Better UI

Makes uGui Better!

version 1.2

Developed by Salomon Zwecker

TABLE OF CONTENTS

Better UI 1

Better UI Elements 5

1 Workflow: Make Better 5

2 UI and Layout Elements Overview 5

3 Better Transitions 8

3.1 How to add a Better Transition 8

3.2 Transition Modes 9

3.2.1 Color Tint 9

3.2.2 Sprite Swap 9

3.2.3 Animation 9

3.2.4 Object Activeness 9

3.2.5 Alpha 9

3.2.6 Material Property 9

4 Screen Dependent Size Modifiers 10

4.1 Size Modification Settings 10

4.1.1 Pixel Height 11

4.1.2 Pixel Width 11

4.1.3 Aspect Ratio 11

4.1.4 Inverse Aspect Ratio 11

4.1.5 Dpi 12

4.2 Size Modifier Types 12

4.3 Components with Size Modifiers 12

5 Better UI Elements 14

5.1 Better Image 14

5.1.1 Color and Gradient 14

5.1.2 Materials 14

5.1.3 Border Resizing 15

5.2 Better Raw Image 16

5.2.1 Color and Gradient 16

5.2.2 Materials 16

5.3 Better Input Field 16

5.4 Better Scroll Rect 16

5.5 Better Text 17

5.5.1 Sizer Only 17

5.5.2 Stay in Bounds (default) 18

5.5.3 Best Fit 18

5.6 Better Toggle 18

5.7 Better Grid Layout Group 18

6 Text Mesh Pro Support 18

6.1 Better Text Mesh Pro UGUI 19

6.1.1 Sizer Only 19

6.1.2 Stay in Bounds (default) 19

6.1.3 Best Fit 19

6.2 Better Text Mesh Pro - Input Field 19

6.3 Better Text Mesh Pro – Dropdown 20

Resolution Monitoring 21

7 Resolution Monitor 21

8 Ingame Resolution Monitor 22

9 IResolutionDependency 22

Materials 24

10 Materials Scriptable Object 24

10.1 Basics 24

10.2 Add your own Material 25

10.3 Animating Properties 25

Editor Windows 26

11 Snap Anchors Window 26

11.1 Background 26

11.2 Workflow 26

11.3 Modes 27

11.3.1 Border 27

11.3.2 Point 27

11.3.3 Pivot 28

12 Align and Distribute Window 29

12.1 Background 29

12.2 Align 29
12.2.1 Align Buttons 29
12.2.2 Align To 30
12.2.3 Anchors 30
12.3 Distribute 30
12.3.1 Distribute Buttons 30
12.3.2 Padding 31
12.3.3 Sorting Order 31
12.3.4 Distribute Along 31
12.3.5 Align By 31
12.3.6 Anchors 31
13 Pick Resolution Window 32
13.1 Settings 32
13.1.1 Resolution Filters 33
13.1.2 Options 33

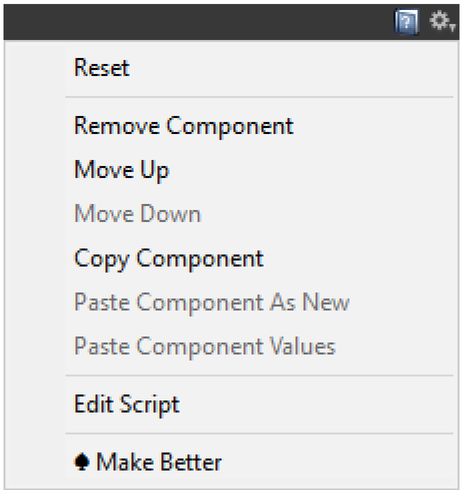
Better UI Elements

The Better UI Elements are extending the UI elements of Unity's uGUI framework by additional functionality.

1 Workflow: Make Better

Better UI is designed to extend uGUI where needed. It is also possible to include it in existing projects and extend certain UI elements with a simple workflow.

Wherever you realize needing some more functionality on an UI element just click the options-gear-wheel on the component and click the "♠ Make Better" option.



This will replace the current UI Element by its "Better" pendant. It will keep all the values of the original uGUI objects properties. It will also search for references to that object in the hierarchy. Any found references to that element will be replaced with references to the "Better" element, so you don't have to worry about manual changes in the scene after making an element "better".

Please note that only references in the scene will be replaced. If you make a prefab "better" which is referenced somewhere, the reference will get lost and you have to re-assign it manually.

2 UI and Layout Elements Overview

The following table is showing a short overview about how a "Better UI" element extends the uGUI element.

A detailed description is documented later.

♠ Better UI

uGui Icon	uGUI Element	Better UI Icon	Better UI Element	What is better
○	**Selectable**	●	Better Selectable	▪ Better Transitions
OK	**Button**	OK	Better Button	▪ Better Transitions
▼	**Dropdown**	▼	Better Dropdown	▪ Better Transitions
▚	**Image**	▚	Better Image	▪ Sliced Mode: ▪ Keep Border Aspect Ratio ▪ Border Scaling ▪ Tiled Mode: ▪ Border Scaling ▪ Gradients instead of Color ▪ Improved Material System ▪ Predefined Fast Materials (Grayscale, Hue-Saturation-Brightness) ▪ Clone custom Materials
▚	**Raw Image**	▚	Better Raw Image	▪ Gradients instead of Color ▪ Improved Material System ▪ Predefined Fast Materials (Grayscale, Hue-Saturation-Brightness) ▪ Clone custom Materials
T|	**Input Field**	T|	Better Input Field	▪ Better Transitions ▪ Additional Placeholders
┘	**Scrollbar**	┘	Better Scrollbar	▪ Better Transitions
▣	**Scroll Rect**	▣	Better Scroll Rect	▪ Horizontal- / Vertical start position
⊶	**Slider**	⊶	Better Slider	▪ Better Transitions

T	**Text**	T	Better Text	▪ Font Sizer (Screen Dependent Size Modifier) ▪ Fitting Modes
✓	**Toggle**	✓	Better Toggle	▪ Better Transitions ▪ Additional Toggle Transitions (On / Off)
▦	**Grid Layout Group**	▦	Better Grid Layout Group	▪ Resolution Dependent Size Modifiers: ▪ Padding Sizer ▪ Spacing Sizer ▪ Cell Sizer ▪ Constraint: Fixed Column- / Row Count ▪ Fit (Cell size adjustment to fit in layout group)
◫	**Horizontal Layout Group**	◫	Better Horizontal Layout Group	▪ Screen Dependent Size Modifiers: ▪ Padding Sizer ▪ Spacing Sizer
☰	**Vertical Layout Group**	☰	Better Vertical Layout Group	▪ Screen Dependent Size Modifiers: ▪ Padding Sizer ▪ Spacing Sizer
			Transform Scaler	▪ Screen Dependent Size Modifiers: ▪ Scale Sizer
T	**Text Mesh Pro UGUI**	T	Better Text Mesh Pro UGUI	▪ Screen Dependent Size Modifiers: ▪ Font Sizer ▪ Min / Max Font Sizer ▪ Margin Sizer ▪ Fitting Modes
I	**TMP_Input Field**	I	Better Text Mesh Pro Input Field	▪ Screen Dependent Size Modifiers: ▪ Point Sizer (if enabled) ▪ Better Transitions
▼	**TMP_Dropdown**	▼	Better Text Mesh Pro Dropdown	▪ Better Transitions ▪ Show / Hide Transitions

3 Better Transitions

Transitions are used to give feedback for the different states of an object. A selectable UI element can have the following states:

- Normal
  When it is just displayed on the screen without having any interaction right now
- Highlighted
  When the object is in Focus (Mouse is above or the last element where a pointer down action has been performed)
- Pressed
  When the pointer is currently pressing the element
- Disabled
  When the element is not interactable

UI Element with "Better Transitions" can have a uGUI transitions as well as additional transitions. These additional transitions can affect any number of objects with different kinds of transitions. Also, there are more options for "Better Transitions" than for the uGUI transition.

Example: If you need a button where the background color should change as well as the text color you could add a "Better Transition" for the Text object.

The Following Better UI Elements providing Better Transitions:

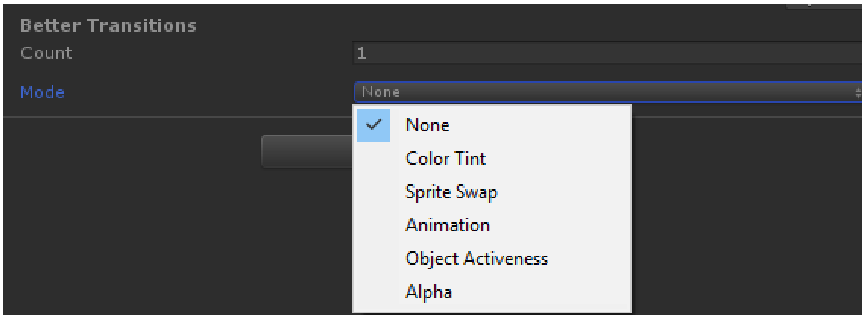
- Better Selectable
- Better Button
- Better Dropdown
- Better Input Field
- Better Scrollbar
- Better Slider
- Better Toggle
- Better Text Mesh Pro Dropdown
- Better Text Mesh Pro Input Field

3.1 How to add a Better Transition

To add a "Better Transition" to one of the UI Elements perform the following steps:

1. Increase the Count of Better Transitions by one
2. Select the Mode of the Transition (see description for the modes below)
3. Drag and Drop a valid Target in the respective Object Field
4. Define the states for every transition

3.2 Transition Modes



Better Transitions

Count 1

Mode None

The following modes can be selected.

It is possible to affect the same object with several transitions. You should make sure not to use the same transition mode for the same target more than once.

3.2.1 Color Tint

Colorizes the Target Graphic for each state. (Like the uGUI Color Tint transition)
The Fade Duration provides information about if and how long a state transition is animated.

You should **make sure that the Target Graphics color is white** unless you want to have mixed up colors.

3.2.2 Sprite Swap

Changes the Sprite of the Target Image for each state. (Like the uGUI Sprite Swap transition)

3.2.3 Animation

Triggers the given Trigger Names on Target Animator for each state. (Like the uGUI Animation transition)

3.2.4 Object Activeness

Can set target GameObjects active or inactive for each state. This cannot be previewed in edit mode.

Make sure the UI Element itself doesn't become inactive through this transition because it cannot enable itself again once it is inactive (it doesn't do anything anymore when inactive).

3.2.5 Alpha

Changes the transparency of Target Graphic for each state. (Like Color Tint transition)
The Fade Duration provides information about if and how long a state transition is animated.

3.2.6 Material Property

Changes the material property of a material assigned to Target Better Image. This only works for properties which are mapped to some vertex information (see Materials).

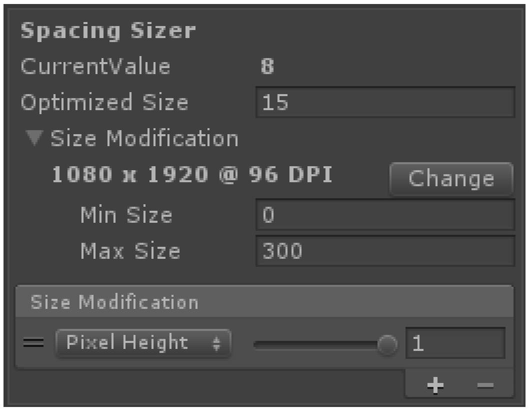
Choose which property you want to affect and the fade duration which specifies how long the transition takes. If there is no property you cannot select one and nothing happens on transition.

4 Screen Dependent Size Modifiers

There are various "Sizer" objects on certain UI elements. They are used to scale certain values depending on the used resolution (and / or DPI).

Every "Sizer" contains the following values:

- **Current Value:** The last calculated value for the current resolution / dpi. Cannot be changed directly because it is calculated.
- **Optimized Size:** The fixed size for the optimized resolution / dpi
- **Size Modification** (Foldout)
    - **<X> x <Y> @ <Z> DPI** [change]: The optimized resolution / dpi for this unity project. by pressing the change button the Resolution Monitor object will be selected where the global Optimized resolution / dpi can be changed (see there).
    - **Min Size:** The minimum size (if the calculation for a resolution / dpi would return a lower value, the Min Size is used instead)
    - **Max Size:** The maximum size (if the calculation for a resolution / dpi would return a higher value, the Max Size is used instead)
    - **Size Modification** (List): Contains Setting entries of how the size should be calculated.
      If the list is empty, the size will always be the optimized size.
      If there is more than one entry, the middle is calculated.



Spacing Sizer
CurrentValue 8
Optimized Size 15
▼ Size Modification
1080 x 1920 @ 96 DPI
Min Size 0
Max Size 300
Size Modification
Pixel Height 1

4.1 Size Modification Settings

Each Modification Setting consists of two values: Mode and Impact.

The Mode defines which Screen-values should be used to calculate the actual size (in the very most cases "Pixel Height" or "Pixel Width")

The Impact defines how much the modification settings affects the change of the size (doesn't affect at zero; affects totally at one).

Depending on the current screen resolution / dpi, the value is recalculated using the size modification settings.

Here are the different Modification Modes in detail.

4.1.1 Pixel Height

If the height of the current resolution is smaller than the optimized resolutions height, the size will get smaller.

If the height of the current resolution is greater than the optimized resolutions height, the size will get bigger.

4.1.2 Pixel Width

If the width of the current resolution is smaller than the optimized resolutions width, the size will get smaller.

If the width of the current resolution is greater than the optimized resolutions width, the size will get bigger.

4.1.3 Aspect Ratio

The aspect ratio is calculated the following way: aspectRatio = width / height

If the aspect ratio of the current resolution is smaller than the optimized resolutions aspect ratio, the size will get smaller.

If the aspect ratio of the current resolution is greater than the optimized resolutions aspect ratio, the size will get bigger.

4.1.4 Inverse Aspect Ratio

The inverse aspect ratio is calculated the following way: aspectRatio = height / width

If the inverse aspect ratio of the current resolution is smaller than the optimized resolutions inverse aspect ratio, the size will get smaller.

If the inverse aspect ratio of the current resolution is greater than the optimized resolutions inverse aspect ratio, the size will get bigger.

4.1.5 Dpi

DPI means "Dots Per Inch" or in other words "how many pixels can fit next to each other within one inch on the current screen".

If you choose to scale in DPI mode, the physical size will always stay the same.

Example: If you have an object which displays a ruler and you adjust the correct size for the optimized resolution / dpi and you resize that object by using a sizer which modifies the size by dpi, the ruler will have the correct physical size on every device (if the device provides the correct dpi for its screen).

4.2 Size Modifier Types

There are Size Modifiers for the following types:

- Float
- Vector2
- Vector3
- Margin (Wrapper for RectOffset – used for Padding of Layout Groups)

For each dimension of a type (x, y, z or left, right, top, bottom) there are modification lists. If you want to adjust the size uniformly make sure to set the same mode to all dimensions (e.g. set all to "Pixel Height").

4.3 Components with Size Modifiers

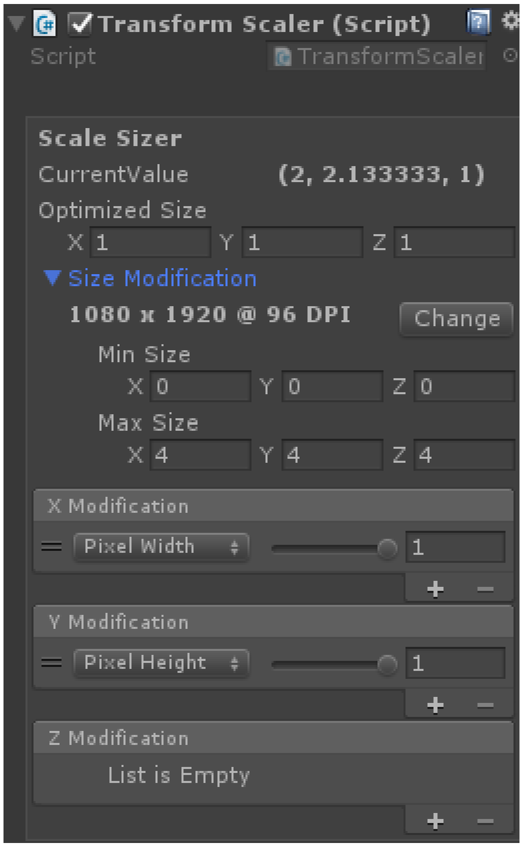
There are some Better UI elements using the Size Modifiers:

- Better Image
    - Sprite Border Scale (Sliced & Tiled mode)
- Better Text
    - Font Sizer
- Better Grid Layout Group
    - Padding Sizer
    - Spacing Sizer
    - Cell Sizer
- Better Horizontal- & Better Vertical Layout Group
    - Padding Sizer
    - Spacing Sizer
- Better Text Mesh Pro UGUI
    - Font Sizer
    - Min / Max Font Sizer (depending on fitting mode)
    - Margin Sizer

- Better Text Mesh Pro Input Field
    - Point Size Scaler (If “Override Point Size” is enabled)

Additionally, there is an extra Component using a size modifier:

- Transform Scaler
    - Scale Sizer



Transform Scaler (Script)
Script TransformScaler

Scale Sizer
CurrentValue (2, 2.133333, 1)
Optimized Size
X 1 Y 1 Z 1
Size Modification
1080 x 1920 @ 96 DPI
Min Size
X 0 Y 0 Z 0
Max Size
X 4 Y 4 Z 4
X Modification
Pixel Width 1
Y Modification
Pixel Height 1
Z Modification
List is Empty

The Transform Scaler affecting the scale of the object. You should use it wisely. Scaling inside the UI often leads to unexpected positions and sizes of objects.

As a rule of thumb, you should use the Transform Scaler only for objects which have the min and max anchor positions on the same spot and which has no children or no complex children hierarchy.

5 Better UI Elements

In addition to the "Better Transitions" and Size Modifiers some elements also have custom behavior.

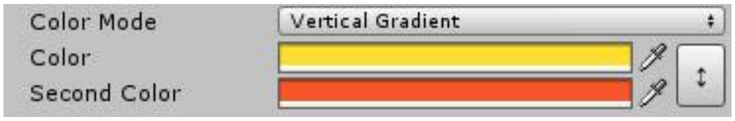
5.1 Better Image

5.1.1 Color and Gradient

Color Mode: Can switch Between Color (default behavior), Horizontal Gradient and Vertical Gradient. A Gradient in this case consists of two colors which defines the start and end color. The colors in between are interpolated.
Gradients are not supported for Images with Filled mode.

Color: The Color which is used to colorize the image. If a gradient mode is selected, it is the color on the left or top of the gradient.

Second Color: The Second Color is only available when a Gradient is selected. It defines the color on the right or bottom of the gradient.

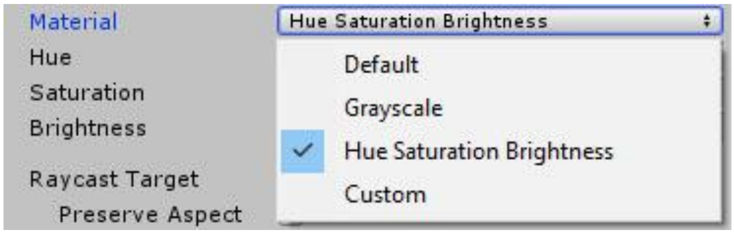


Color Mode: Vertical Gradient
Color
Second Color

The button on the right-hand side in gradient mode allows to swap the colors to mirror the gradient.

5.1.2 Materials

Material: This is a Dropdown in Better UI where you can select any predefined material (see Materials Scriptable Object), the default material or a Custom Material.



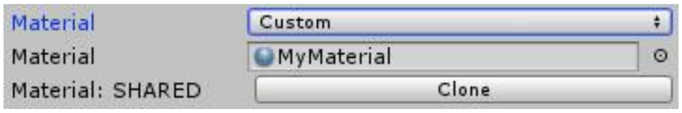
Material: Hue Saturation Brightness
Hue
Saturation
Brightness
Raycast Target
Preserve Aspect

Standard Material: It is like the Default Material but can have assigned an effect.

Grayscale Material: Applies a simple shader which displays the colors of the sprites as grayscale values.

Hue Saturation Brightness Material: Allows to shift the colors of the sprites (hue), make them intense or gray (saturation) and darker or brighter (brightness). This is a very powerful shader which is shared between all Images using it. However, the values can be different on each instance. This is possible because of a trick and is much better for performance if you have a lot of images with this shader (See Materials Scriptable Object).
Hue Saturation Brightness Material is not supported for Images with Filled mode.

Custom Material: Assign any material you want. After assigning there will appear a “Clone” Button. You want to clone a material if you want to change properties of it only for that image and the original material should keep the original values.



Material: Custom
Material: MyMaterial
Material: SHARED

5.1.2.1 *Material Effects*

For the Better UI predefined Materials (Standard, Grayscale and Hue Saturation Brightness) there is an option to define the Effect of the image. This enables the image to be mixed with the background in some way.

Normal: The image is not mixed with the background in any special way. It is just put on top of it.

Additive: The colors of the image are combined with the colors of the background so that the colors are mixed and saturated. The brighter the color of the image and / or background the more intense the color appears.

Linear Dodge: like additive but the colors are even more intense. The background color is not so important for the intensity but the images colors is.

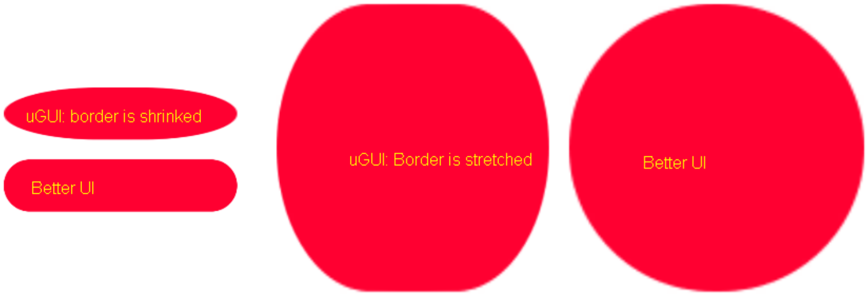
Multiply: The colors are mixed with the background, while darker colors are dominating the brighter colors. Because alpha becomes opaque black by this effect the transparent pixels are clipped which leads to hard pixel lines. This may not be a non-acceptable look so you should consider wisely if you want to use the effect at all.

5.1.3 Border Resizing

Border Resizing options are only available for Sliced or Tiled Images

5.1.3.1 *Sliced*

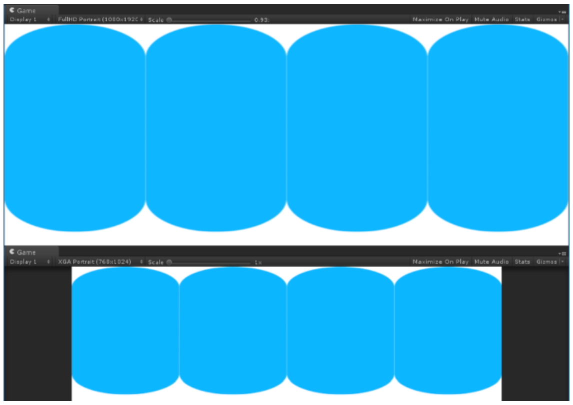
Keep Border Aspect: Scales the borders of the image to preserve their aspect ratio if necessary.



Sprite Border Scale: Scales the borders of the image using the settings inside the sizer. Also scales the aspect ratio for the "Keep Border Aspect" option.

5.1.3.2 Tiled

Sprite Border Scale: Scales the size and border of the tile-pattern. If set up correctly the same number of tiles are shown at any resolution.



5.2 Better Raw Image

5.2.1 Color and Gradient

The Color and Gradient options work exactly like in Better Image.

5.2.2 Materials

The Materials work exactly like in Better Image.

5.3 Better Input Field

In addition to the Better Transitions the Better Input Field has a list of **Additional Placeholders**.

These Placeholders are Graphic objects (Text, Image or Raw Image) which are visible (enabled) when there is no text entered in the input field and invisible (disabled) as soon as the user starts to write.

Example: If you need e.g. an image as a placeholder as well as a text, add them to the Additional Placeholders list.

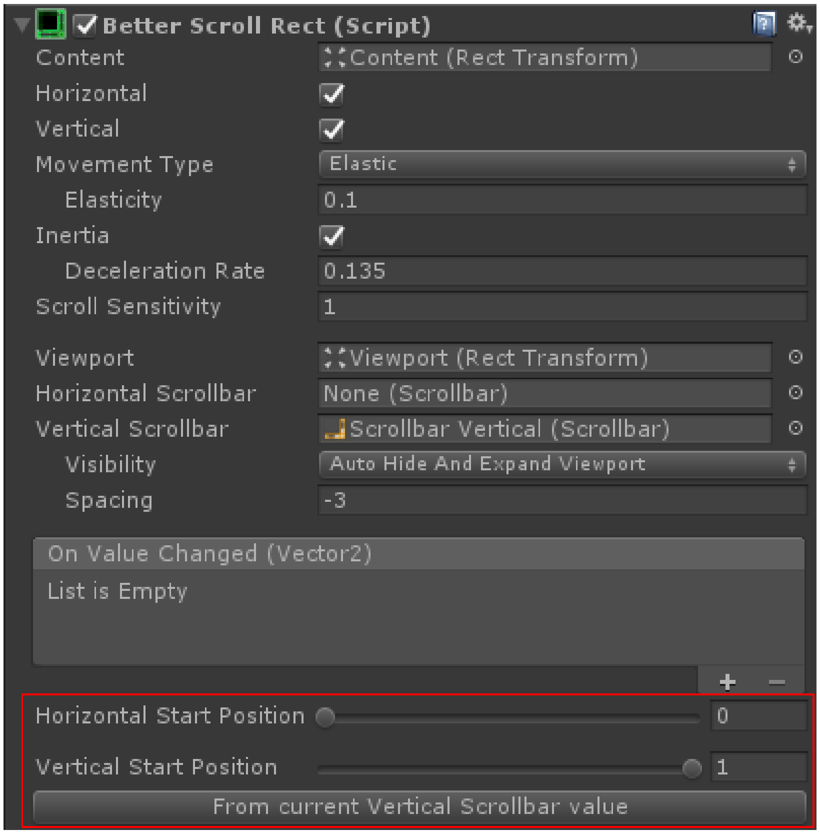
5.4 Better Scroll Rect

uGUIs Scroll Rect has the odd behavior to always jump somewhere in the middle of the vertical scroll area on start.

The Better Scroll Rect provides two extra fields: **Horizontal Start Position** and **Vertical Start Position**.

The Scrollbar will jump to that (relative) position on start.

If you have horizontal / vertical Scrollbars assigned, you can inject the current value of them by a click on the button below the respective start position slider.



☑ Better Scroll Rect (Script)

Content	Content (Rect Transform)
Horizontal	☑
Vertical	☑
Movement Type	Elastic
Elasticity	0.1
Inertia	☑
Deceleration Rate	0.135
Scroll Sensitivity	1
Viewport	Viewport (Rect Transform)
Horizontal Scrollbar	None (Scrollbar)
Vertical Scrollbar	Scrollbar Vertical (Scrollbar)
Visibility	Auto Hide And Expand Viewport
Spacing	-3

On Value Changed (Vector2)

List is Empty

Horizontal Start Position	0
Vertical Start Position	1

In the background a Coroutine is started which waits a frame before changing the positions. Therefore, it is not possible in this version of Better UI to have the position change in edit mode.

5.5 Better Text

Better Text can Scale the Font Size according to the current resolution / dpi with the Font Sizer.

It also has three kinds of Fitting Modes:

5.5.1 Sizer Only

Will just affect the font size of the text using the Font Sizer. If the size becomes too large, parts of the text may be cut off or overflow the bounds (depending on the overflow settings).

5.5.2 Stay in Bounds (default)

The size is affected by the Font Sizer. But if the text wouldn't fit inside its bounds anymore the size is reduced to fit in.

5.5.3 Best Fit

Equal to the "Best Fit" option of uGUI. The text will grow or shrink to fit inside the bounds. The Min Size and Max Size values of the Font Sizer are used to avoid too small or too large font sizes.

5.6 Better Toggle

In addition to the "Better Transitions" there are "**Better Toggle Transitions (On / Off)**".

They function the same way as "Better Transitions" but have the states "**On**" and "**Off**" instead of "Normal", "Highlighted", "Pressed" and "Disabled". Accordingly, they are triggered when the "Is On" state of the toggle changed.

It might lead to unexpected behavior if you assign the same kind of transition with the same target to "Better Transitions" and "Better Toggle Transitions". However, the Better Toggle logic tries to behave as you would expect in such a case.

5.7 Better Grid Layout Group

Besides the Size Modifiers for Padding, Spacing and Cell Size, there is an extra option if you select "Fixed Column Count" or "Fixed Row Count" as a constraint: **Fit**

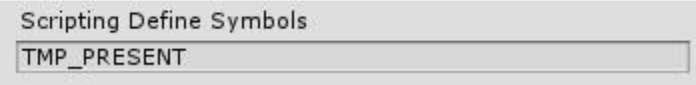
If "Fit" is enabled, the cell height (fixed row count) or cell width (fixed column count) are stretched or shrinked to exactly fit all together inside the parent while respecting the size of the padding and spacing.

6 Text Mesh Pro Support

If you are using Text Mesh Pro you can activate the Text Mesh Pro support of Better UI by adding a scripting define symbol.

To do so, follow these steps:

1. Navigate to the Player Settings (Edit -> Project Settings -> Player)
2. Unfold the "Other Settings" section
3. In the “Configuration” section Insert "TMP_PRESENT" (all capitals, without quotes) in the field with the title "Scripting Define Symbols"



Scripting Define Symbols

TMP_PRESENT

4. Repeat 2. and 3. for each Platform you want to deploy for.

Then you can convert the Text Mesh Pro components to its "better" pendant.

6.1 Better Text Mesh Pro UGUI

Better Text Mesh Pro UGUI also has a Font Sizer to adjust the font size according to the current resolution.

Text Mesh Pro UGUI has a margin for the text. Of course, this margin will be represented by a sizer object on the better pendant (to scale the margin with the resolution).

Like Better Text it provides the Fitting Modes “Sizer Only”, “Stay In Bounds” (default) and “Best Fit”. The logic behind works a bit different here.

6.1.1 Sizer Only

The Font Sizer is responsible for the Font size. It scales with the resolution but doesn’t do any fitting stuff.

6.1.2 Stay in Bounds (default)

The size is affected by the Font Sizer. But if the text wouldn't fit inside its bounds anymore the size is reduced to fit in.

Internally “Auto Size” of Text Mesh Pro UGUI is enabled. The “Min” value can be adjusted with a sizer. The “Max” value is the value of the Font Sizer.

6.1.3 Best Fit

Equal to the "Auto Size" option of Text Mesh Pro UGUI. The text will grow or shrink to fit inside the bounds. The Min Size and Max Size values can be adjusted with the corresponding Sizer objects which appear in this mode.

6.2 Better Text Mesh Pro - Input Field

Better Transitions and Additional Placeholders work like Better Input Field (see there).

Additionally, there is a checkbox “Override Point Size”. If checked a Sizer object “Point Size Scaler” appears. This will override the “Point Size” field provided by Text Mesh Pro, while it scales with the resolution. This sets the font size of the Text and Placeholder(s). If you use “Better Text Mesh Pro UGUI” inside the input field, you need to use “Override Point Size” because the default Point Size logic may lead to unexpected behavior here.

6.3 Better Text Mesh Pro – Dropdown

In addition to the “Better Transitions” there are “Show / Hide Transitions”. These Transitions are triggered when the option list of the dropdown is opened (Show) or closed (Hide). The same transition types as in “Better Transitions” are available.

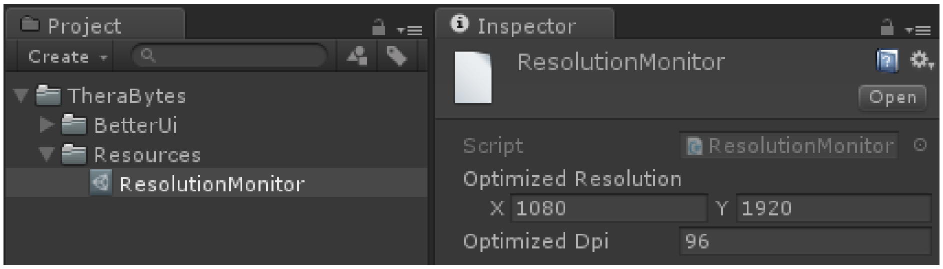
As with the “Toggle Transitions” also the “Show / Hide Transitions” may behave unexpected when the same target and transition type is selected for a normal or “Better” Transition as well as for a “Show / Hide Transition”.

7 Resolution Monitor

The Resolution Monitor is a scriptable object which holds the optimized resolution / dpi and which tracks changes of the resolution and notifies certain scene objects about a change.

The Resolution Monitor object can be found in your Unity project at "TheraBytes/Resources/ResolutionMonitor". There you can set the optimized Resolution / DPI for your project.

If there is no ResolutionMonitor object for some reason, you can create it manually by selecting "Window > Thera Bytes > Force ScriptableObjectSingleton Initialization" from the menu bar of Unity.



Script: ResolutionMonitor

Optimized Resolution: X 1080 Y 1920

Optimized Dpi: 96

The following static properties can be accessed:

- ResolutionMonitor.**OptimizedResolution**: A Vector2 indicating the resolution which is used to build the UI.
- ResolutionMonitor.**OprimizedDpi**: A float value indicating the optimized DPIyou are working on.
- ResolutionMonitor.**CurrentResolution**: The current Resolution (or the resolution which has been detected the last time)
  In the Editor it is the selected resolution of the main game view window. This might be different to Screen.width and Screen.height.
- ResolutionMonitor.**CurrentDpi**: The current DPI (only tracked for changes inside the editor)
  The scale of the main game view window is affecting the DPI inside the Editor. Scaling of the game view can be used to simulate different DPI values.

The Resolution Monitor automatically keeps track of resolution changes inside the Editor. All MonoBehaviours of the scene which implement the interface IResolutionDependency will be automatically notified about the Resolution Change.

If you want to have the same behavior in the final build, you need to create an Ingame Resolution Monitor.

8 Ingame Resolution Monitor

The Ingame Resolution Monitor is a simple MonoBehvaiour which triggers the logic of the Resolution Monitor in-game. If the user can change the Resolution inside of your game, you should use it.

To do so, call the following code once at start of your game:

```
IngameResolutionMonitor.Create();
```

Once created the Ingame Resolution Monitor will not be destroyed anymore. So make sure to create only one at the beginning and not more.

Note that the ResolutionMonitor.CurrentResolution and ResolutionMonitor.CurrentDpi are equal to Screen.width / Screen.height and Screen.dpi during runtime.

9 IResolutionDependency

If you want to add your own script which should update itself whenever the resolution changes, implement IResolutionDependency. You will then need to implement a method called "OnResolutionChanged()". Trigger your update stuff there. Note that you probably also need to perform the same logic in your OnEnable() method to make sure it is also calculated when the scene is opened and the resolution has not changed.

The Resolution Monitor will update your MonoBehaviour then automatically when the resolution changed.

The following code is an Example how the IResolutionDependency can be used (this example logs whether the screen is in Portrait or Landscape mode):

```
using TheraBytes.BetterUi;
using UnityEngine;

public class OrientationTracker : MonoBehaviour, IResolutionDependency
{
    // Called by Unity
    private void OnEnable()
    {
        // Check the resolution when the object becomes active
        LogOrientation();
    }

    // Implementation of IResolutionDependency
    public void OnResolutionChanged()
    {
        // Check the resolution after it changed
        LogOrientation();
    }

    // Logs the orientation of the current resolution (Portrait / Landscape)
    private void LogOrientation()
    {
        Vector2 resolution = ResolutionMonitor.CurrentResolution;
        if (resolution.x < resolution.y)
        {
            Debug.Log("Portrait");
        }
        else
        {
            Debug.Log("Landscape");
        }
    }
}
```

Materials

10 Materials Scriptable Object

For Better Images, there are some pre-defined materials which can be selected from a drop down (see there).

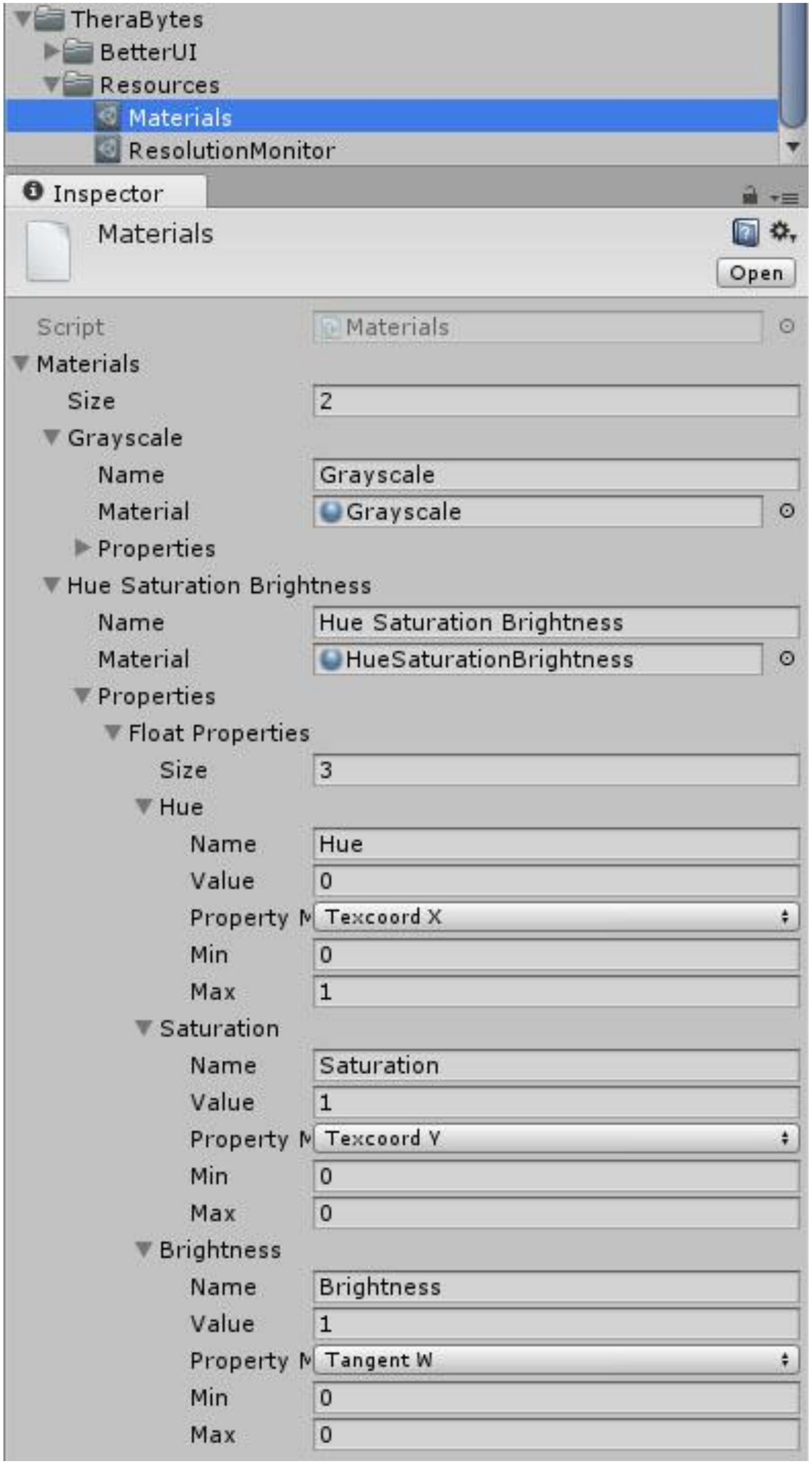
The Materials listed in that dropdown are defined in the Scriptable Object “Materials” at “TheraBytes -> Resources” (if not present click “Window -> Thera Bytes -> Force ScriptableObjectSingleton Initialization”).

10.1 Basics

It is reserved for materials without any properties and for materials which use the float2 TEXCOORD1 and the w-value of the float4 TANGENT semantics.

By using these Vertex-variables for the properties of your shader, it is possible to share one material but having different properties on each Image. This allows not only a faster workflow, it also increases performance if you have many Images using one Material (instead of using cloned materials).

The Materials List is not for materials with normal properties.



```
▼ TheraBytes
  ▶ BetterUI
  ▼ Resources
      Materials
      ResolutionMonitor
Inspector
Materials                                Open
Script                     Materials
▼ Materials
    Size                   2
  ▼ Grayscale
      Name                 Grayscale
      Material             Grayscale
    ▶ Properties
  ▼ Hue Saturation Brightness
      Name                 Hue Saturation Brightness
      Material             HueSaturationBrightness
    ▼ Properties
      ▼ Float Properties
          Size             3
        ▼ Hue
            Name           Hue
            Value          0
            Property M     Texcoord X
            Min            0
            Max            1
        ▼ Saturation
            Name           Saturation
            Value          1
            Property M     Texcoord Y
            Min            0
            Max            0
        ▼ Brightness
            Name           Brightness
            Value          1
            Property M     Tangent W
            Min            0
            Max            0
```

10.2 ADD YOUR OWN MATERIAL

You can add your own shaders to the Materials list to easily access it from any better image. Here is how to do it:

1. Increase the **Size** of Materials by one.
2. Expand the last material definition
3. Give it a Name in the **Name** filed (This name will be displayed in the Image's dropdown)
4. Drag and Drop your Material in the **Material** field
5. Expand **Properties** and **Float Properties**
6. Insert the number of smart Properties in the **Size** field (maximum: 3)
7. For each Property Field do the following:
   a. Enter the Name of the Property in the **Name** field (Label for the Property in the Image Inspector)
   b. Enter the default value in the **Value** field
   c. Select the Vertex variable where this property maps to in the **Property Map** dropdown
   d. If you want to display a slider in the Image Inspector for the property, you can define the **Min** and **Max** values in the respective fields. If Max is smaller or equal Min, any number can be chosen without a slider.

10.3 ANIMATING PROPERTIES

To Animate a property there are three variables available inside Better Image: materialProperty1, materialProperty2 and materialProperty3 connected to the first, second and third defined Property of your material.

These properties are mapped to the properties of the respective material. You don't have to care about them too much because the properties can be modified in the inspector while animating where their property name is displayed.

Editor Windows

11 Snap Anchors Window

The Snap Anchors Window can be opened from the menu bar of Unity under "Window > Thera Bytes > Snap Anchors".

11.1 Background

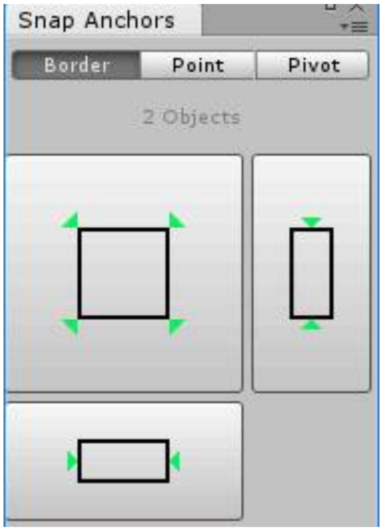
To really work resolution independently you should never use constant pixel sizes anywhere. Instead all measurements should be done with "percentages of the screen". To achieve this you should use Anchors instead of position and size values in pixels. Anchors describe the top, left, bottom and right anchor of an object in relative coordinates (relative to it's parent). uGUI comes with an anchoring system which allows exactly this. However, the predefined Anchoring settings often doesn't fit the requirements, so you must setup the anchors by hand which can be really annoying. The Snap Anchors window allows you to adjust the anchors in the most used way by just clicking a button.

11.2 Workflow

Add an UI element to a canvas in while working with the optimized resolution. Move and resize the object as you want (but avoid it to scale or rotate it). When you are ready click the big button of the Snap Anchors Window which will change the anchors of the object but keeps its position and size.

Change the resolution to see how the objects position and size is affected.

You can also select several Objects and apply the anchoring to all of them. Note that only anchors of selected objects will be adjusted. Their children keep their previous anchoring as long as they are not selected as well.



It is also possible to snap only the horizontal Anchors (button on bottom) or the vertical anchors (button on left) and keep the other axis as it were before.

Keep in mind that the anchors are always relative to their parents. If the parent doesn't change its size, the anchors will be irrelevant. So, make sure that the parents are anchored correctly as well.

For some objects anchoring doesn't work as expected. This is the case for objects where the anchors are changed inside the code. Such an object is the Handle of a Slider for example.

11.3 Modes

There are three modes how to snap the anchors which can be selected at the top of the window (Border, Point, Pivot).

The Border mode is the most important and probably used more than 90% in comparison to the others.

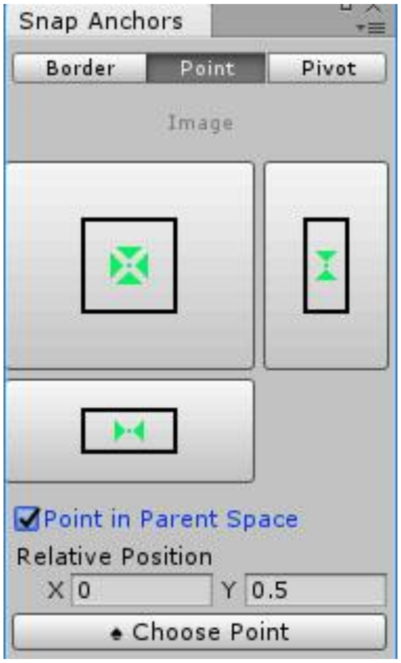
11.3.1 Border

In Border mode, the Anchors are snapped to the bounding of an object. This eliminates any pixel-distances and converts them to percentages relative to the parent. If the parent changes its size (e.g. due to a different resolution), the anchored object will change its position and size relative to that change.

11.3.2 Point

The Point mode adds some extra options to the window. It sets the anchors to a relative point of the selected object or its parent (if "Point in Parent Space" is selected). The "Choose Point" Button opens a popup where one of the most used options can be selected.

This option doesn't eliminate pixel distances. It is most likely used to only set the horizontal or vertical anchors and set the other axis in Border mode.



☑ Point in Parent Space

Relative Position

X 0 Y 0.5

11.3.3 Pivot

The Pivot mode sets the Anchors to the current position of the pivot point of the selected object.

This option doesn't eliminate pixel distances. It is most likely used to only set the horizontal or vertical anchors and set the other axis in Border mode.

12 Align and Distribute Window

The Align and Distribute Window can be opened from the menu bar of Unity under "Window > Thera Bytes > Align and Distribute".

12.1 Background

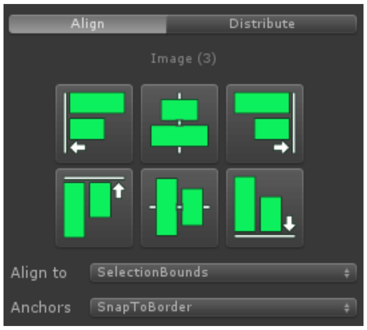
In UI development, it is often required to align certain elements to let controls appear in place. This can be achieved by either dragging each control to the side of some other RectTransform to snap it there or by manipulating the coordinates by hand.

Also, certain controls often kind of belong together and should be placed next to each other with the same distance in between. This can be achieved with layout groups or by manipulating the coordinates by hand.

With the Align and Distribute Window, these tasks become a lot easier. You just select the UI elements you want to align or distribute and click a button.

The tool allows it to align or distribute your selection if they share the same parent.

12.2 Align



Align to SelectionBounds

Anchors SnapToBorder

12.2.1 Align Buttons

At the top of the window there are six buttons.

The upper three are for aligning horizontally. From left to right:

- Align to the left
- Align to the horizontal center
- Align to the right

The lower three are for aligning vertically. From left to right:

- Align to the top
- Align to the vertical middle
- Align to the bottom

When clicking one of these buttons every object of the selection is aligned to a base line with its respective side (or center).

12.2.2 Align To

The Align to option allows you to specify the base line at which all the selected objects are aligned to. It describes a rectangle. The base line is along the respective side (or horizontal / vertical center) of that rectangle

Selection Bounds: A rectangle where all selected objects just fit in is used.

Parent: The parent of all selected objects is used.

First In Hierarchy: The selected object which is placed highest in the hierarchy is used.

Last In Hierarchy: The selected object which is placed lowest in the hierarchy is used.

Biggest Object: The selected object with the largest size in the aligned direction is used.

Smallest Object: The selected object with the smallest size in the aligned direction is used.

12.2.3 Anchors

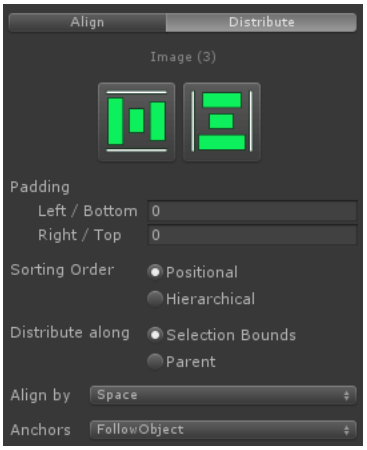
The anchors option allows you to specify how the min-/max anchors of the selected objects are adjusted when the position of the object updates. The Anchors mode is shared between Align and Distribute.

Snap To Border: Just snaps the all anchors to the border in all directions to the object. It is as if you would press the main snap button in the Border tab of the Snap Anchors window.

Follow Object: The anchors move with the object. The object should behave similar as before when changing the parent size / screen resolution.

Stay At Current Position: The anchors are not moved and stay where they have been before moving the object.

12.3 Distribute



Padding
Left / Bottom 0
Right / Top 0
Sorting Order ● Positional ○ Hierarchical
Distribute along ● Selection Bounds ○ Parent
Align by Space
Anchors FollowObject

12.3.1 Distribute Buttons

The two buttons on top allow you to distribute your selected objects horizontally (left button) or vertically (right button). Distribute means that your objects are positioned next to each other within a certain region while having the same distances in between them.

12.3.2 Padding

The region in which the selected objects are distributed in can be modified with the padding. Positive values shrink the region while negative values expand it.

Left / Bottom: The number of pixels from the left (horizontal distribution) or bottom (vertical distribution) of the region.

Right / Top: The number of pixels from the right (horizontal distribution) or top (vertical distribution) of the region.

12.3.3 Sorting Order

The sorting order specifies which of the selected objects are placed where.

Positional: The current position is used to determine where the object is placed. This option is ideal for visual people. Arrange the objects first by dragging around then select all objects and press the distribute button to have correct distances.

Hierarchical: The hierarchical order is used to determine where the object is placed. This option is for structured people. The hierarchy mirrors the positions in the scene. If you want to re-arrange the order, just change the hierarchical order, select all objects and press the distribute button to update the positions.

12.3.4 Distribute Along

This option defines what is used as region in which the objects are distributed.

Selection Bounds: A rectangle where all selected objects just fit in is used.

Parent: The parent of all selected objects is used.

12.3.5 Align By

The distance between objects can be measured in different ways. This option allows to choose the way you need for distributing the selected objects.

If your objects all have the same size and pivot this option doesn’t change anything.

Space: The distance between the objects is used. For horizontal distribution, it is the distance between the right side of an object to the left side of the next object.

Pivot: The distance between the pivots of each object is used.

Left Bottom: The distance between the left sides (horizontal distribution) or bottom sides (vertical distribution) of each object is used.

Center: The distance between the center positions of each object is used.

Right Top: The distance between the right sides (horizontal distribution) or top sides (vertical distribution) of each object is used.

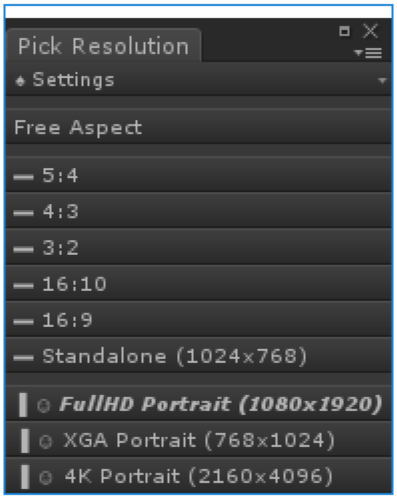
12.3.6 Anchors

Defines how the anchors are moving with the object (See Align Anchors).

13 Pick Resolution Window

The Pick Resolution Window is a shortcut to change resolutions with one click. When working with different resolutions it can be very annoying to use the resolution drop down of the game view all the time. It is a lot faster to just click a button which is not hidden inside a drop down.

The Pick Resolution Window can be opened from the menu bar of Unity under "Window > Thera Bytes > Pick Resolution".



In that window, you can find all the resolutions and aspect ratios which can be selected. They are the same as in the drop down of the game view.

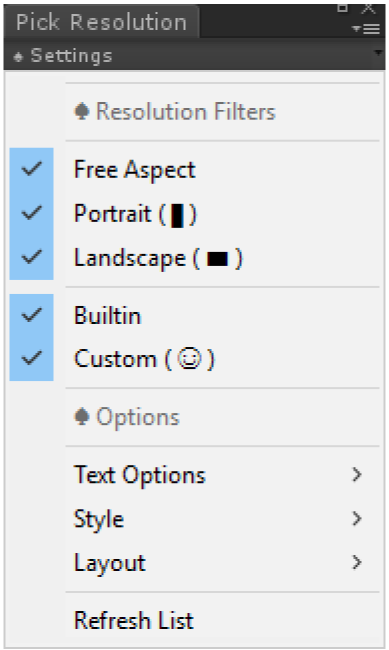
With default settings, there is a horizontal or vertical bar at the beginning of each entry name indicating if the entry is for landscape or portrait mode. Entries which are defined by the user have also a smiley indicator before the name 🙂.

If a resolution matches the optimized resolution specified in the Resolution Monitor object, it is displayed in italics.

The currently active resolution of the main game view is displayed in bold.

13.1 Settings

the very first control of the Pick Resolution Window is a drop down to change some settings. These settings are saved and loaded between the sessions.



13.1.1 Resolution Filters

With the Resolution Filters you can hide Entries from the list. This can be handy if you only work in one orientation or want to use only your own resolution entries.

The Filter options are:

- **Free Aspect**: Should the "Free Aspect" button be visible or not?
- **Portrait**: Should Portrait resolutions be in the list?
- **Landscape**: Should Landscape resolutions be in the list?
- **Builtin**: Do you want to have the predefined entries in your list?
- **Custom**: Do you want your own created entries in your list?

The filter options can be checked and unchecked to show or hide the respective entry.

Note that all filter conditions must be fulfilled to show an entry. An exception is the "Free Aspect" entry. It is not considered as builtin nor as custom.

13.1.2 Options

There are some options which allows to modify the look and layout of the window.

13.1.2.1 Text Options

Text Options define what you see on the buttons. The upper three options are for the actual text:

- **Name** and Size: Displays the Label of the entry as well as the resolution or aspect ratio (e.g. "My Favorite Resolution (320x240)"
- **Name**: Displays only the Label of the entry – if the label has no text, the resolution / aspect ratio is displayed instead (e.g. "My Favorite Resolution")
- **Size**: Displays the resolution / aspect ratio without the label (e.g. "320x240" or "4:3")

The option "**Orientation Hint**" shows or hides horizontal or vertical bars in front of each entry to indicate if an entry is in landscape or portrait mode.

The option "**Mark Custom**" shows or hides a smiley in front of custom entries to indicate that the user created it.

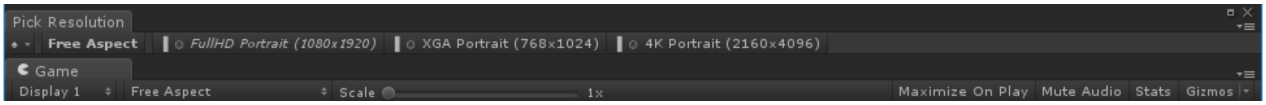
13.1.2.2 Style

You can use **Small** or **Big** style. Big style may not look as good as the small style but the buttons are easier to click and separated more clearly from each other.

13.1.2.3 Layout

The Buttons can be ordered next to each other (**Horizontal**) or below each other (**Vertical**).

The horizontal layout can be placed nicely above or below the game view. This way it doesn't need much space and is close to the area it affects.



13.1.2.4 Refresh

If you added, deleted or edited a resolution it is not immediately put into the Pick resolution window. To have it there just click Refresh.

In very rare cases some entries display the wrong resolution. A click on Refresh should resolve such a problem.