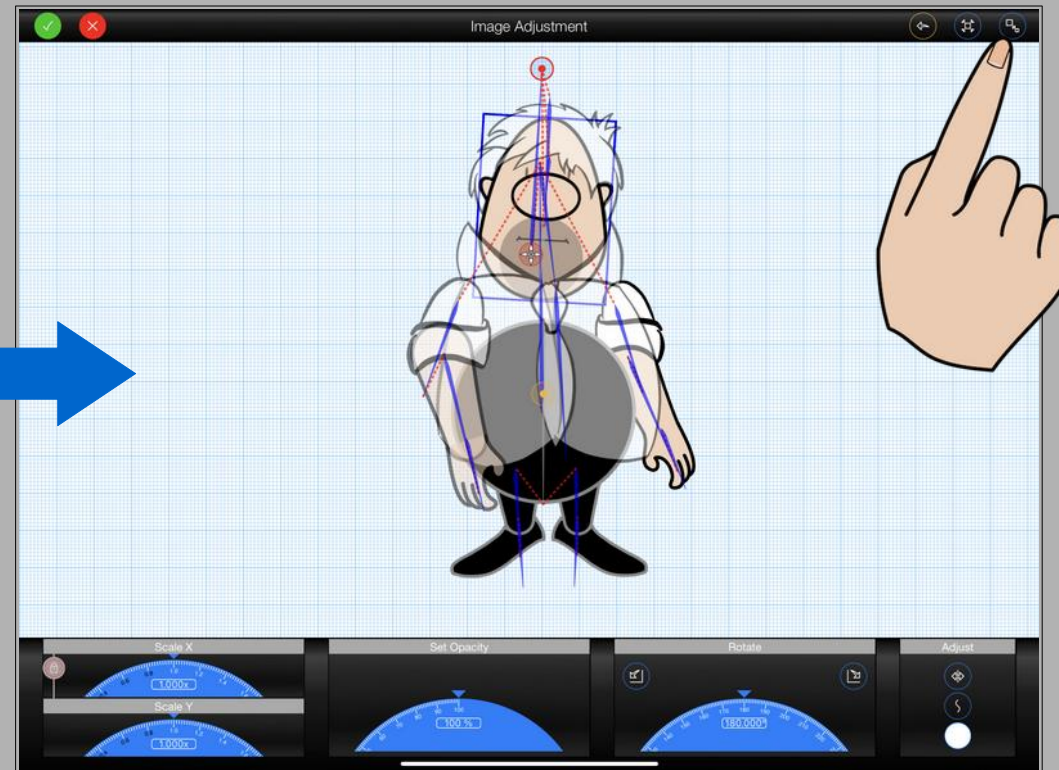


## From the 'Figure Editor':

1. Tap on an image item in your figure and select the 'Item Adjustment' tool:



2. Press the 'Resample' button at the top right of the 'Item Adjustment' screen:



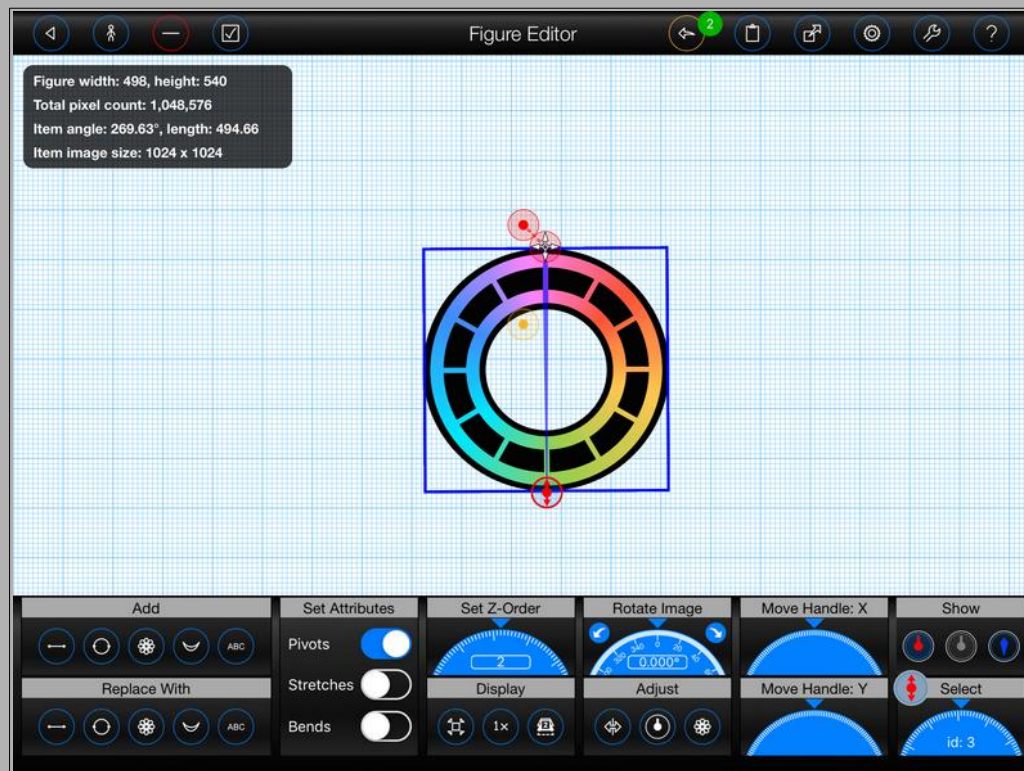


## Resampling Images

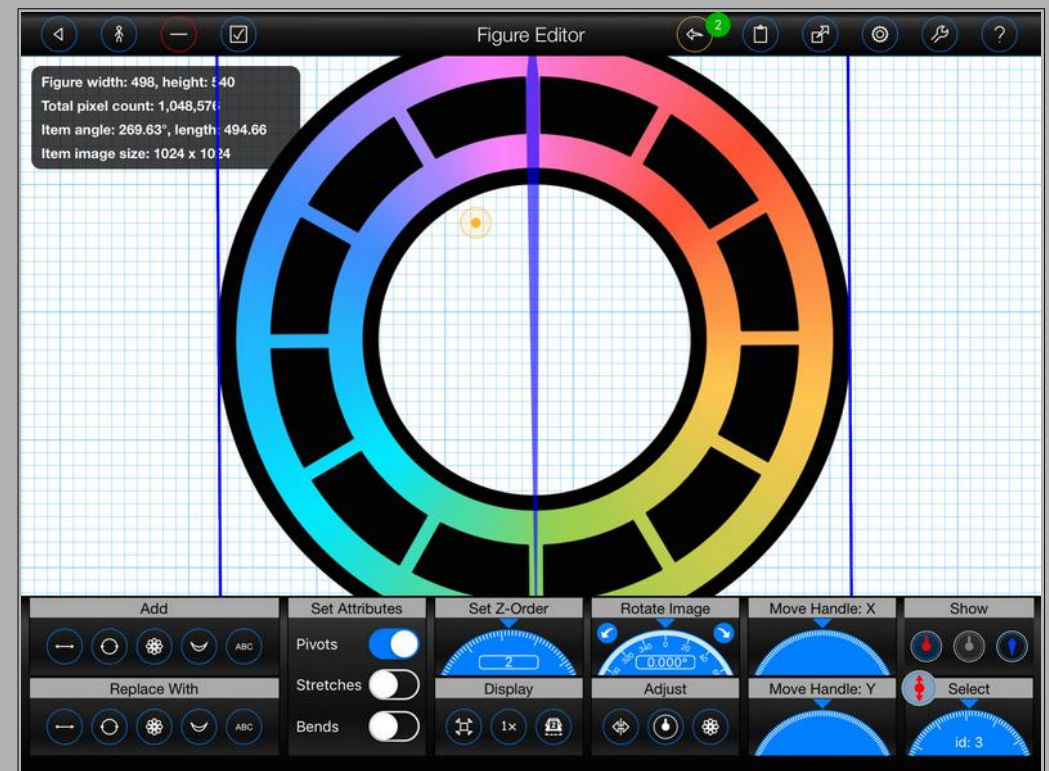
When an image is added to a figure, it occupies a 'layer' within that figure. It is important to note that when that 'layer' is resized, e.g. via an 'Item Adjustment', the underlying size (resolution) of the image does **NOT** change.

So let's consider what happens if you add a really large image to a figure:

(a)



(b)



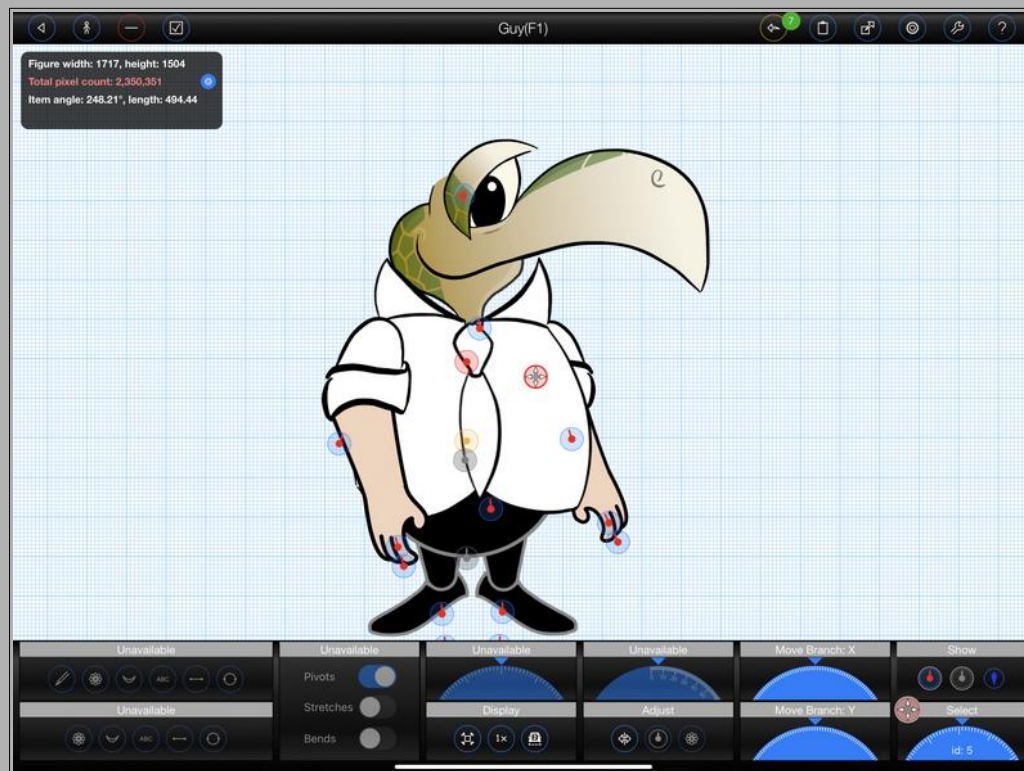
Here (a), I have created a figure that contains an image of the Animation Pro icon. The layer that contains the image is quite small, so the image appears to be small. In reality, however, the image is quite large. So if I zoom right in on the figure (b), it still looks good. And that can be a good thing if you intend to zoom right in on your figures whilst animating!

But if you don't intend to zoom in on your figure whilst animating, large images really serve no purpose. Worse still, they will consume unnecessary memory and degrade the performance of Animation Pro (exports, for example, will take considerably more time).

**So, in general, the images in your figures should be kept to the absolute minimum size.** But how do you do that?

## 1. Removing unnecessary pixels

From time to time I have received emails from people who have received memory warnings after adding only a handful of their figures to a frame. In some cases I have found that those figures contained images with a lot of unnecessary blank/transparent pixels, making them really large. Let's take a look at an example:



In this figure, the turtle's head looks quite small.



If I tap on the handle of the item containing the turtle's head, Animation Pro will indicate that the item has been selected by drawing a blue border around it.

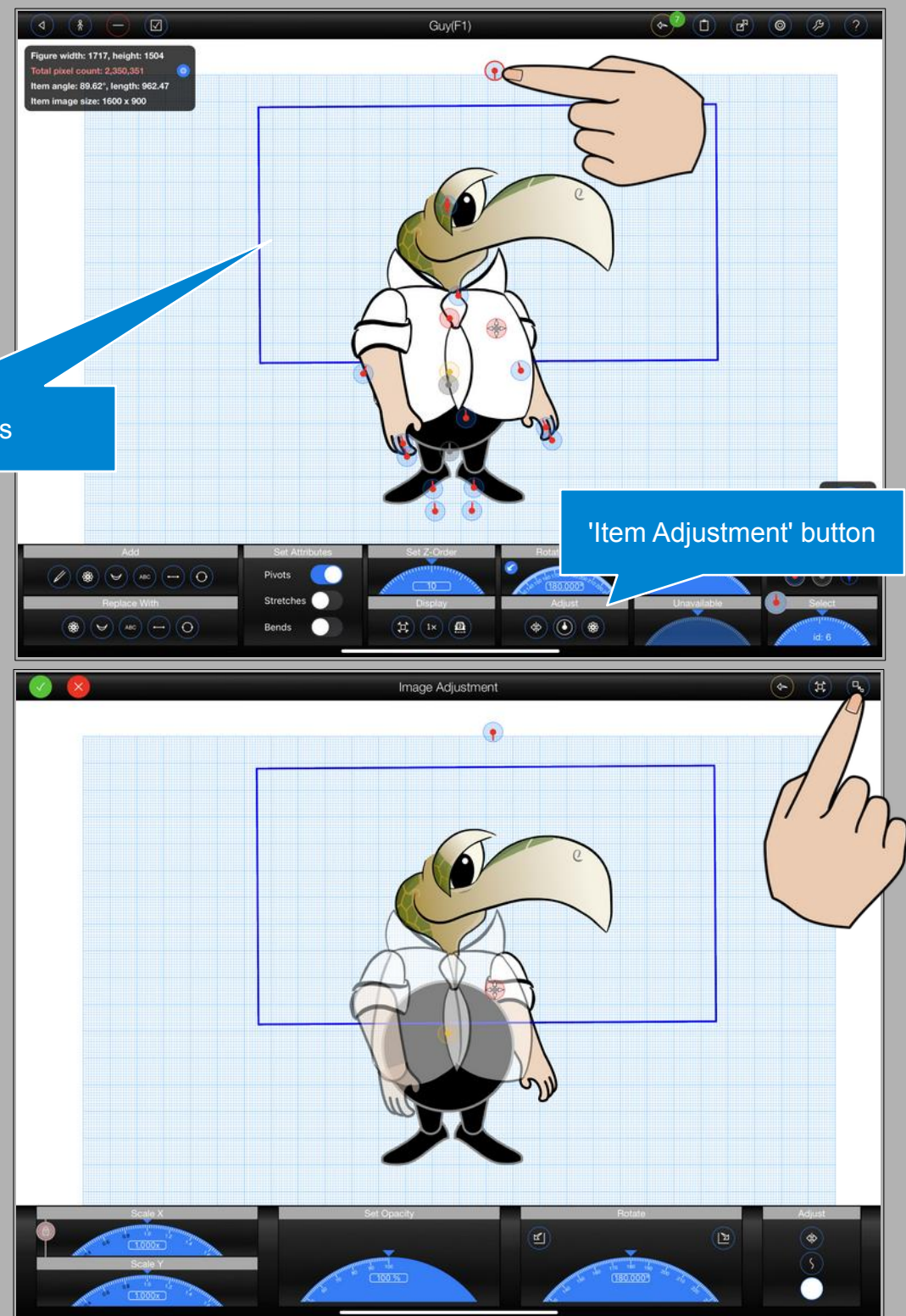
In this case, the blue border is much larger than the turtle's head which indicates that the underlying image of the turtle's head contains a **LOT** of blank and unnecessary pixels.

Unnecessary pixels

Animation Pro can automatically crop unnecessary/blank pixels from the underlying images in a figure:

1. Tap on an (image) item's handle to select it (as shown, above)
2. Press the 'Item Adjustment' button (as shown, above) to open the 'Item Adjustment' screen
3. Press the 'Resample' button (as shown, right)

Please note that you can also do this from the main animation screen by tapping on an (image) item's handle and selecting 'Adjust' from the popover that appears.



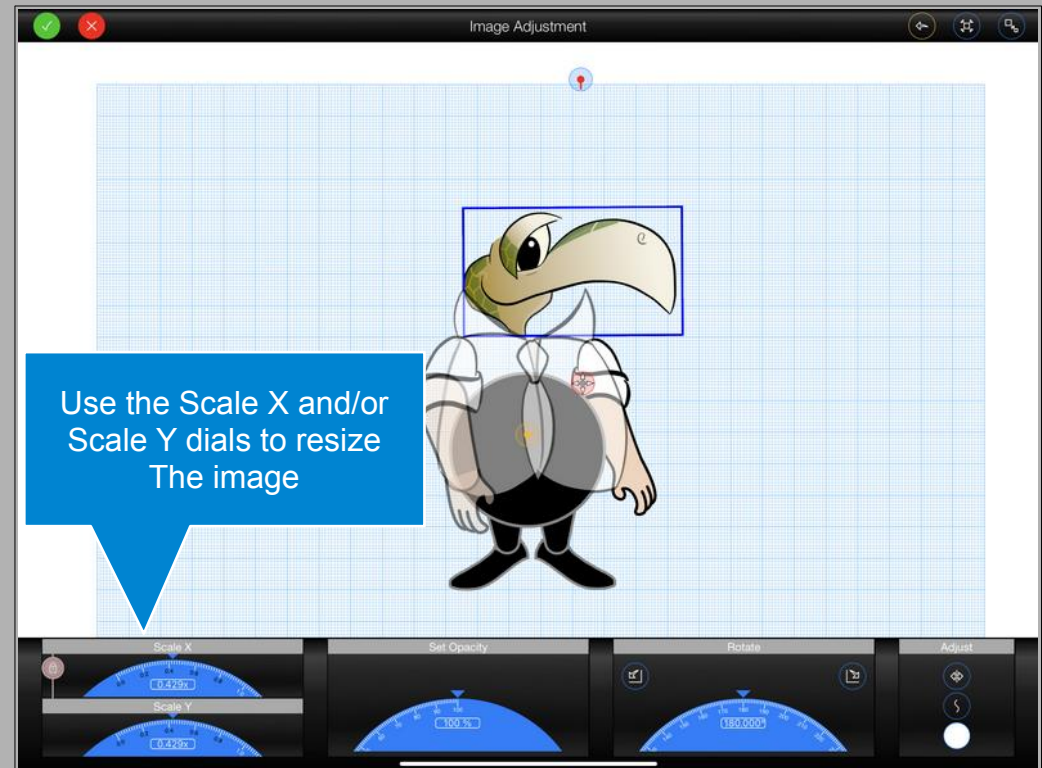
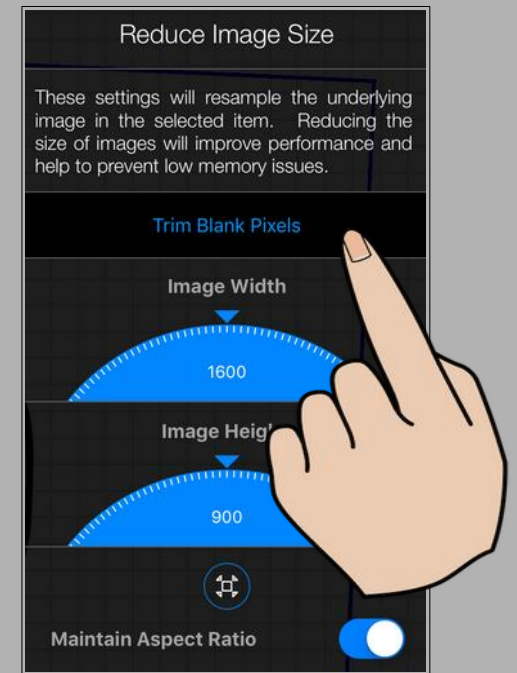
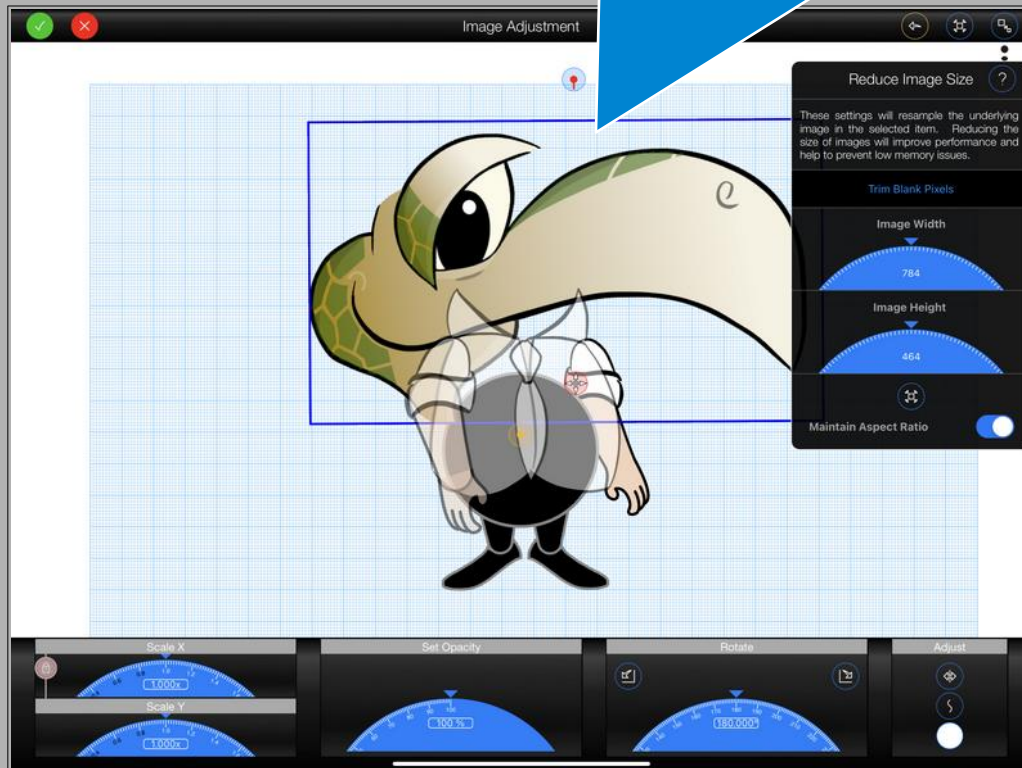


Animation Pro will display the 'Reduce Image Size' popover.

#### 4. Press the 'Trim Blank Pixels' button

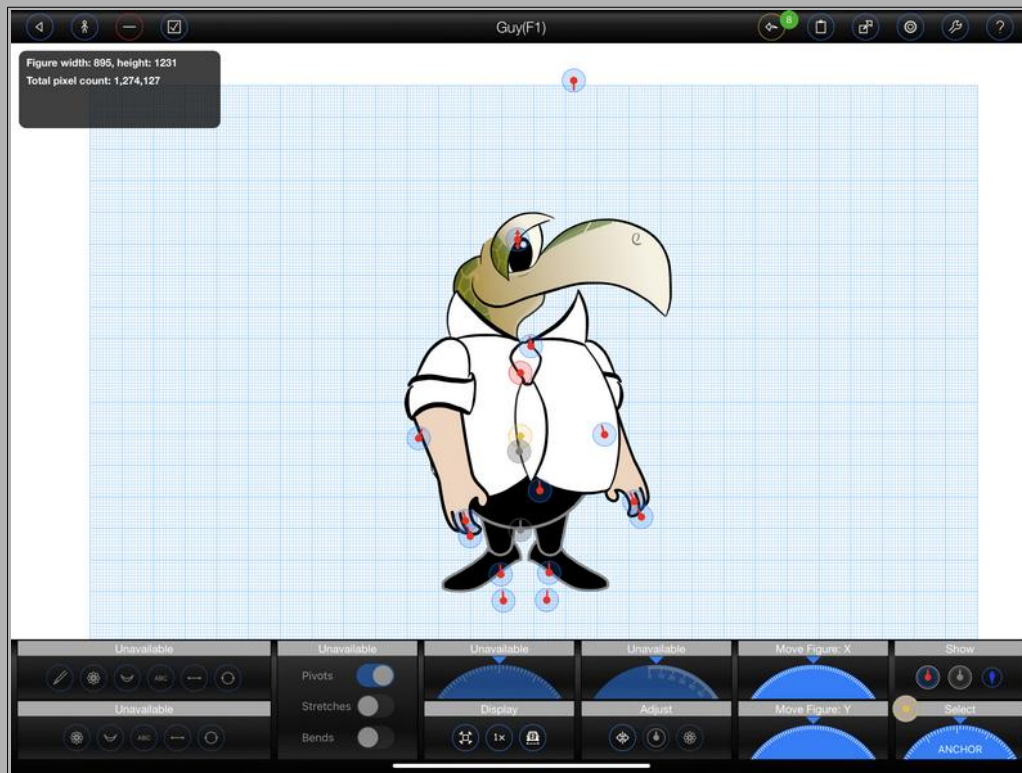
Animation Pro will automatically remove all of the blank pixels that it can from the image. Please note that this may cause the image to expand to fill the layer in which it is contained. In other words, you may need to resize the layer using the tools on the 'Item Adjustment' screen after removing the blank pixels, please see below:

The blank pixels have been removed. As a result, the turtle's head expands to fill the item's layer.



## 2. Reducing the size of images

From time to time I have received emails from people who have received memory warnings after adding only a handful of their figures to a frame. In some cases I have found that those figures contained unnecessarily large (in some cases, huge) images. Let's take a look at an example:



In this figure, the turtle's head looks quite small.



If I tap on the handle of the item containing the turtle's head, Animation Pro will indicate that the item has been selected by drawing a blue border around it.

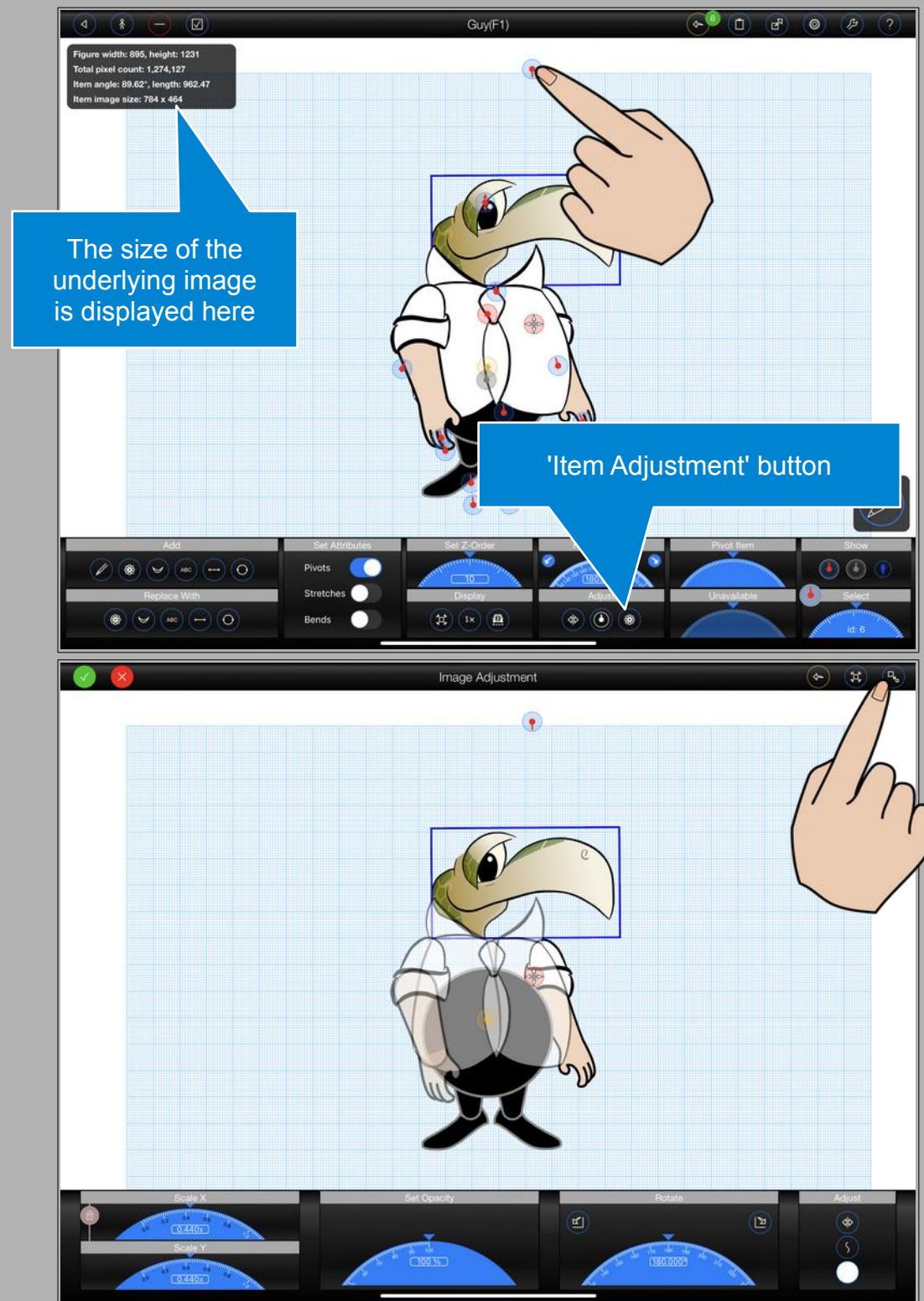
Upon selecting an (image) item in the 'Figure Editor', the size of the underlying image (measured in pixels) will be displayed at the top-left of the screen.

In this case, the turtle's head is 784 pixels wide and 464 pixels high.

Animation Pro can reduce the size of images:

1. Tap on an (image) item's handle to select it (as shown, above)
2. Press the 'Item Adjustment' button (as shown, above) to open the 'Item Adjustment' screen
3. Press the 'Resample' button (as shown, right)

Please note that you can also do this from the main animation screen by tapping on an (image) item's handle and selecting 'Adjust' from the popover that appears.

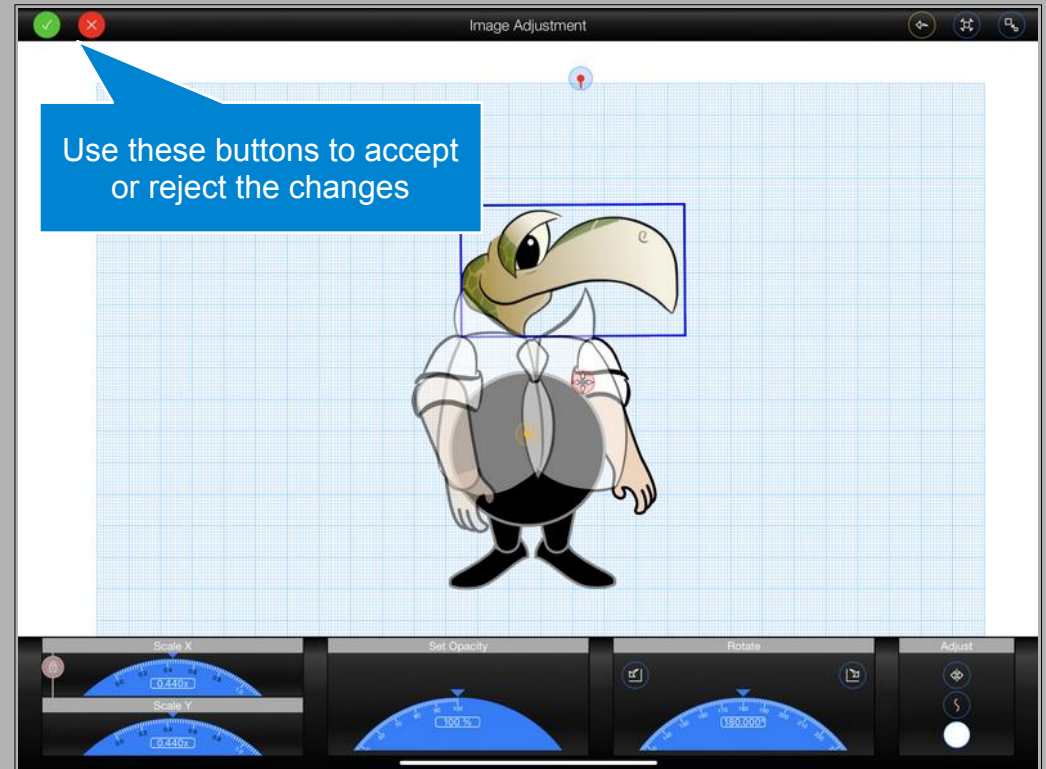
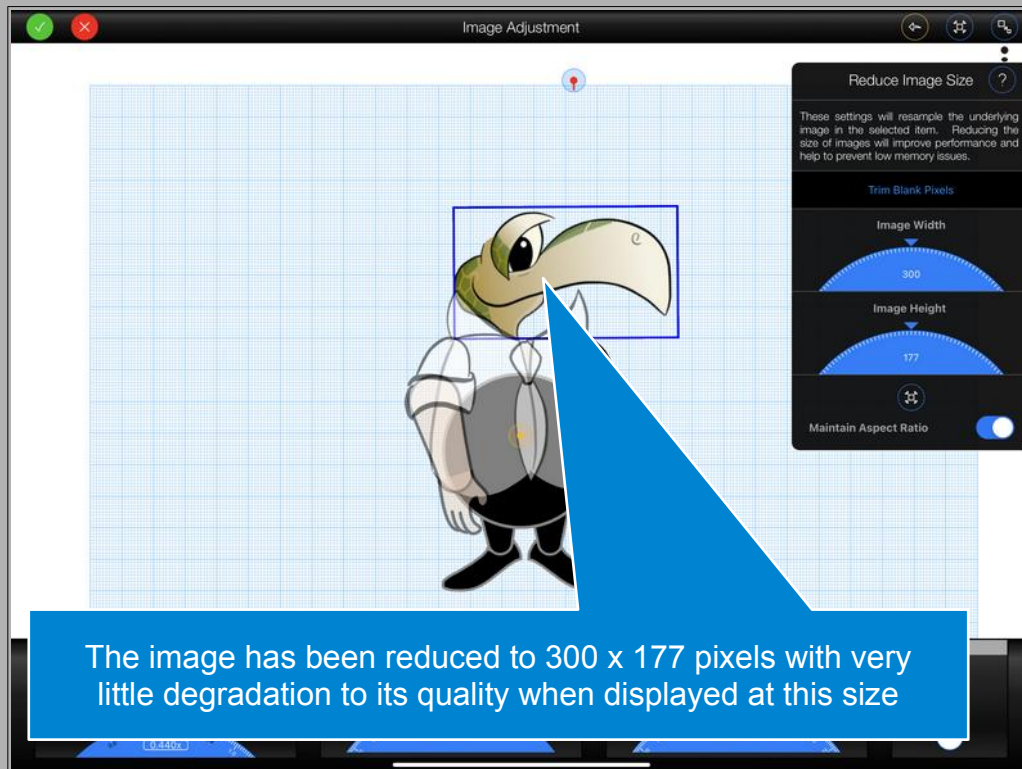
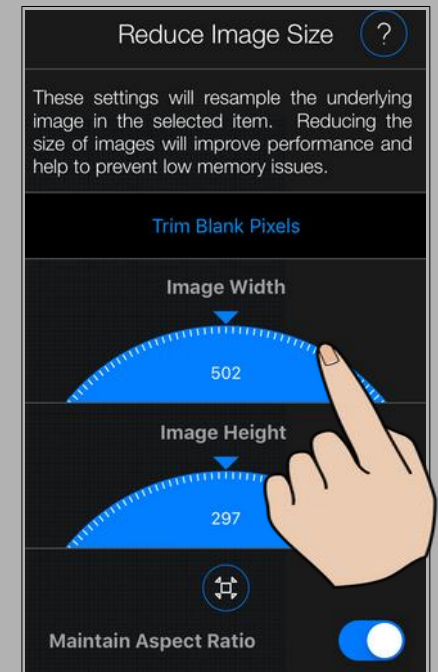


Animation Pro will display the 'Reduce Image Size' popover.

4. Rotate either the 'Image Width' or the 'Image Height' dial to the right to reduce the size of the image.

### Please note:

By default, the 'Maintain Aspect Ratio' switch will be on; in which case, adjusting the width will also adjust the height (and vice-versa). If you wish to adjust the width and/or height independently, please turn the 'Maintain Aspect Ratio' switch off.





## Undoing Changes

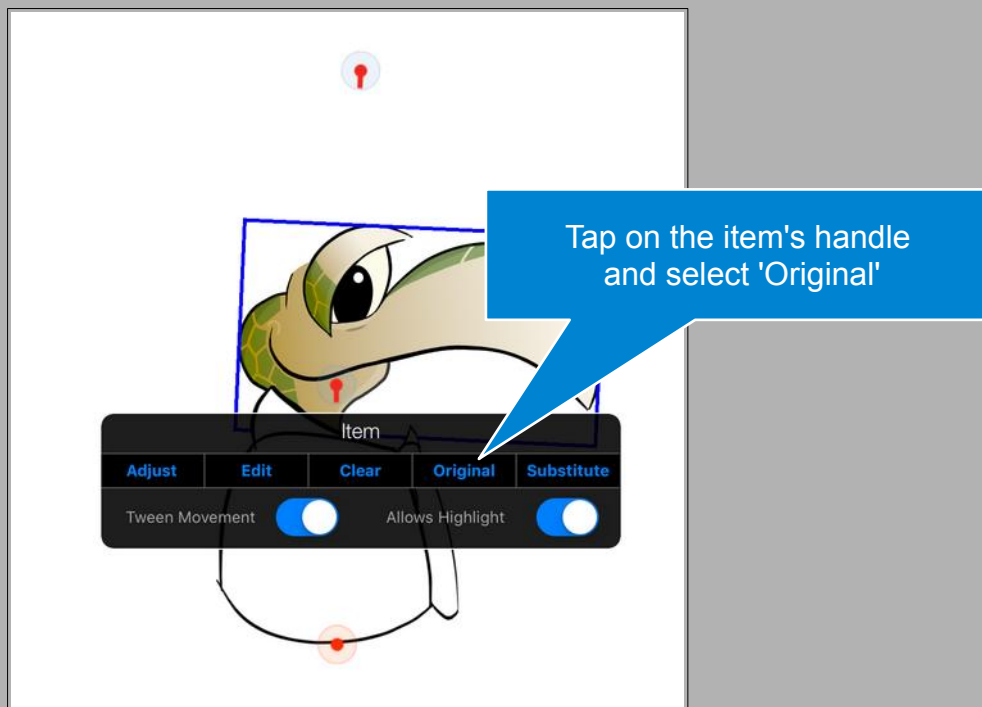
You can use the  button on the 'Reduce Image Size' popover to undo changes.

### Please note:

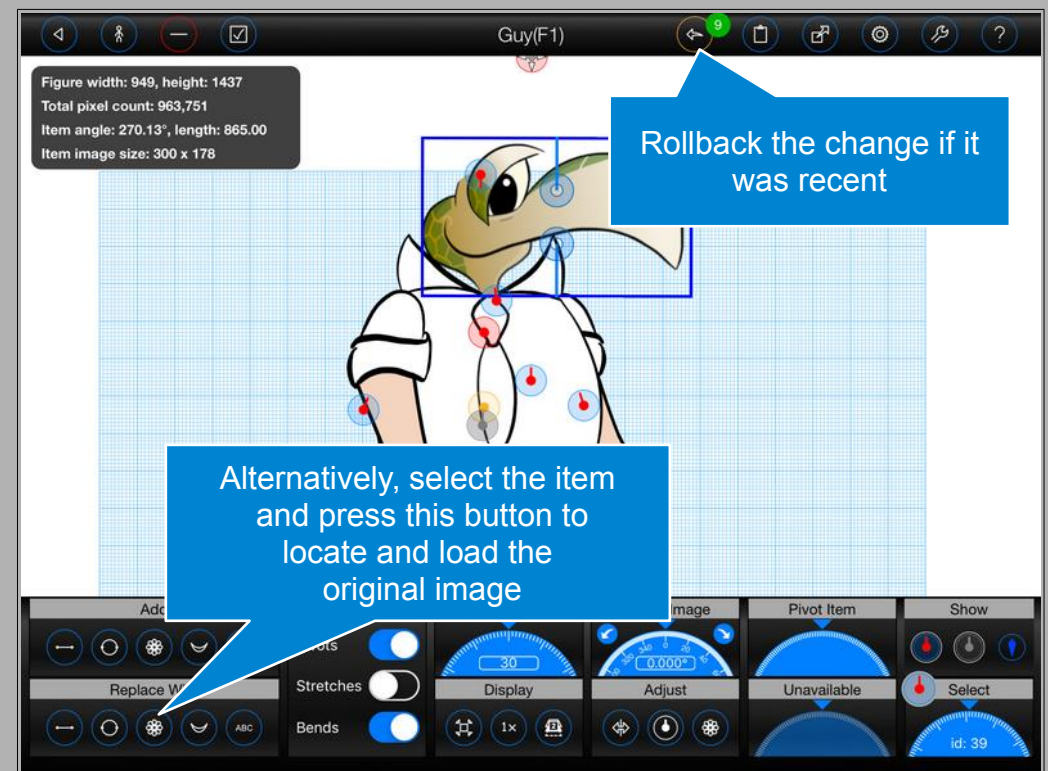
Once you exit the 'Item Adjustment' screen by pressing the green tick button, any changes made to an underlying image will be applied to your figure.

So if you should find that you need to reinstate the original image, then:

### Where the changes were made from the main animation screen:



### Where the changes were made in the 'Figure Editor':



# Resampled Images

Whenever an image is resampled using the 'Reduce Image Size' popover, the resampled image will be added to the 'File Manager' and may be found under the 'User Images -> RESAMPLED' category:



For more information about file management, please open the 'File Manager' topic, left.

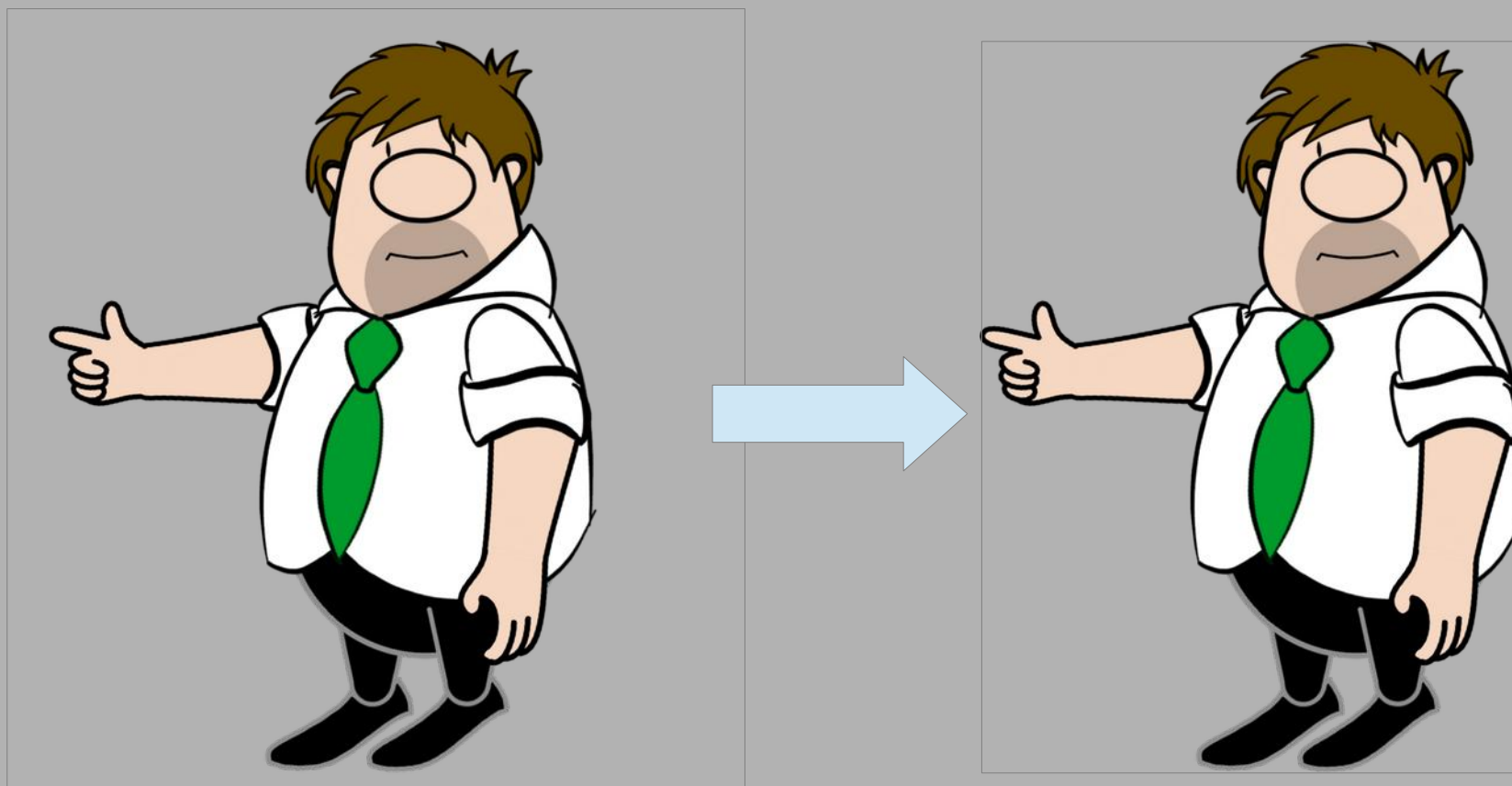


## Figure Editor Optimisation

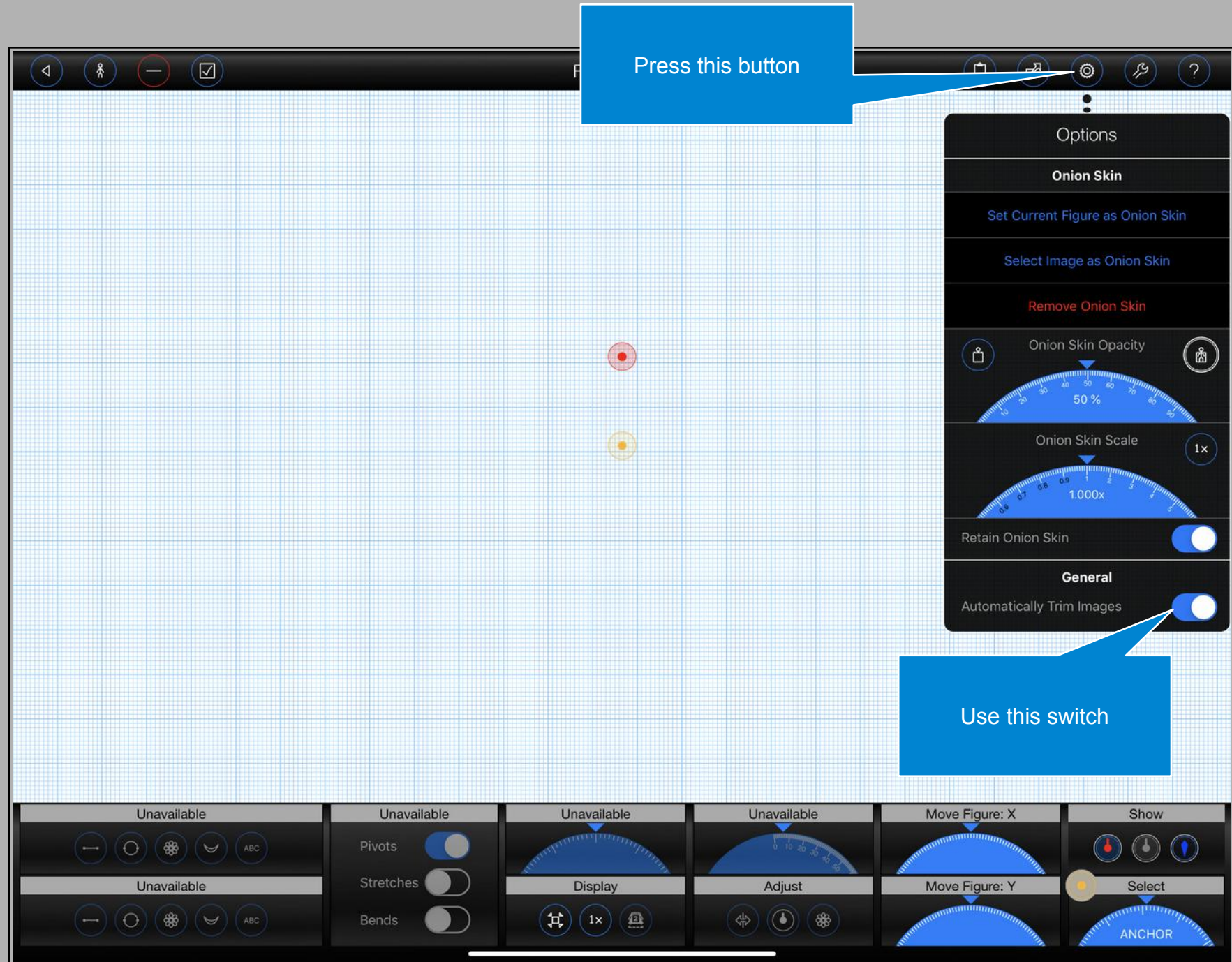
Up until now I've talked about trimming and resampling individual images in a figure which can be quite a painful process if your figures contain a lot of images! Animation Pro 1.8 thus introduces a couple of new features into the Figure Editor to make the whole process much easier.

### Automatically Trimming Images

The Figure Editor can be instructed to automatically trim images when adding them to your figure. This removes any blank pixels from around the images to reduce their overall size without affecting the quality of the images:



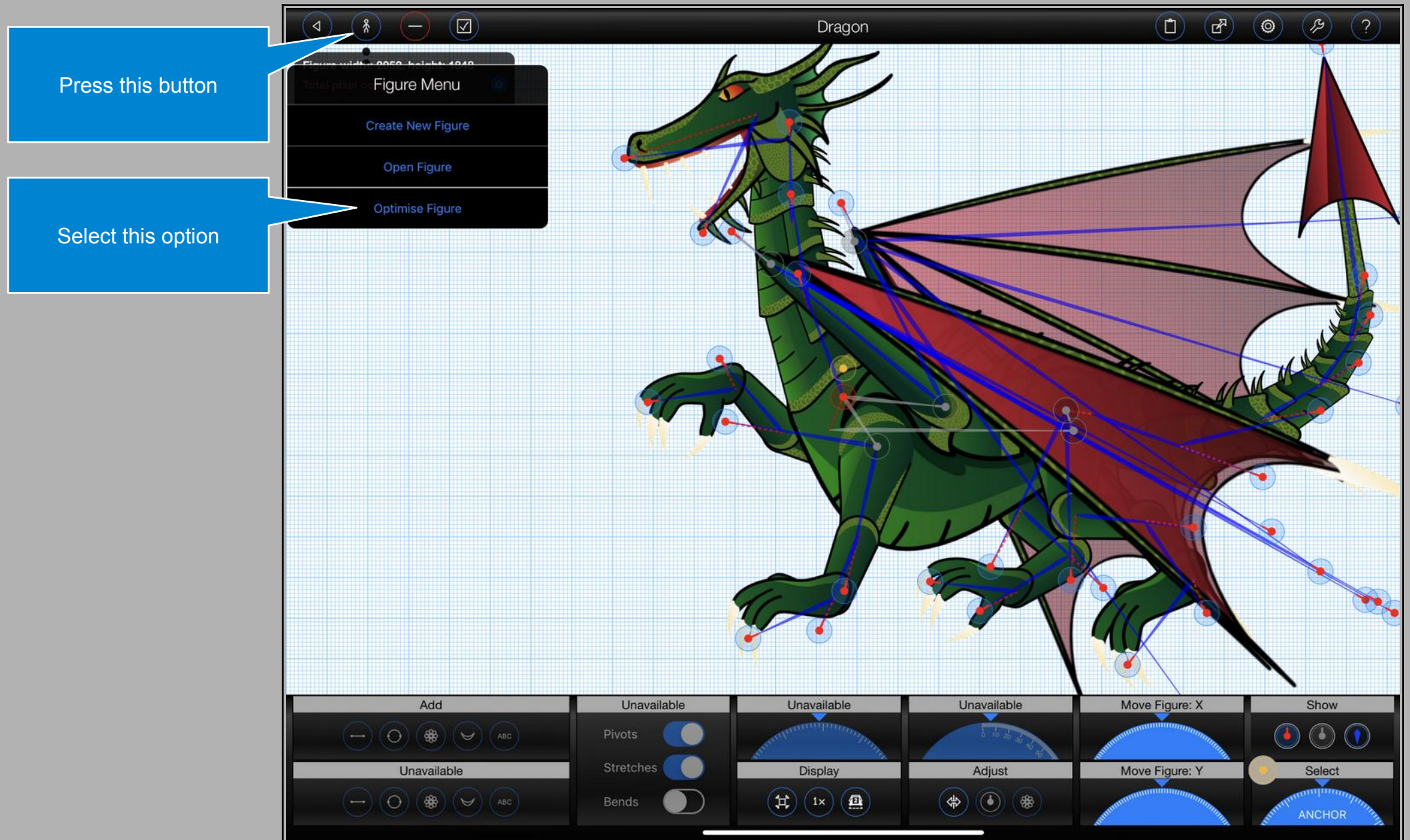
You can turn this feature on or off via the 'Automatically Trim Images' switch in the options menu as shown below:





## Optimising a Figure

The Figure Editor can automatically resize (resample) **all** of the images in a figure at once to reduce the amount of memory the figure consumes.





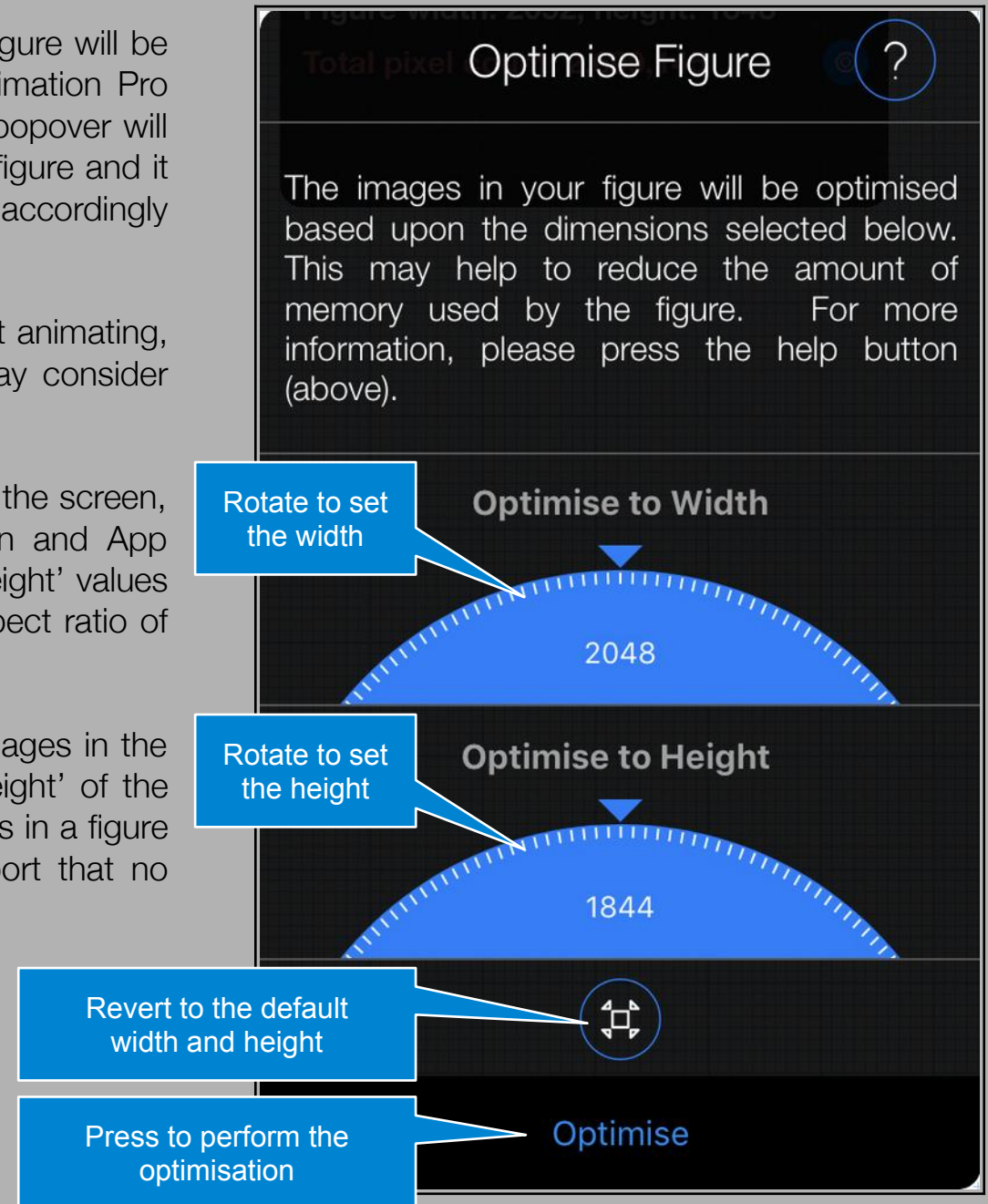
The 'Optimise Figure' popover will be displayed, as shown (right).

When optimising a figure, you will need to consider how the figure will be displayed in your animations. The size of a typical 16:9 Animation Pro animation frame is **2048 by 1152** pixels. So, by default, the popover will assume that **2048 by 1152** will be the maximum size of your figure and it will set the 'Optimise to Width' and 'Optimise to Height' dials accordingly (based upon the aspect ratio of your figure).

If you intend to zoom the virtual camera in on your figure whilst animating, or scale your figure to a larger size whilst animating, you may consider making the values larger.

If your figure will only ever be displayed at, say, half the size of the screen, then it **will** be advantageous (in terms of memory utilisation and App performance) to set the 'Optimise to Width' or 'Optimise to Height' values to half of the frame's width or height (depending upon the aspect ratio of your figure).

The process of optimising the figure will resample all of the images in the figure relative to the 'Optimise to Width' and 'Optimise to Height' of the figure. This process will only ever reduce the size of the images in a figure i.e. where large values are selected, Animation Pro may report that no optimisation is necessary.



## The 'Properties' panel

Animation Pro will display a 'Properties' panel at the top-left corner of the Figure Editor. This panel displays the properties of the figure and the currently selected item (in the figure):

As shown (right), when the total number of pixels across all images in the figure exceeds the total number of pixels in a typical 16:9 animation frame (which has a resolution of 2048 by 1152 pixels), the figure's 'Total pixel count' will be displayed in red and a button will appear. You can press this button to optimise the figure.

Please see the previous pages (above) for more information regarding figure optimisation.

The screenshot displays the Animation Pro Figure Editor interface. At the top-left, a 'Properties' panel is visible, showing the following information:

- Figure width: 2052, height: 1848
- Total pixel count: 2,699,145 (displayed in red)
- Item angle: 351.46°, length: 218.16
- Item image size: 232 x 178

A blue callout box labeled 'Properties panel' points to this panel. The main workspace shows a green dragon figure with red and blue control points and lines, indicating it is being edited. The bottom of the interface features several toolbars:

- Add:** Contains icons for adding lines, circles, polygons, and text (ABC).
- Replace With:** Contains icons for replacing with lines, circles, polygons, and text (ABC).
- Set Attributes:** Includes toggles for 'Pivots', 'Stretches', and 'Bends'.
- Set Z-Order:** Includes a 'Display' section with icons for z-ordering and a '1x' magnification icon.
- Rotate Image:** Includes a 'Rotate Image' section with a circular scale and a '91.805°' value.
- Pivot Item:** Includes a 'Pivot Item' section with a circular scale and an 'Unavailable' status.
- Show:** Includes a 'Show' section with a 'Select' button and an 'id: 35' label.