



# DMON-16S

## 1 to 16 Channel (3G/HD/SD)-SDI Multi- viewer with SDI and HDMI outputs



# Contents

1.0 Status Tab .....	6
1.1 Custom Name .....	6
1.2 Firmware Version .....	6
1.3 Input Status .....	6
2.0 Control Tab .....	7
2.1 HDMI Output Type .....	7
2.2 3G-SDI Output Format.....	7
3.0 Multi-view.....	8
3.1 Output Select.....	8
3.2 Multi-Viewer Output Format.....	8
3.3 Multi-Viewer Number of Windows .....	9
3.4 Multi-View Layout .....	10
3.5 Multi-View Audio Source.....	10
3.6 Multi-Viewer Reference .....	10
3.7 Full Screen is scaled .....	10
3.8 On Screen Format Enable .....	10
3.9 On Screen Audio Source ID.....	10
3.9 Apply Tally to .....	10
3.10 Tally Transparency.....	11
4.0 Layouts .....	12
4.1.0 Layout Tab Operational Buttons .....	13
4.1.1 Mode Selection.....	14
4.1.2 Windows Selection .....	14
4.1.3 Layout Selection .....	14
4.1.4 Default Gap size.....	15
4.1.5 Preview display Window .....	15
4.1.6 Show Border and Show Aspect.....	15
4.1.7 Show Input Aspect.....	15
4.1.8 Default SD Output Aspect.....	16
4.2 Layout Aspects tab.....	17
4.3 Layout UMD Tab .....	18
4.4 Layout Status Tab .....	19
4.5 Layout Tallies Tab .....	20
4.6 Layout Meters Tab (Audio Meters) .....	21
5.0 Routing Setup .....	22
6.0 Under Monitor Display (UMD) .....	23
7.0 Audio Meters.....	24

8.0 Graticules.....	26
9.0 Colours.....	28
Table 1.1 Colour table .....	28
Table 1.2 Colour table extended .....	28
10.0 GPI .....	29
11.0 Setup.....	31
11.1 LCD off Time .....	31
11.2 Return to Status time .....	31
11.3 Auto Save.....	31
11.4 Demo Cycle Type .....	32
11.5 Demo Cycle Time (seconds).....	32
12.0 Designing a custom layout .....	33
12.1 Custom Window Positioning .....	34
12.2 Custom UMD Positioning.....	36
Table 1.3 UMD Coordinates calculations.....	36
12.3 Custom Status Positioning .....	37
12.4 Custom Tallies Positioning .....	38
Table 1.4 Tally Box Calculations.....	38
12.5 Custom Audio Meters Positioning .....	39

## **Introduction**

Thank you for purchasing the DMON-16S 16 Channel (3G/HD/SD)-SDI Multi-viewer with HDMI and SDI Outputs.

The DMON-16S is a truly portable converter, which incorporates our new easy to use LCD and button control system. This gives you easy access to all of the amazing features that have been unavailable without a computer until now. The days of having to play with complicated dip switches or having to carry around a computer to change a simple setting are gone.

The DMON-16S features the following:

- Low cost miniature (3G/HD/SD)-SDI 16 to 1 Multi-viewer or 16 to 1 input multiplexer
- Various multi-viewer layouts
- Selectable output format in Multi-viewer mode
- Low latency buffering for each input allowing non-synchronous inputs
- Linked (3G/HD/SD)-SDI and HDMI outputs
- 16 x (3G/HD/SD)-SDI inputs with auto detection (26 Formats supported in total)
- Each quadrant is independent of the others, allowing any 3G/HD/SD format of any frame rate to be displayed simultaneously
- Variable aspect ratios per quadrant
- Pass-Through mode allowing any of the 16 inputs to be selected for output
- In Pass-Through mode the selected input is passed through to both the (3G/HD/SD)-SDI and HDMI outputs
- This unit also includes:
  - 32 GPI
  - USB port for control and firmware updates
  - Heavy duty metal box
  - Metal Thread Locking DC Power Socket
  - Power Supply, HDMI Cable and USB Cable

## **Glossary**

The following terms are used interchangeably throughout this manual.

**GPI: General purpose Interface**

**LB: Letter box aspect ratio**

**PB: Pillar box aspect ratio**

**FL: Stretch image to fill window with image.**

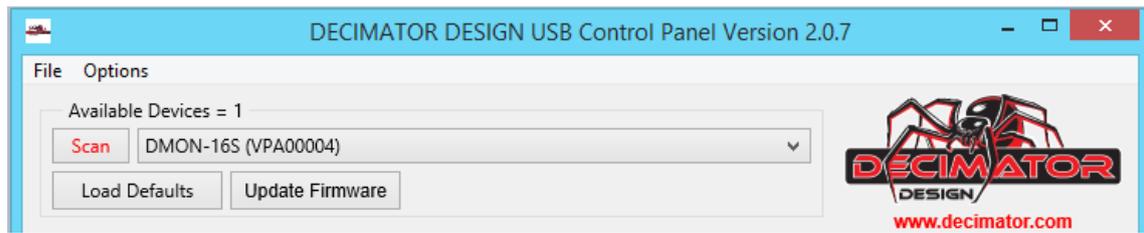
**UMD: Under Monitor Display**

**TSL: Tally Serial Link**

## USB Control Panel

Welcome to the USB control panel manual, this manual is written to help users learn about all the important features available to them when using the USB control panel.

When first using the USB control panel the user is presented with 4 main items, these are:



**Available devices**, this shows the user the number of Decimator Design devices currently plugged in and detected by the computer. These devices can be of varying models and serials.

**Scan**, the Scan button is used whenever a Decimator Design device is connected to the computer. The user must press this button to do a scan of the currently connected decimator design devices.

When a device is detected its model number and serial number are displayed in the drop down box next to this button.

**Load Defaults**, this button allows the user to reset the devices to the default parameters defined in the program's memory.

**Update Firmware**, this button allows the user to update the firmware of the device to the latest firmware stored in the USB control panel. Please note that multiple devices can be updated simultaneously by going to options and selecting update all devices.

### File Menu

The File Menu allows the user to save the settings of the device currently selected in the drop down box it can also program settings from a previous saved settings file.

**Load Settings**, the load settings option allows the user to load a previously saved settings file for the currently selected unit.

**Save Settings**, the save settings option allows the user to save all the current settings of the currently selected unit into a file that can be used later or loaded onto another device.

**Load Layouts**, the load layouts option allows the user to load a previously saved layouts file for the currently selected unit. All 2048 layouts will then be written to the DMON-16S memory.

**Save Layouts**, the save layouts option allows the user to save all the layouts of the currently selected unit to a file that can be used on other DMON-16S or recalled as a backup. When saving the layouts the unit will read all the layouts from the currently selected unit and save them into a layout file.

### Options Menu

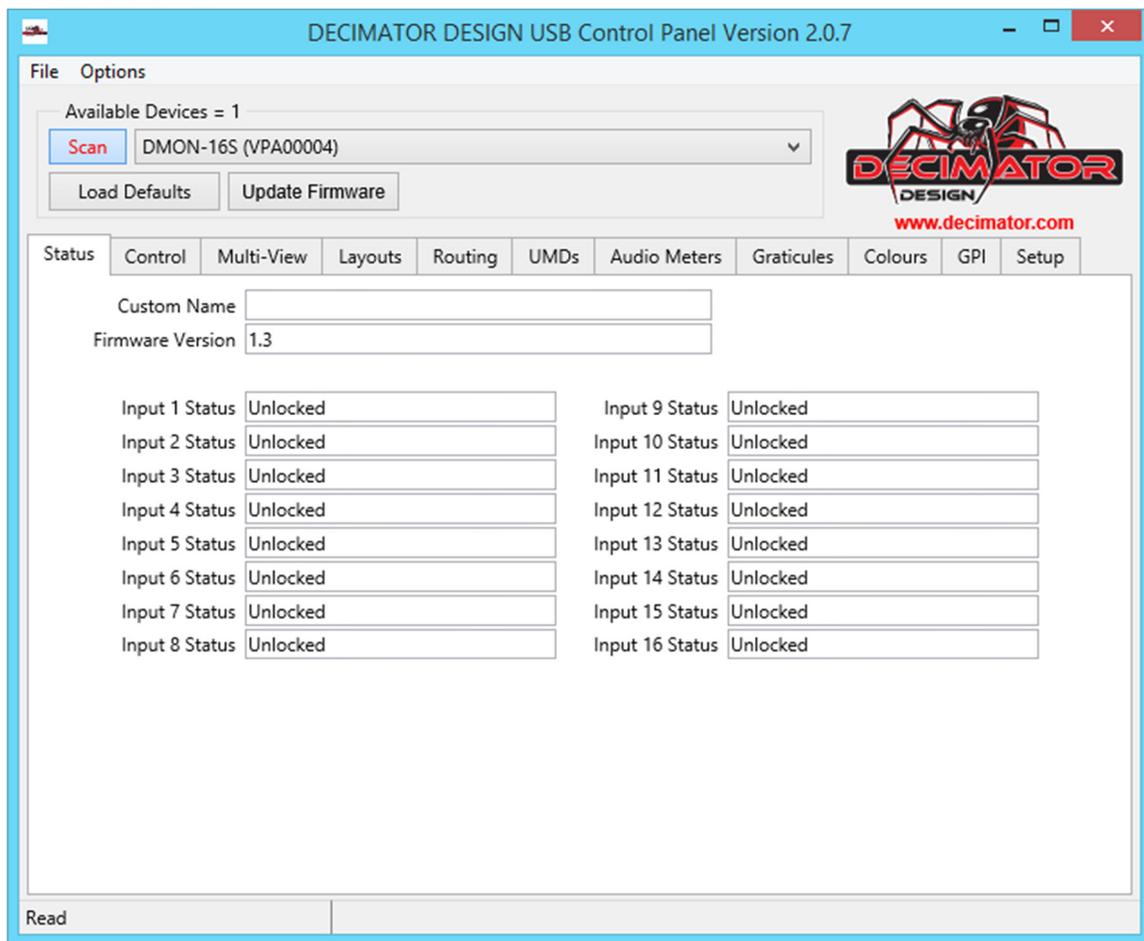
**Update All Devices**, this option allows the user to update all currently detected units to the latest firmware of the USB control panel.

**Reset all devices to Defaults**, this option resets all currently detected devices settings to default.

**Verify after program**, this option checks the firmware after programming to verify it programmed correctly.

Notes:

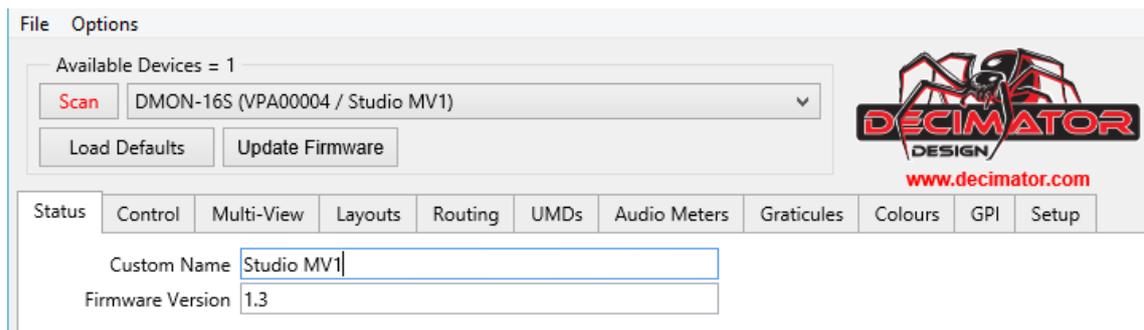
1. Defaults are highlighted in yellow.



The Status tab is the first tab the user sees once a unit is detected by the scan devices button. This tab shows the user the unit's Custom name, Firmware version and the SDI input signals that are detected by the DMON-16S.

### 1.1 Custom Name

This field allows the user to name the Unit with a custom name of their choosing. Once a Name is entered pressing enter will save the name to the DMON-16S and it will appear next to the unit's serial number. Pressing the Scan button after naming the unit will show the custom name.



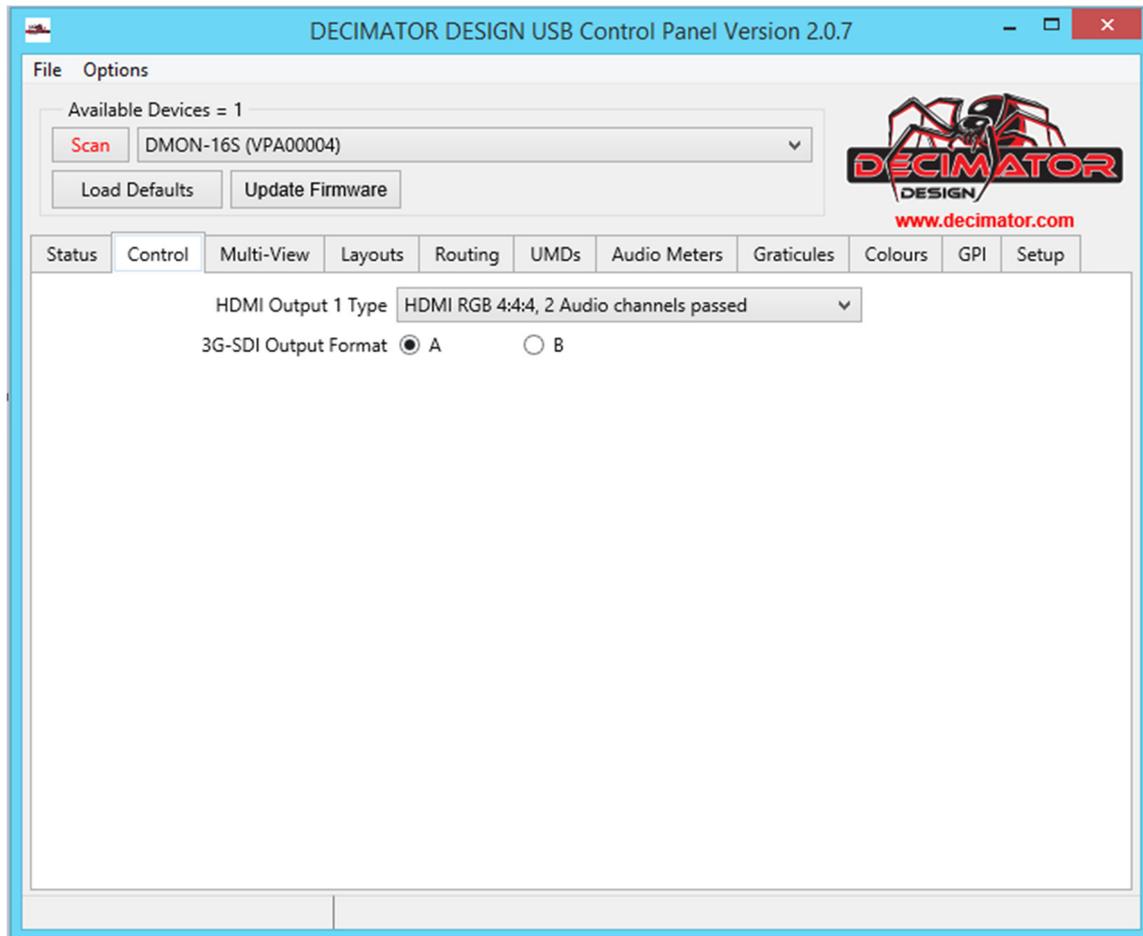
Note: The maximum length of the custom name is 16 characters.

### 1.2 Firmware Version

This is the current version of the devices firmware.

### 1.3 Input Status

The input status shows the signal format detected on each input as long as it is one of the 26 supported formats/frame rates.



2.1 HDMI Output Type

The HDMI Output Type allows the user to change between the 7 supported HDMI output types as listed below.

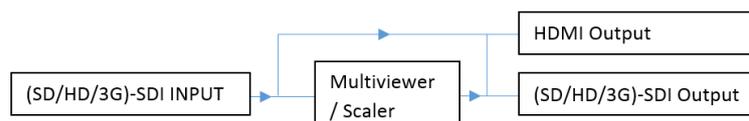
- 1.) DVI RGB444 ← DVI-D RGB 4:4:4
- 2.) **HDMI RGB444 2C** ← **HDMI RGB 4:4:4 with 2-Channels of Audio**
- 3.) HDMI YCbCr444 2C ← HDMI YCbCr 4:4:4 with 2-Channels of Audio
- 4.) HDMI YCbCr422 2C ← HDMI YCbCr 4:2:2 with 2-Channels of Audio
- 5.) HDMI RGB444 8C ← HDMI RGB 4:4:4 with 8-Channels of Audio
- 6.) HDMI YCbCr444 8C ← HDMI YCbCr 4:4:4 with 8-Channels of Audio
- 7.) HDMI YCbCr422 8C ← HDMI YCbCr 4:2:2 with 8-Channels of Audio

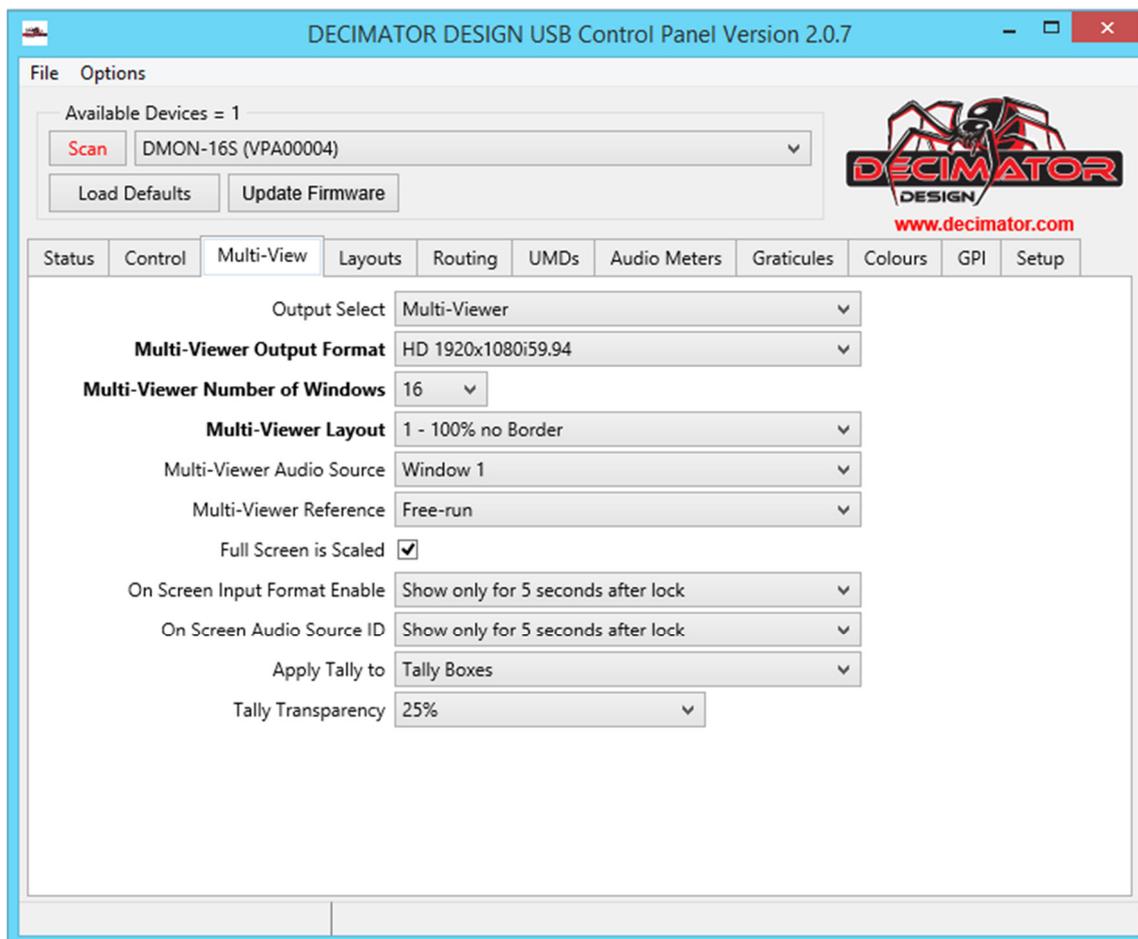
2.2 3G-SDI Output Format

This option controls the 3G output level of the SDI output as some equipment will only work with level A or level B, this however doesn't apply to the HDMI output as that is always level A.

This setting will only work when the DMON-16S is outputting a format that is 3G 1920x1080p50/59/60.

For example if input 4 is 3G 1920x1080p59 level A and the DMON-16S is set to pass input 4 full screen and the Full Screen is Scaled option is turned off, but the level is set to level B via this setting then the output will be 3G 1920x1080p59 level B on the SDI output and level A via the HDMI output.





3.1 Output Select

The output select allows you to choose whether the DMON-16S outputs the Multi-Viewer on the SDI and HDMI outputs or whether you want to allow for full screen pass-through of one of the 16 inputs.

1. Multi-viewer	4. Input 3	7. Input 6	10. Input 9	13. Input 12	16. Input 15
2. Input 1	5. Input 4	8. Input 7	11. Input 10	14. Input 13	17. Input 16
3. Input 2	6. Input 5	9. Input 8	12. Input 11	15. Input 14	

3.2 Multi-Viewer Output Format

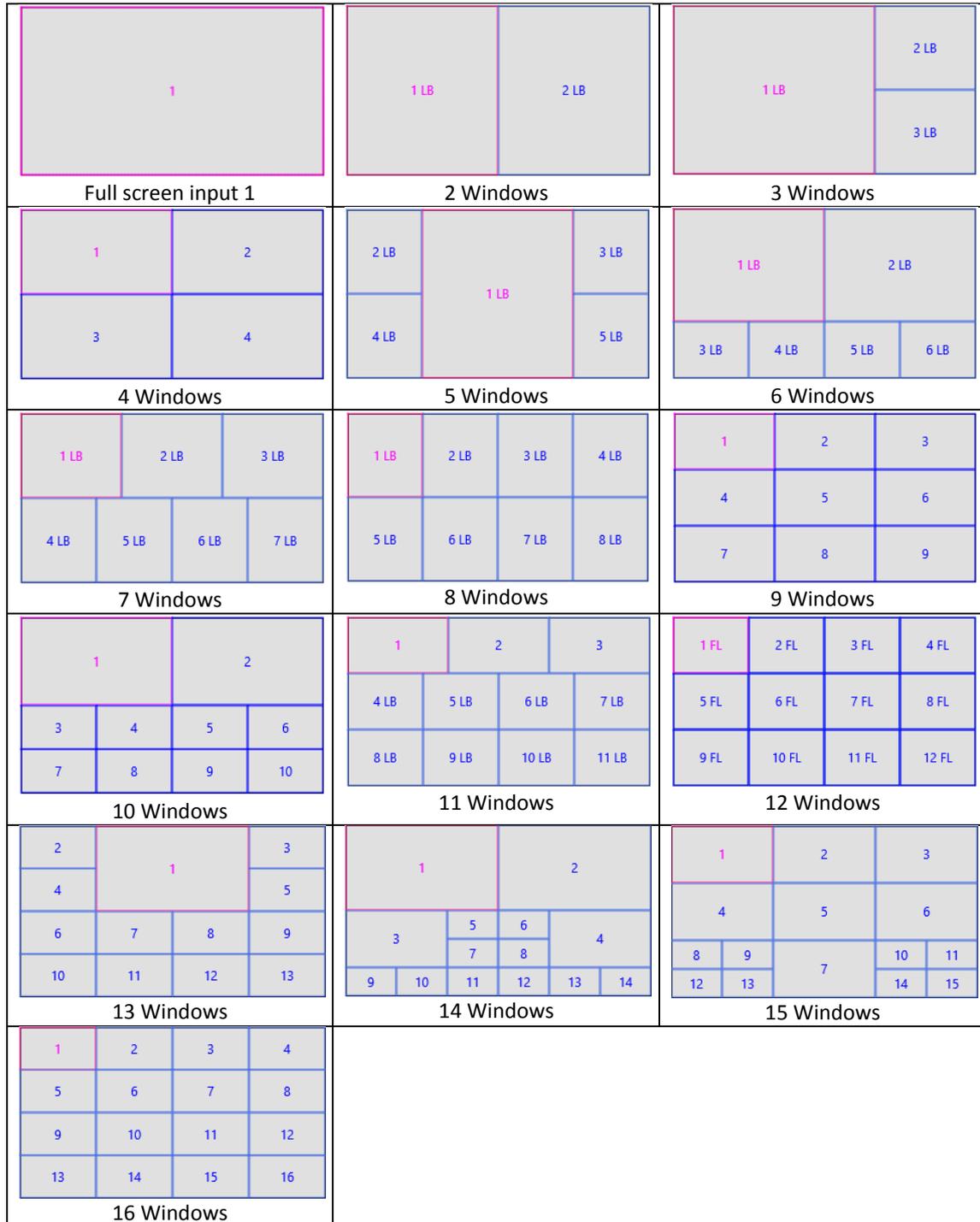
The Multi-Viewer output format drop down box allows you to select any of the following 26 supported formats frame rates as the output type for the HDMI and SDI outputs.

Note: HDMI and SDI outputs are not independent and will be the same output on each.

1. SD 720x487i59.94	11. HD 1920x1080p30	21. HD 1280x720p25
2. SD 720x576i50	12. HD 1920x1080p29.97	22. HD 1280x720p24
3. HD 1920x1080i60	13. HD 1920x1080p25	23. HD 1280x720p23.98
4. HD 1920x1080i59.94	14. HD 1920x1080p24	24. 3G 1920x1080p60
5. HD 1920x1080i50	15. HD 1920x1080p23.98	25. 3G 1920x1080p59.94
6. HD 1920x1080psf30	16. HD 1280x720p60	26. 3G 1920x1080p50
7. HD 1920x1080psf29.97	17. HD 1280x720p59.94	
8. HD 1920x1080psf25	18. HD 1280x720p50	
9. HD 1920x1080psf24	19. HD 1280x720p30	
10. HD 1920x1080psf23.98	20. HD 1280x720p29.97	

### 3.3 Multi-Viewer Number of Windows

This setting allows the user to display anywhere from 1 to 16 inputs on the Multi-Viewer layout. The diagram below shows default layout 1 for each of the 16 window selections via this setting.



Please note abbreviations FL stand for fill, PB for pillar-box and LB for Letterbox aspects

### 3.4 Multi-View Layout

This setting allows the user to choose the layout to be displayed on the Multi-Viewer output. The number of available layouts per output resolution is 32, these can all be modified via the Layouts tab.

The layouts for each resolution (mode)/Windows are predefined with the first 8 being set up with varying border and gap sizes and layouts 31 and 32 are left to right and top to bottom respectively. The remaining layouts are the same as layout 1 in parameters.

### 3.5 Multi-View Audio Source

When the DMON-16S Output is set to Multi-Viewer, audio from inputs 1 to 16 can be passed to the output Multi-Viewer.

Only audio from any one of the input sources can be passed at any time.

### 3.6 Multi-Viewer Reference

**Free-Run:** When free-run is selected the DMON-16S will output a signal via the HDMI and SDI independent of whether any inputs are connected to the device.

**Window 1:** When window 1 is selected the DMON-16S will only output a signal via the HDMI and SDI when a signal is connected to input 1.

### 3.7 Full Screen is scaled

This feature is used when the DMON-16S Output select is set to one of the inputs. When selected, inputs 1 to 16 will be converted to the output format selected allowing for fast switching between inputs and displaying them full screen.

### 3.8 On Screen Format Enable

When an input is detected the DMON-16S will display the format detected in the top left of each window by default unless the location has been modified. The options applicable to this setting are:

- 1.) Show for 5 sec
- 2.) Show Always
- 3.) Off

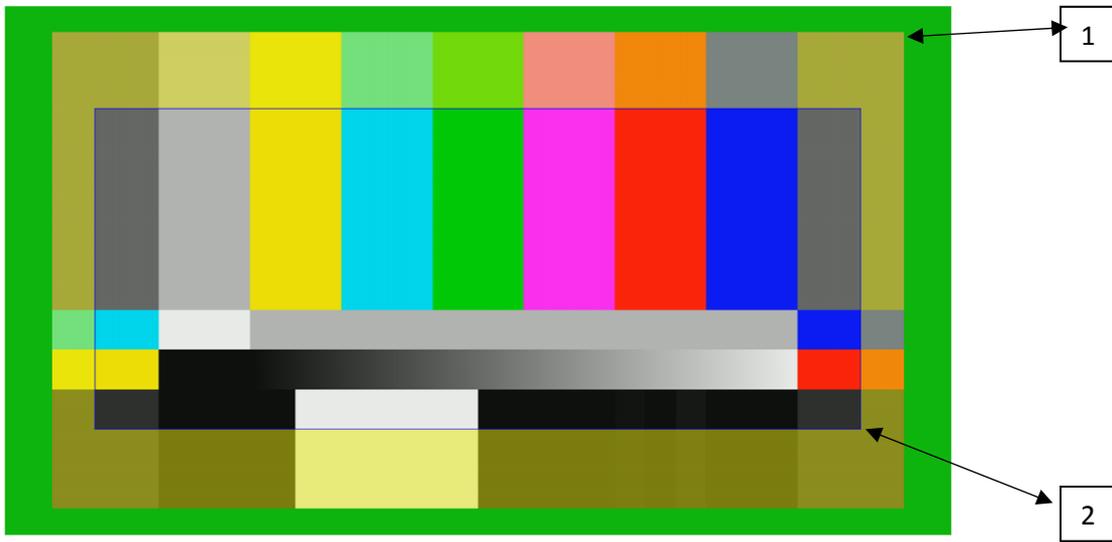
### 3.9 On Screen Audio Source ID

The Audio Source Identification icon will appear when selecting which window the audio will be passed to the output when in multi-viewer mode. This option toggles whether the icon is shown to indicate the window source the audio is coming from. This icon appears in front of the Format Status. The options applicable to this setting are:

- 1.) Show for 5 sec
- 2.) Show Always
- 3.) Off

### 3.9 Apply Tally to

The Apply tally to parameter allows the selection of the 3 different types of tally indicators. When a tally is triggered it can be displayed as a small box on the bottom left (default position) of the inputs window or as border around the window. The Tally can also fill the outside of the safe action box.



**Point 1** indicates the area that is covered when the tally trigger is set to border. This size was created by setting the border using the Multiview layout tool, generally the border will not appear unless one is created or if the image is shown as pillar/letter box and in that case the unfilled area will be filled by the tally.

**Point 2** indicates the area that can be filled when the tally is set to outside safe action. In this picture the yellow transparency area would also be green if the tally option was set to outside safe action.

### 3.10 Tally Transparency

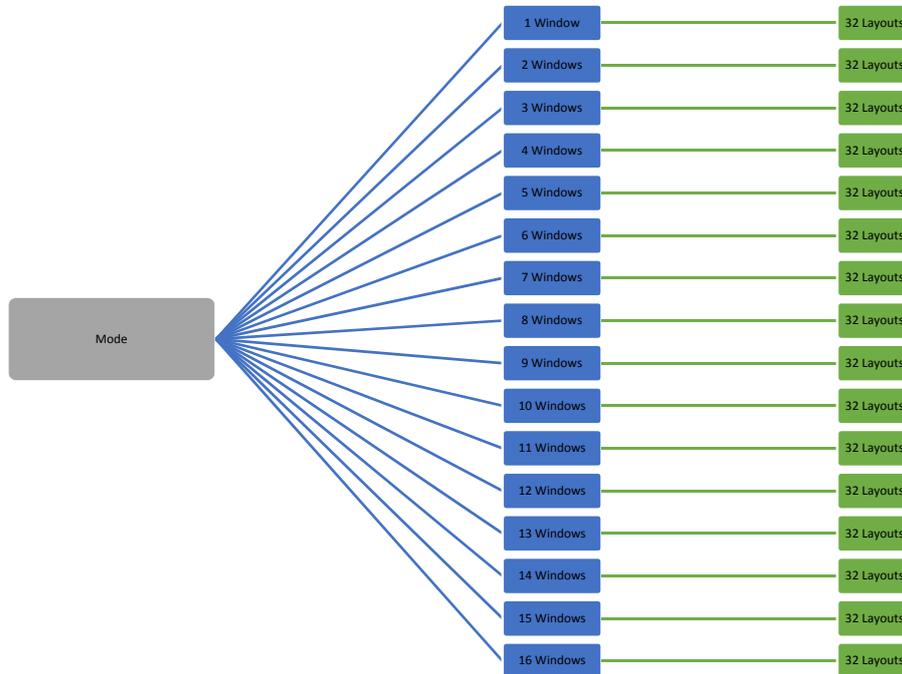
The Tally transparency feature changes the transparency of the tally box / border / Outside safe Action.

- 1.) 0%
- 2.) 25%
- 3.) 50%

## 4.0 Layouts

The Layouts tab is used for designing custom layouts for the various multi-viewer setups the user needs.

When creating a new layout the user must select the desired output resolution the multi-viewer will be displaying as well as the number of windows to be displayed on the screen. When these are chosen the user then selects the layout number to modify and begin creating their own unique setup. Note that all layouts are unique to the window number and output resolution, for example when in 1920 x 1080 mode there are 32 layouts for each window number. This means the DMON-16S has a total of 2048 unique layouts



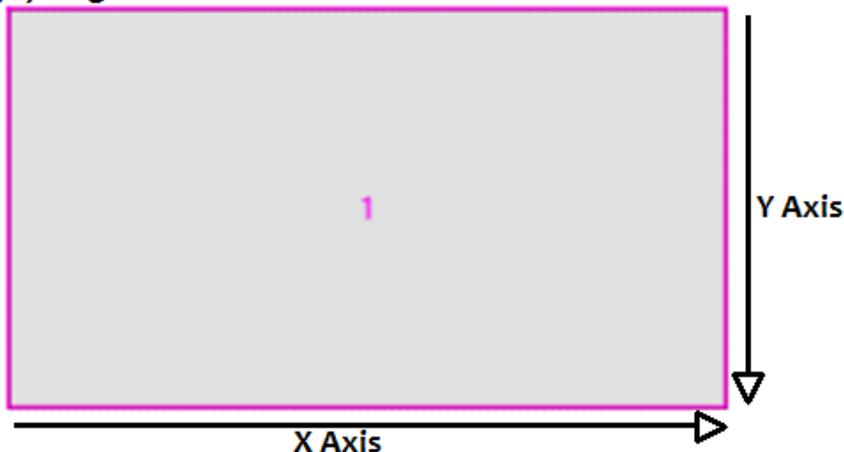
In the Windows tab there are 6 columns shown for each window that is being displayed on the multi-viewer. These are X, Y, Width, Height, Border X and Border Y.

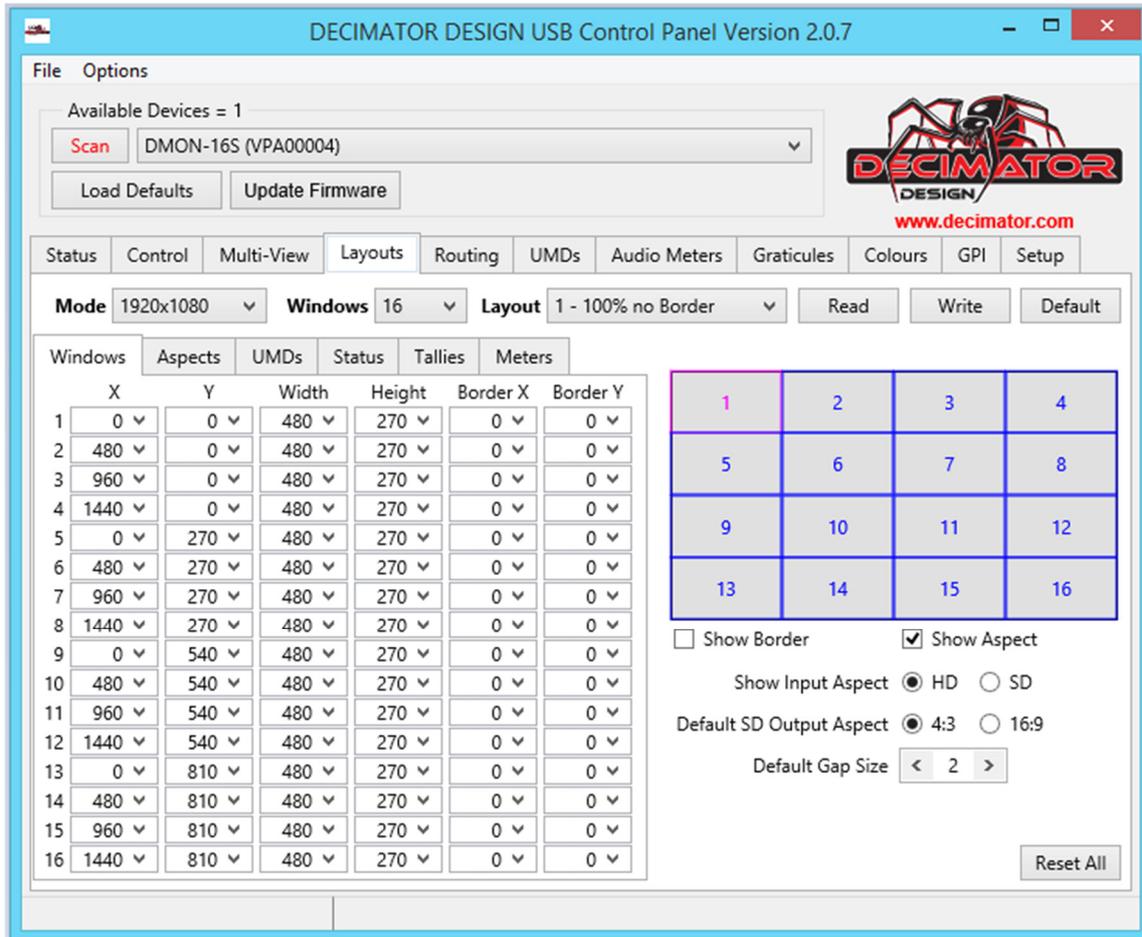
The X and Y columns are the starting point of the top left corner of each window and by using the slide bar or entering a number the window can be moved to the desired location on the multi-viewer.

The Width and Height Columns allow the user to change the size of each of the windows from the starting point of the window, increasing or decreasing from the top left corner.

The border X and border y columns allow the user to set an internal border of where the image will be placed. The border area will then be used when triggering tallies and will fill the border area from the outside of the image to the border of its window when the tally is triggered.

**(0,0) Origin**





**Read**, this button will read from the DMON-16S memory the parameters for the current layout selected and load these settings onto the current layout. This button is useful when altering a layout or the user wishes to undo the changes they made as long as the changes have not been written back to the device.

**Write**, this button will write the current layouts parameters into the DMON-16S memory. The write function is disabled if any of the windows from 2 to 16 overlap each other. **This is also indicated by a red border around the windows causing overlapping conflicts.**

**Default**, this button will change the current layout to the default parameters for that layout number. This does not change the parameters saved to the DMON-16S. This only affects the appearance in the USB control panel. To revert the layout to its default look the write button must be pressed after the default button.

**Reset All**, This button will load the default values for all layouts and write them to the DMON-16S memory, resetting any modified layouts.

Notes:

- Window 1 can be set to fill the entire screen, but all other windows will overlap it. This is best used for Picture in picture layouts.

#### 4.1.1 Mode Selection

The Mode box in the DMON-16S layouts tab allows the selection of one of the 4 format sizes that the multi-view can be presented on, these are:

##### **1920 x 1080 pixels**

Applies to 3G 1920x1080p60/59.94/50

Applies to HD 1920x1080i60/59.94/50

Applies to HD 1920x1080psf30/29.97/25/24/23.98

Applies to HD 1920x1080p30/29/97/25/24/23.98

##### **1280 x 720 pixels**

Applies to HD 1280x720p60/59.94/50/30/29.97/25/24/23.98

##### **720 x 480 pixels**

Applies to SD 720x480i59.94

##### **720 x 576 pixels**

Applies to SD 720x576i50

These modes apply when the output of the DMON-16S is set to a format that matches the mode via the control tab.

#### 4.1.2 Windows Selection

The Windows Selection box controls how many of the inputs you wish to be displayed in the multi-view layout ranging from one input displayed all the way to 16 inputs displayed.

Note: When designing a layout the multi-viewer number of windows display box in the control tab must match the number in the windows selection box in order to view this layout on the DMON-16S outputs.

#### 4.1.3 Layout Selection

The layout Selection box allows the user to select 1 to 32 layouts, the first 8 layouts and layout 31 and 32 are already predefined by default. These are as follows:

- Layout 1: 100% no border
- Layout 2: 100% with border
- Layout 3: 90% no border
- Layout 4: 90% with border
- Layout 5: 100% no border + Gap
- Layout 6: 100% with border + Gap
- Layout 7: 90% no border + Gap
- Layout 8: 90% with border + Gap
- Layout 31: Top to Bottom  
In this Layout the inputs are displayed vertically on top of each other and set each input is set to fill the entire box.
- Layout 32: Left to Right  
In this Layout the inputs are displayed horizontally from left to right other and set each input is set to fill the entire box.

Note: Layouts 9 to 30 are the same layout settings as layout 1, but labelled as “custom”.

#### 4.1.4 Default Gap size

This option allows the user to set a gap between each window, the measurement for gap size is in pixels and the default is set to 2 pixels.

#### 4.1.5 Preview display Window

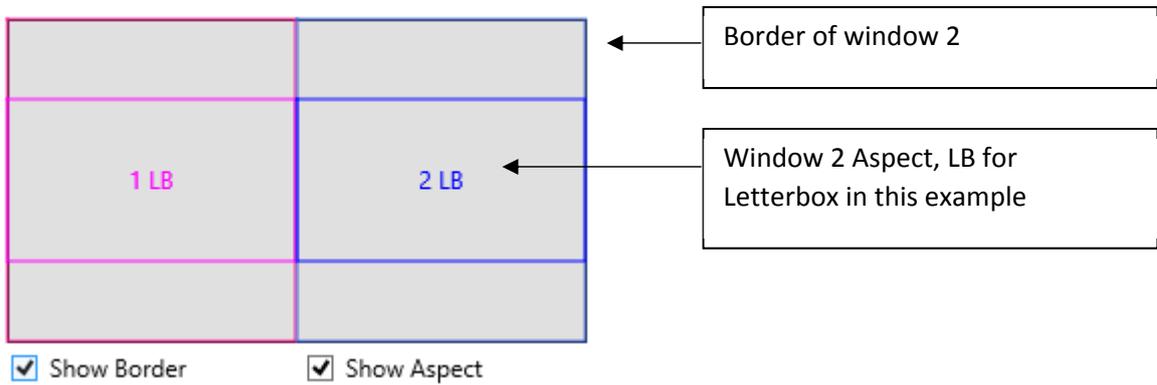
On the right of the tab is a small window that shows a preview of the current layout of the multi-viewer that the user is creating. This display updates with each change.

Each window on the preview is labelled 1 to 16 (depending on window selection box) and will show FL, PB or LB next to the number indicating what the aspect display is set to. FL will fill the window with the input image, PB will show the image as a pillar-box inside the windows and LB will show the image as letterbox inside the window.

#### 4.1.6 Show Border and Show Aspect

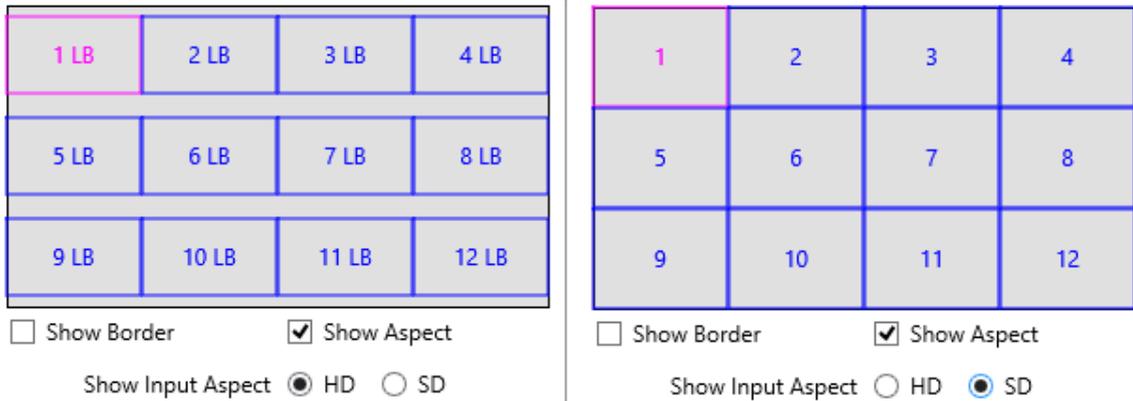
When the show border checkbox is selected the preview window will show the border of each window.

When the show Aspect checkbox is selected the preview window will display a box that indicates what the image will look like according to the aspect setting set for that window. The Aspect setting is found in the Aspects tab.



#### 4.1.7 Show Input Aspect

This option allows the user to see how the inputs will appear on the multi-viewer when the input is either HD or SD.



#### 4.1.8 Default SD Output Aspect

When the Mode is set to a SD Resolution (720 x 480/720 x 576 pixels) the SD Output aspect checkbox allows the user to simulate on the preview window the output of the multi-viewer as 4:3 or 16:9.

1 LB	2 LB	3 LB	4 LB
5 LB	6 LB	7 LB	8 LB
9 LB	10 LB	11 LB	12 LB

4:3 Aspect ratio output

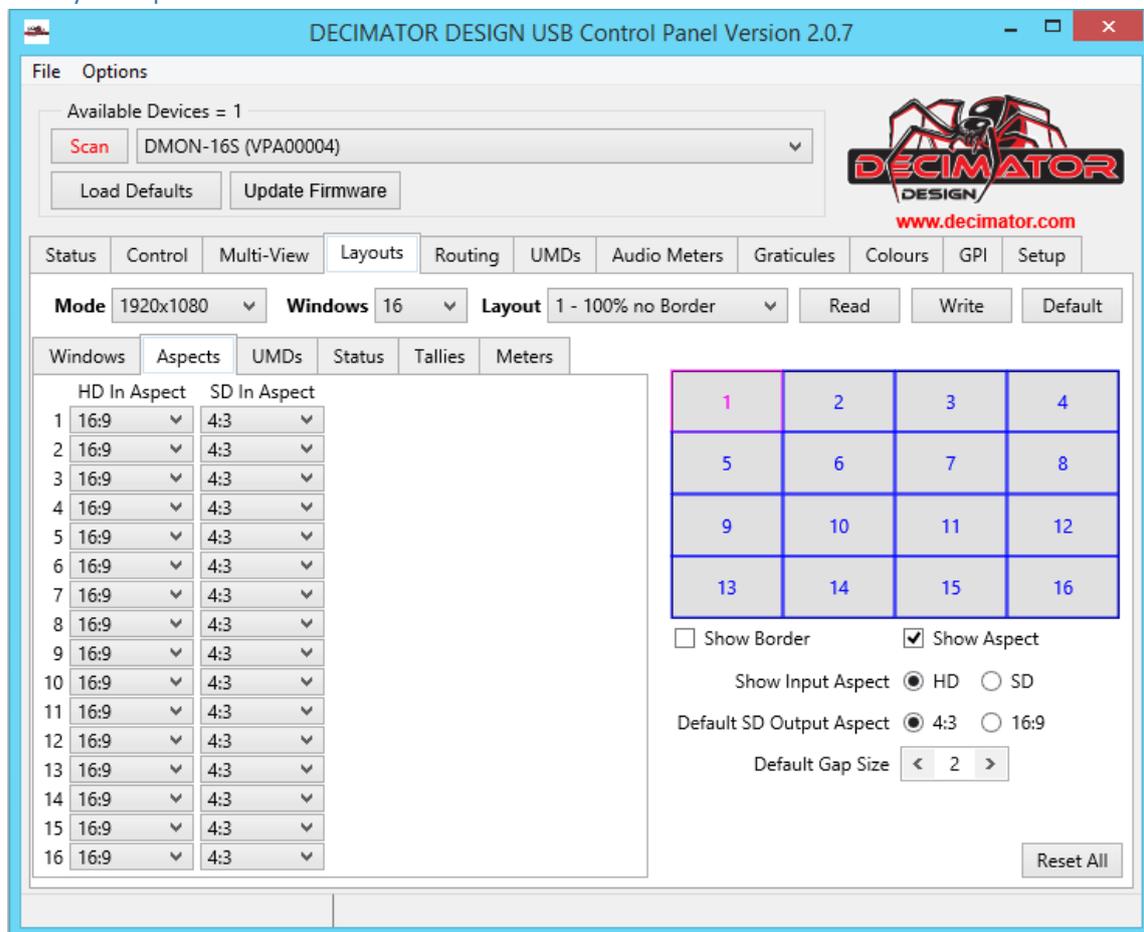
1 LB	2 LB	3 LB	4 LB
5 LB	6 LB	7 LB	8 LB
9 LB	10 LB	11 LB	12 LB

16:9 Aspect ratio output

Note:

Default aspect display for a HD/3G input is 16:9.

Default aspect display for a SD input is 4:3.



The Aspects tab allows the user to set the aspect ratio of any of the inputs and allows the user to set the aspect ratio of the input when the signal is SD or HD.

If the input is a HD signal the available options are:

FL; fill the entire window with the input image.

16:9; the Input image will be displayed as 16:9 in the window.

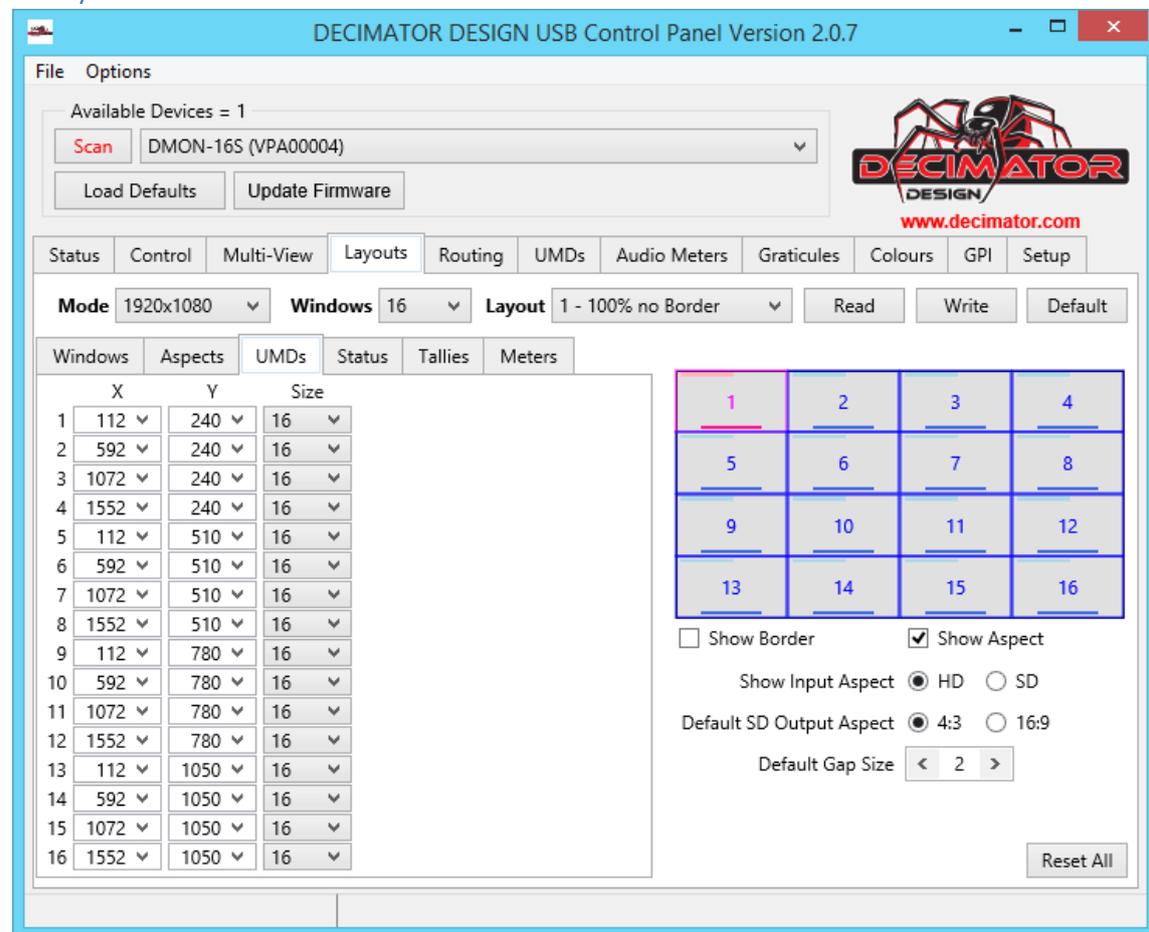
If the input is a SD signal the available options are:

FL; fill the entire window with the input image

16:9; the Input image will be displayed as 16:9 in the window.

4:3; the Input image will be displayed as 4:3 in the window.

### 4.3 Layout UMD Tab



The UMD tab of the Layouts section allows the user to move the location of the UMDs for each window and also change the size of the text displayed.

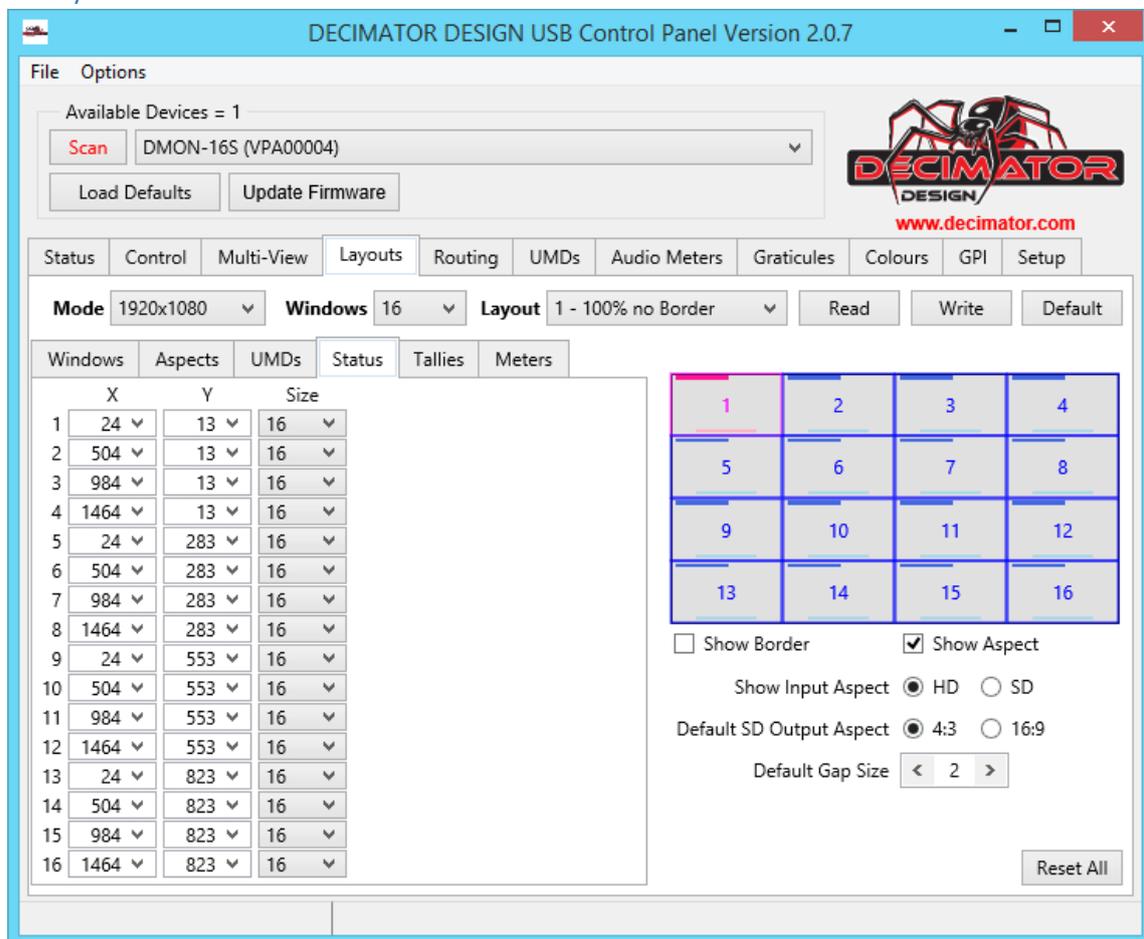
The UMD size can be 8, 16 and 32 measured in pixel height by pixel length. As the UMD box is 16 characters long this means the UMD box is the following sizes when positioning them on the multi-viewer.

Size 8: Height is 8 pixels high by 128 pixels long

Size 16: Height is 16 pixels high by 256 pixels long

Size 32: Height is 32 pixels high by 512 pixels long

#### 4.4 Layout Status Tab



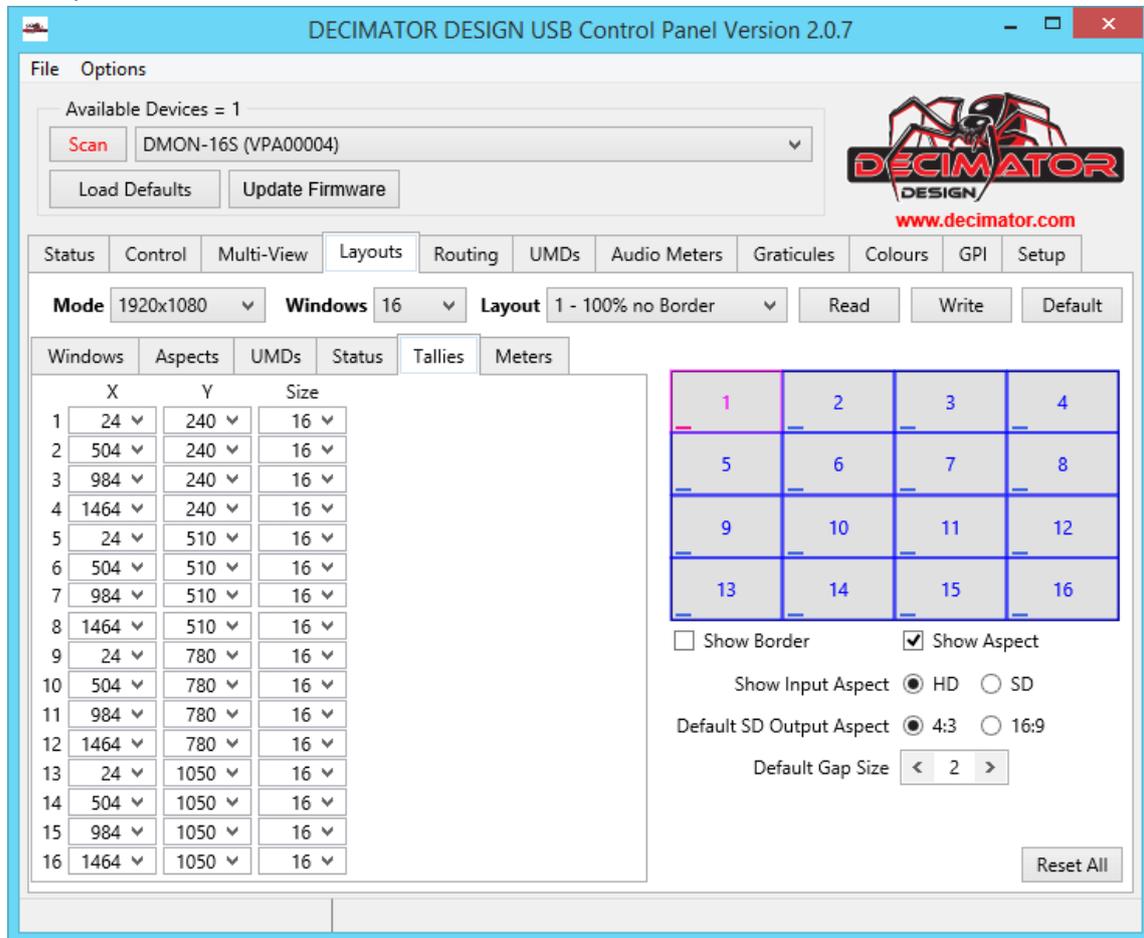
The Status tab of the Layouts section is used to position the status text that appears when an input format is detected. The default location is the top left of a window and it is 13 characters long and so when positioning the format box the user must account for the following box sizes.

Size 8: Height is 8 pixels by 104 pixels long

Size 16: Height is 16 pixels by 208 pixels long

Size 32: Height is 32 pixels by 416 pixels long

## 4.5 Layout Tallies Tab



The Tallies tab of the Layout section is used to position the tally box that appears when the mode is set to tally box and is used when it is triggered from a TSL command or via the DSUB(GPI) connector.

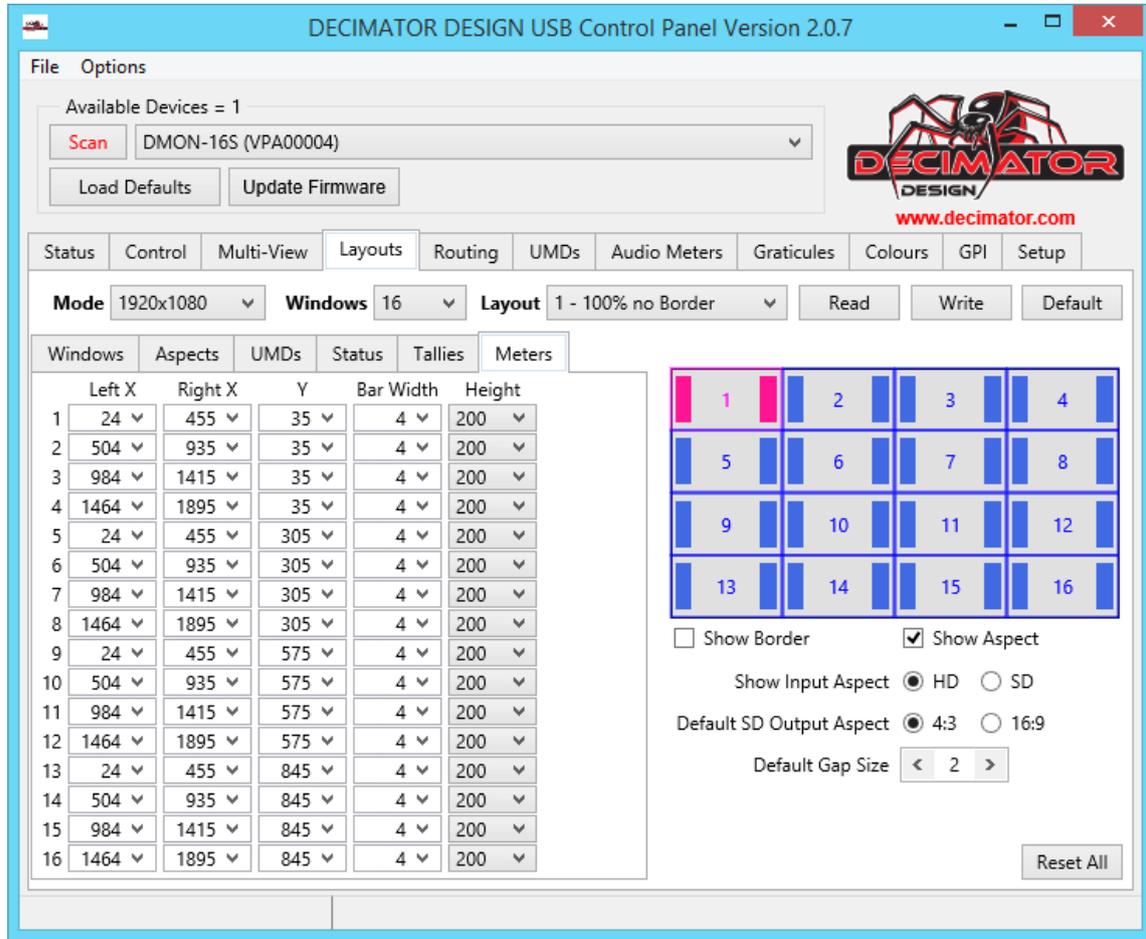
The tally box is shaped as a rectangle box is split up into 4 boxes each of the size chosen by the user next to each other from left to right. If the size of the tally box is 16 then the size of the rectangle is 16 pixels high and 64 pixels long. Each box is a different colour going Green, Red, Blue and Yellow from left to right respectively.

Size 8: Height is 8 pixels by 32 pixels long

Size 16: Height is 16 pixels by 64 pixels long

Size 32: Height is 32 pixels by 128 pixels long

#### 4.6 Layout Meters Tab (Audio Meters)



The Meters tab in the Layouts section is used to position the audio meters for each window anywhere on the multi-viewer.

(DMON-16S) Each window has 8 audio meters which are divided up into 2 sets of 4 channels on each side and will always be linked to the same Y axis so not to separate them.

(DMON-6S/12S/MD-Quad) Each window has 16 audio meters which are divided up into 2 sets of 8 channels on each side and will always be linked to the same Y axis so not to separate them.

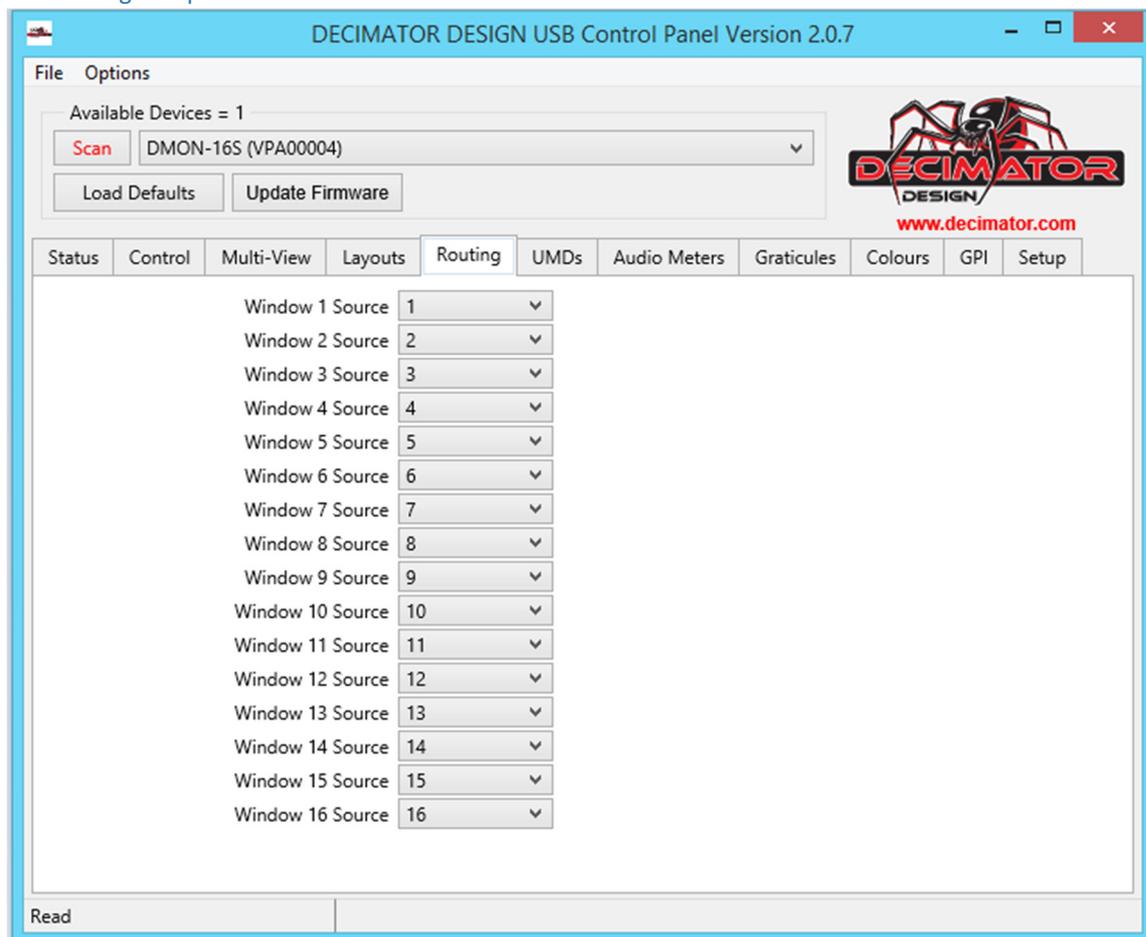
The Left X column allows the user to choose the starting position for the first 8 channels of the meters and are drawn from the top left corner of the box.

The Right X column allows the user to choose the starting position for the second 8 channels of the meters and are drawn from the top left corner of the box.

The Y Column allows the user to choose the starting position of both left and right audio meters starting from the top of the box. As the audio meters are connected in pairs on the Y scale, so when specifying the Y starting position both audio meters will move up or down.

To calculate the size of each of the 8 channel boxes the user must multiply the bar width by 8 for maximum channels displayed and this will give the width of the box in pixels and the height will be the size listed in the height column in pixels.

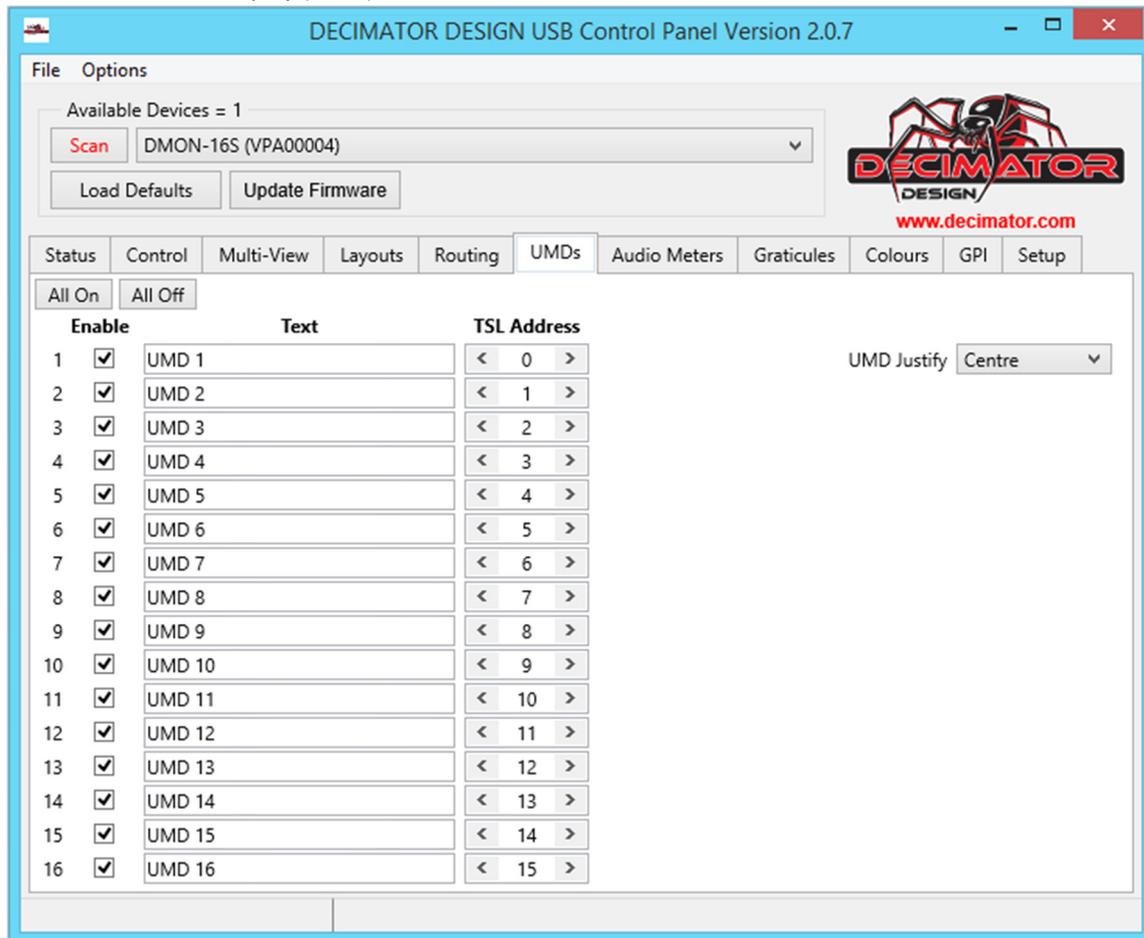
In the example above the boxes are 32 pixels wide and 200 pixels long.



The Routing Tab allows for rearrangement of any of the input signals to any of the windows. This tab also allows the user to copy inputs to other windows without requiring external copies of the signal being connected to the SDI inputs.

Note: The Routing applies to all layout tabs, it does not change from layout to layout.

E.g. A user could feed the DMON-16S with 4 inputs into inputs 1, 3, 9 and 11 and have no cables connected to the remaining inputs. Using the Routing tab the user can set Input 3, 9 and 11 to windows 2, 3 and 4 and use the device as a 2/3/4-split multi-viewer without having to physically rearrange the input cables.



The UMD tab allows the user to enable the Under Monitor Display for each window on the DMON-16S as well as set the TSL address for each window and manually enter in the desired text for each UMD to display.

**Enable:** When the checkbox is checked the corresponding UMD will appear for that window.

**Text:** Any text entered here will be displayed on the window where the UMD is set to appear.

**TSL Address:** The TSL address can be set anywhere from 0 to 255 and is used when transmitting UMD text via the TSL protocol to the RS +/- Pins on the DSUB connector.

**UMD Justify:** UMD Justify will align the text to the left, right and centre within the 16 Character box. If there are 16 characters there will be no effect.

Left Justify	Right Justify	Centre Justify
UMD 1	UMD 1	UMD 1

**Notes:**

Each UMD has a maximum character limit of 16 characters.

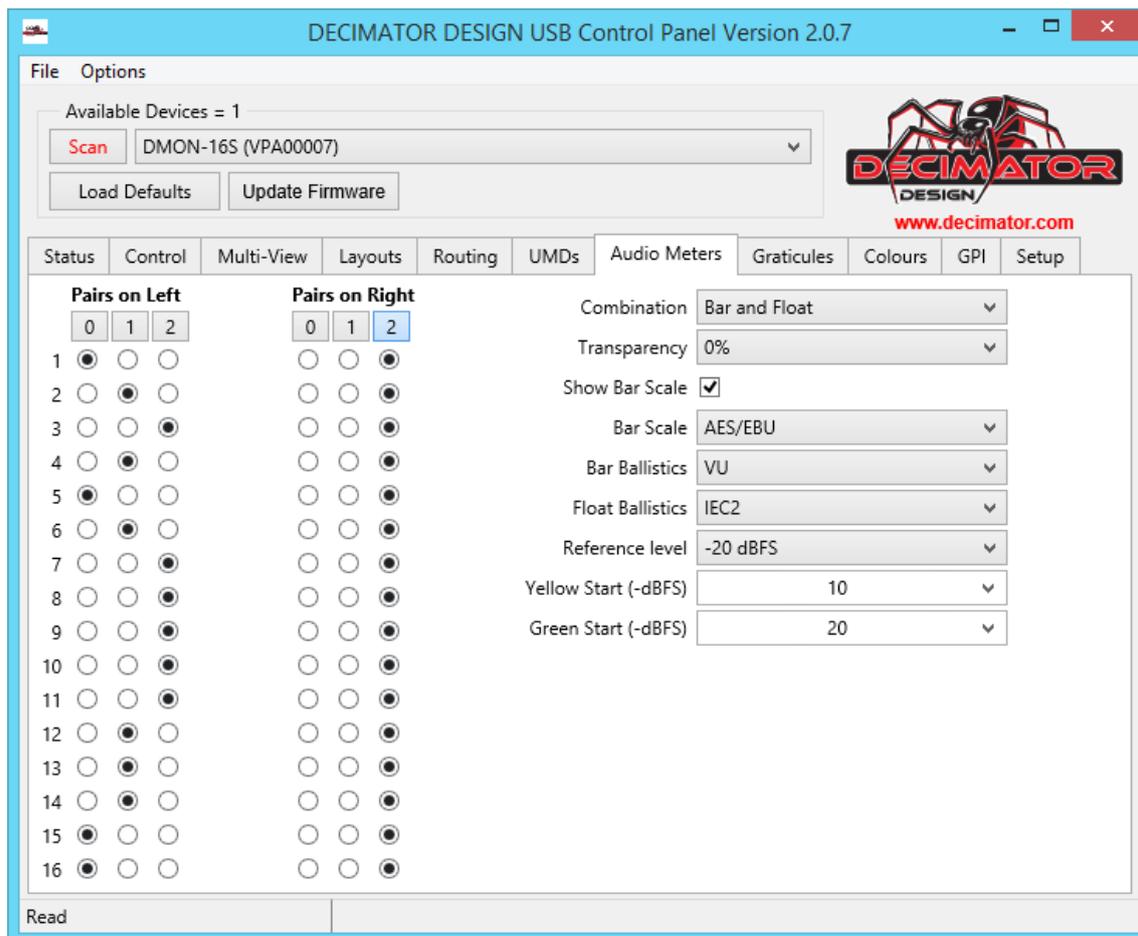
UMD Justify will align the text to the left, right and centre within the 16 Character box. If there are 16 characters there will be no effect.

The Audio Meters tab allows the user to enable the display of the 8/16 channel audio meters per window and set the metering type required.

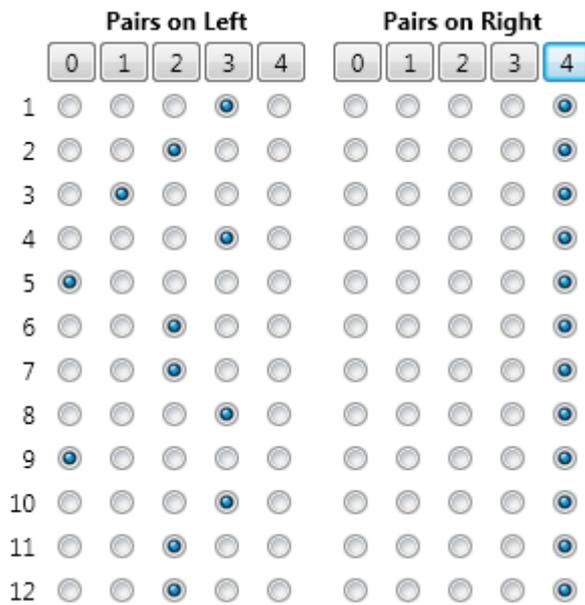
**Pairs on Left, Pairs on Right:** This setting allows the user to enable the Audio meters for each window of the DMON-16S.

The options are separated so that the left 4 (8 for DMON-6S/12S) audio channels are defaulted to appear on the left and the next 4 (8 for DMON-6S/12S) audio channels are displayed on the right of each window. Each checkbox represents 2 channels to display (“a pair”) and when enabling these pairs they can only be displayed with the previous channels as well. For example when enabling checkbox 2 all 2 pairs/ 4 channels will be displayed.

The buttons marked 0, 1, 2, 3, 4 at the top of the tab allow the user to turn on the audio meters to every window in one click.



(Applicable to DMON-16S) In this example Window 1 will show no Audio channels on the left and 4 channels on the right, Window 2 will show 2 Channels on the left and 4 channels on the right etc.



(Applicable to DMON-6S/12S) In this example Window 1 will show 6 Audio channels on the left and 8 channels on the right, Window 2 will show 4 Channels on the left and 8 channels on the right etc.

**Combination:** The Combination setting allows the user to set whether the audio meters are displayed as a solid bar, as a marker that moves to the sound levels detected or both.

**Transparency:** The Transparency setting allows the user to set the opaqueness of the Audio meters when displayed over the window.

- 1.) 0%
- 2.) 25%
- 3.) 50%

**Show Bar Scale:** This setting allows the user to enable or disable the display of the level numbers.

**Bar Scale:**

- 1.) AES/EBU
- 2.) VU
- 3.) Extended VU
- 4.) BBC PPM (IEC 2a)
- 5.) EBU PPM (IEC 2b)
- 6.) DIN PPM (IEC 1a)
- 7.) NORDIC (IEC 1b)

**Bar Ballistics:**

- 1.) VU
- 2.) IEC1
- 3.) IEC2

**Float Ballistics:**

- 1.) VU
- 2.) IEC1
- 3.) IEC2

**Reference Level:**

- 1.) -20 dBFS
- 2.) -18 dBFS
- 3.) -15 dBFS

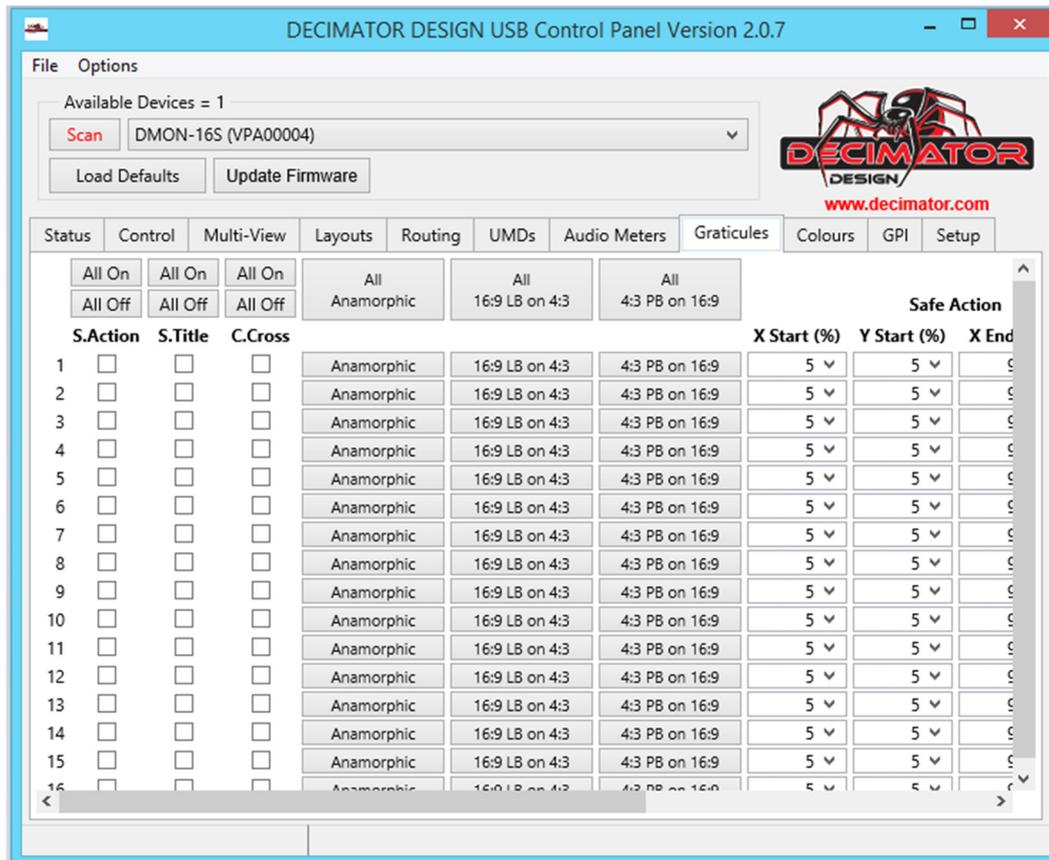
**Yellow Start (dBFS):** This setting allows the user to set where the yellow range of the audio meter begins. The yellow range extends from the end position of the Green meter to the start of the red position.

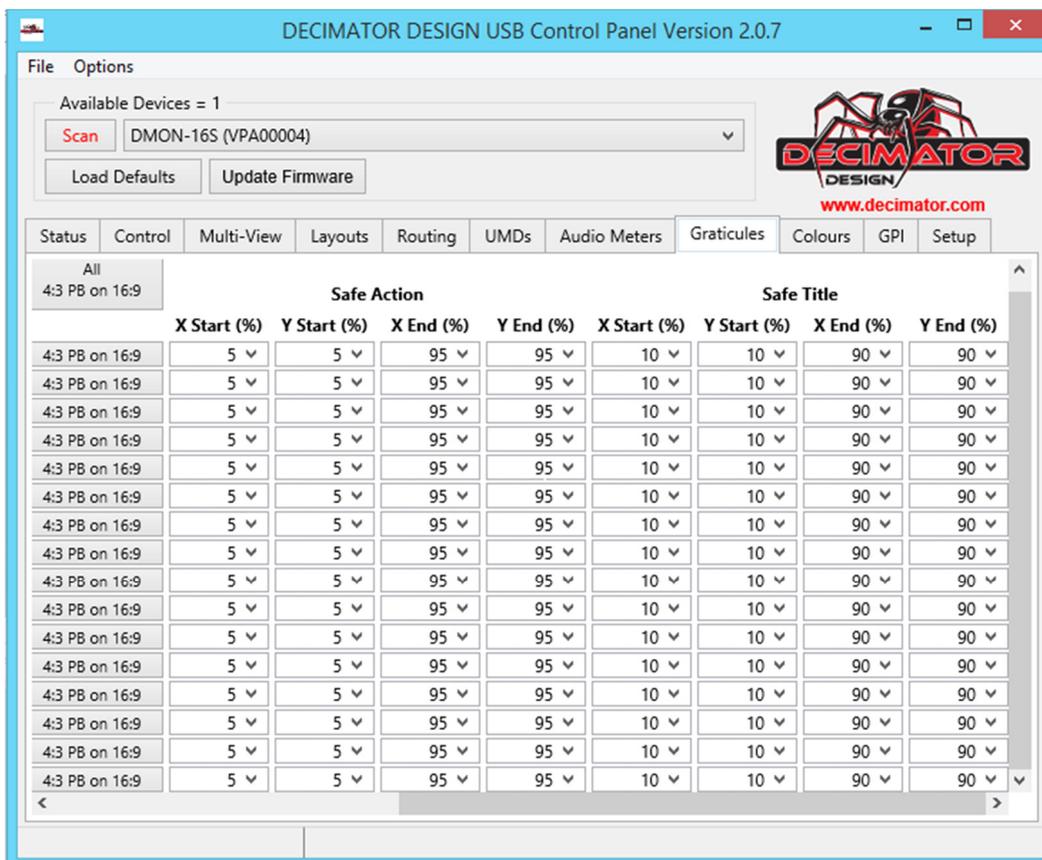
**Green Start (dBFS):** This setting allows the user to set where the green range of the audio meter begins. The green range extends to the yellow start dBFS point.

### 8.0 Graticules

The Graticules Tab allows the user to enable and position the Safe Action, Safe Title and centre cross Graticules.

The graticule generator tab allows the user to enable the Safe Action, Safe Title and centre cross for each window and set their positions manually or set them as 3 different aspect ratio sizes.





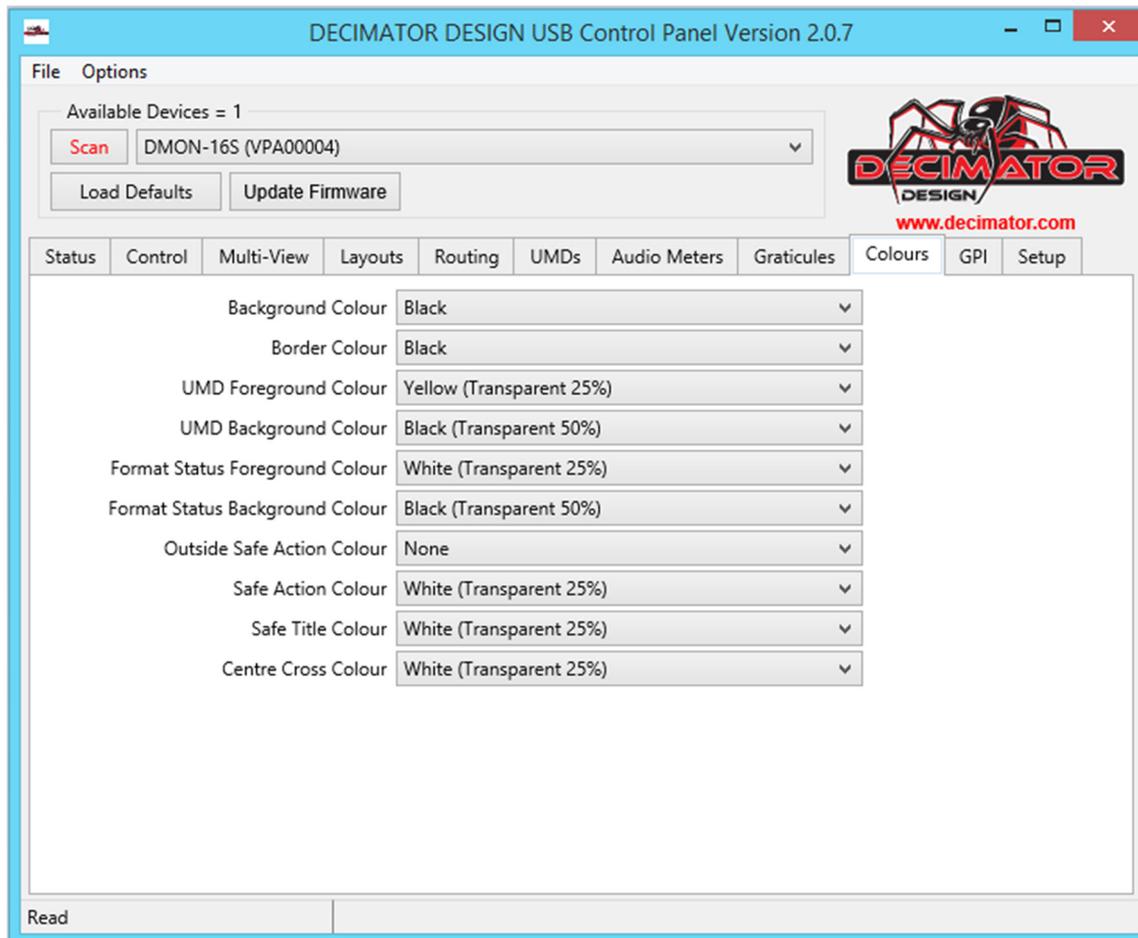
**Safe Action:** The Safe Action option displays a solid line box inside the window it is enabled on. The size of this box is controlled via the graticules tab as seen in the images above. The size of each box is specified by the percentage of the window to expand across.

Note: when using the outside Safe Action option in the colours tab, the area outside this line to the edge of the window is the area it is referring to.

**Safe Title:** The Safe Title option displays a hashed line box inside the window it is enabled on. The size of this box is controlled via the graticules tab as seen in the images above. The size of each box is specified by the percentage of the window to expand across.

**Centre Cross:** The centre cross option displays a cross in the centre of the window.

Note: The colours of each windows will all be the same colour as designated in the colours tab and cannot be changed separately.



The Colours tab allows the user to change the colours of the following features of the DMON-16S:

- Multi-Viewer Background colour: Refer to table 1.1, default colour is Black
- Window Border colour: Refer to table 1.1, default colour is Black
- UMD Foreground: Refer to table 1.2, default colour is Yellow (Transparent 25%)
- UMD Background: Refer to table 1.2, default colour is Black (Transparent 50%)
- Format Status Foreground: Refer to table 1.2, default colour is White (Transparent 25%)
- Format Status Background: Refer to table 1.2, default colour is Black (Transparent 50%)
- Outside Safe Action: Refer to table 1.2, default colour is White (Transparent 25%)
- Safe Action Box Border: Refer to table 1.2, default colour is White (Transparent 25%)
- Safe Title Box Border: Refer to table 1.2, default colour is White (Transparent 25%)
- Centre Cross: Refer to table 1.2, default colour is White (Transparent 25%)

Available colours:

1. Black	2. Blue	3. Green
4. Cyan	5. Red	6. Magenta
7. Yellow	8. White	

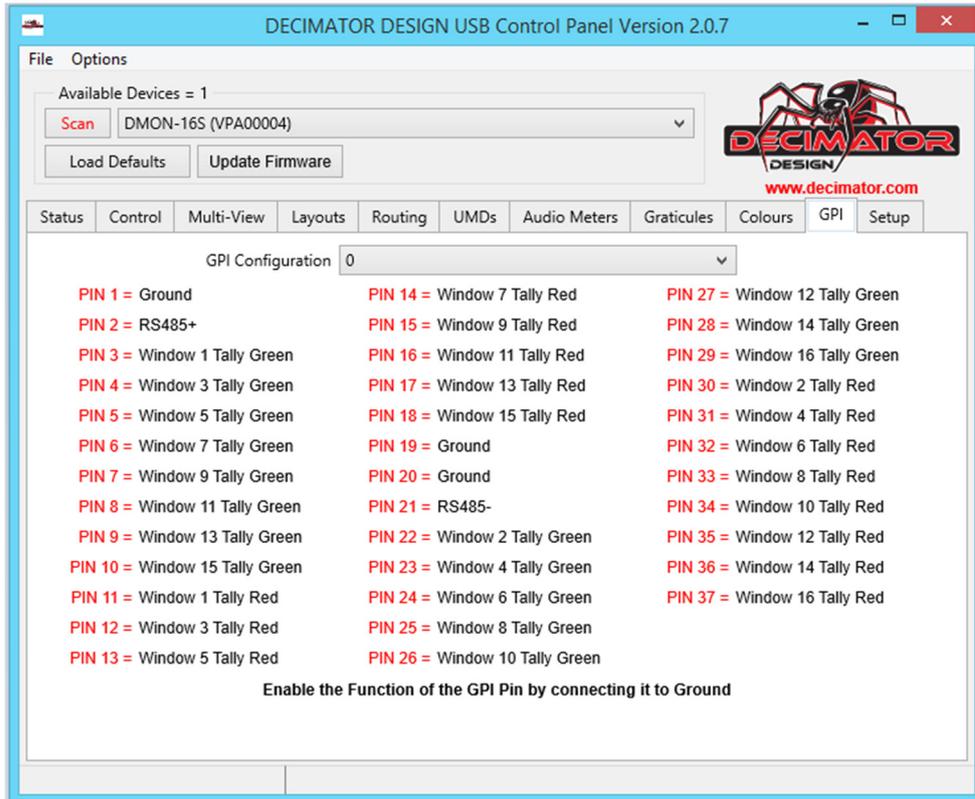
Table 1.1 Colour table

1. None	10. Black (Transparent 25%)	19. Blue (Transparent 0%)
2. Black (Transparent 50%)	11. Blue (Transparent 25%)	20. Green (Transparent 0%)
3. Blue (Transparent 50%)	12. Green (Transparent 25%)	21. Cyan (Transparent 0%)
4. Green (Transparent 50%)	13. Cyan (Transparent 25%)	22. Red (Transparent 0%)
5. Cyan (Transparent 50%)	14. Red (Transparent 25%)	23. Magenta (Transparent 0%)
6. Red (Transparent 50%)	15. Magenta (Transparent 25%)	24. Yellow (Transparent 0%)
7. Magenta (Transparent 50%)	16. Yellow (Transparent 25%)	25. White (Transparent 0%)
8. Yellow (Transparent 50%)	17. White (Transparent 25%)	
9. White (Transparent 50%)	18. Black (Transparent 0%)	

Table 1.2 Colour table extended

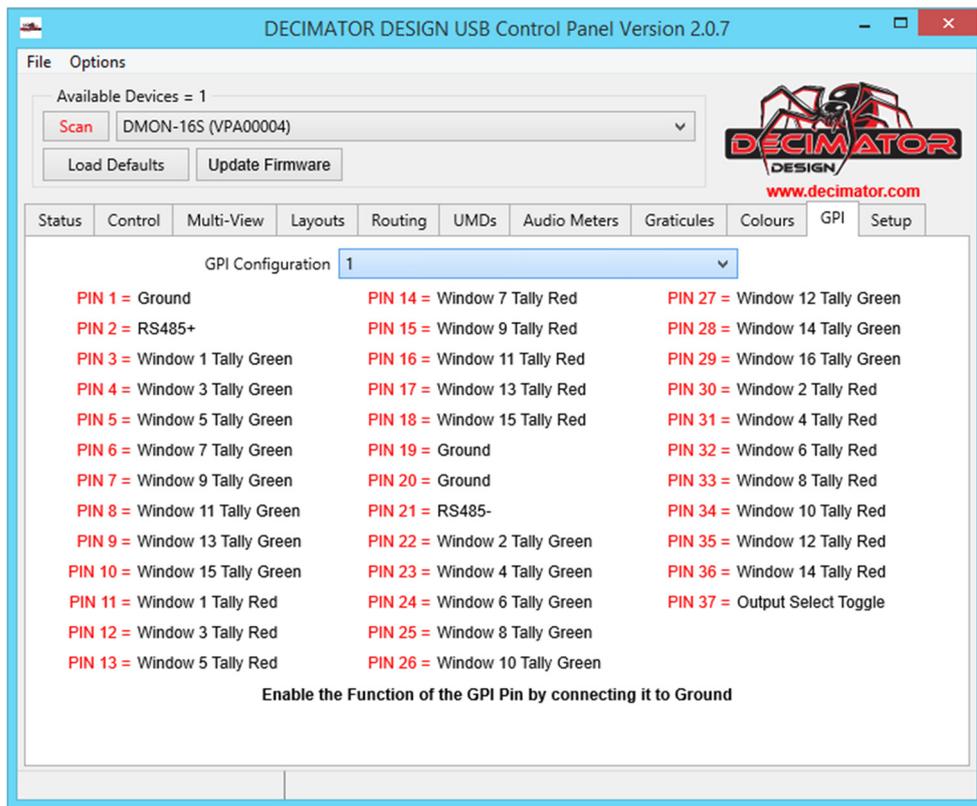
## 10.0 GPI

The GPI tab of the USB control panel for the DMON-16S displays the pin layout for the DSUB-37 pin connector on the back of the unit.



GPI Configuration 0.

This Configuration is used when the user wishes to link up the DSUB-37 connector to devices that control tally signals. A connection between the ground pin and the tally pin will keep the tally visible.

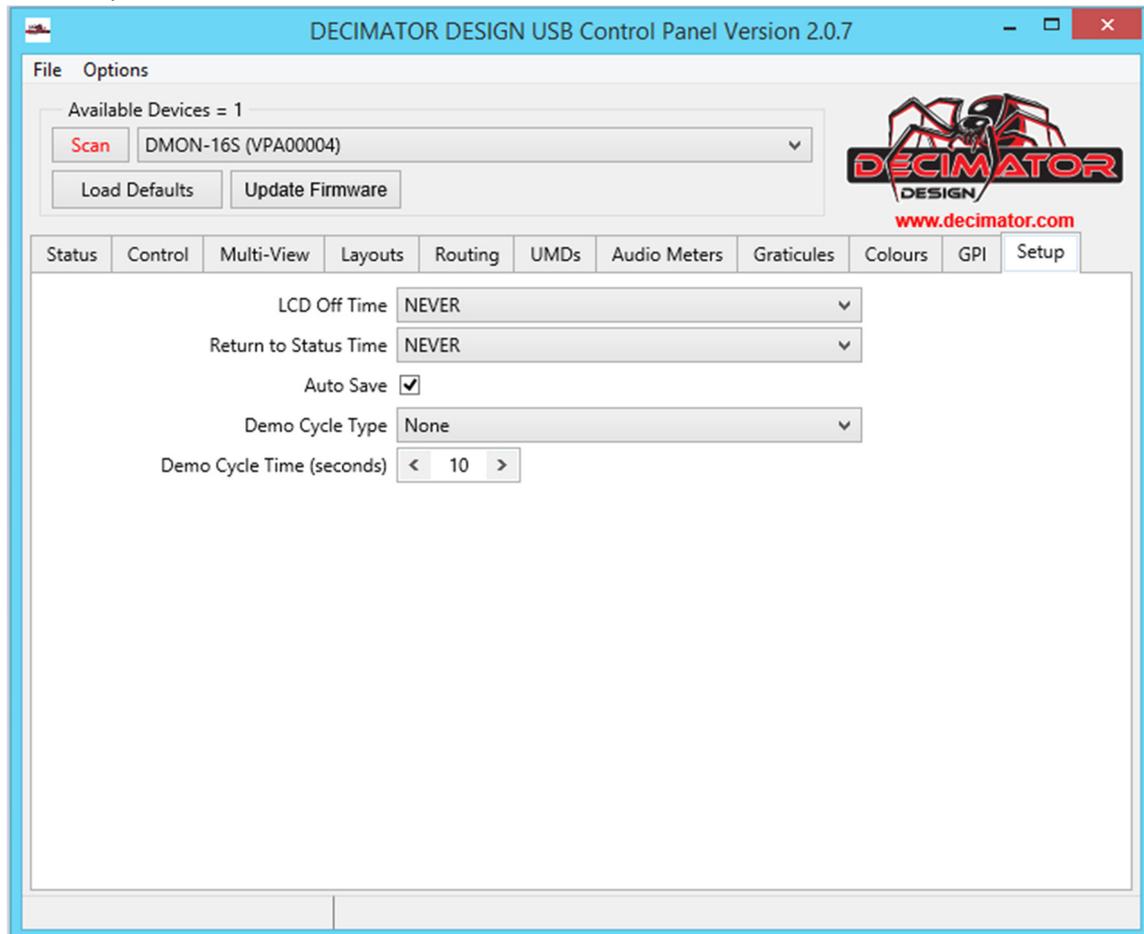


#### GPI Configuration 1.

This Configuration is used when the user wishes to link up the DSUB-37 connector to devices that control tally signals. A connection between the ground pin and the tally pin will keep the tally visible. In this configuration pin 37 is a Multiview output toggle, Which sequences through all inputs.

#### GPI Configuration 2.

This Configuration is used when the user wishes to wire up the DSUB-37 connector to a device to use the DMON-16S as a switcher. When connecting the pins of the DSUB-37 up as a switcher the user needs only to have a simple button between the select pin and ground as all that is needed is a momentary connection and that will cause the output to change.



The Setup tab allows the user to control the LCD backlight timer, return to status timer and the demo cycle feature.

#### 11.1 LCD off Time

This setting allows the user to set the amount of time to pass before the LCD backlight is turned off.

1. 5 Seconds	2. 15 Seconds	3. 30 Seconds	4. 1 Minute
5. 5 Minutes	6. 15 Minutes	7. 30 Minutes	8. Never

#### 11.2 Return to Status time

This setting allows the user to set the amount of time before the menu on the LCD display defaults back to signal input status screen.

1. 5 Seconds	2. 15 Seconds	3. 30 Seconds	4. 1 Minute
5. 5 Minutes	6. 15 Minutes	7. 30 Minutes	8. Never

#### 11.3 Auto Save

The Auto save option allows the user to define whether after a setting is changed, if that setting is saved to memory or not. This setting helps users who set the DMON-16S up the way they want it and want to change settings but not have these saved to memory and have the DMON-16S return to the previously saved settings when powered down and back on again.

#### 11.4 Demo Cycle Type

The Demo cycle feature is designed to let the user set a timer for the DMON-16S to automatically cycle through the different outputs.

E.g. If set to multi-viewer layouts the DMON-16S will show layout 1 then layout 2 etc. when reaching layout 32 it will return to layout 1 and the cycle will begin again.

##### **Output Select**

When demo cycle is set to output select the DMON-16S will cycle through the output select options listed in 2.2 , changing at the interval set by demo cycle time.

##### **Multi-viewer Windows**

When demo cycle is set Multi-viewer Windows the DMON-16S will cycle through the 16 window sizes from displaying 1 window on the screen up to showing 16, changing at the interval set by demo cycle time.

##### **Multi-viewer Layouts**

When demo cycle is set Multi-viewer Layouts the DMON-16S will cycle through the 32 custom layouts, changing at the interval set by demo cycle time.

#### 11.5 Demo Cycle Time (seconds)

The Demo Cycle time allows the user to set the interval of time before the Demo Cycle type cycles to its next option. The interval time can be anywhere from 1 second to 256 seconds.

## 12.0 Designing a custom layout

The section will detail how to design a custom layout step by step for the DMON-16S Multi-Viewer.

The first step in designing a custom layout is deciding on the basic layout of the multi-viewer. In this tutorial we assume the user wishes to create an 11 window multi-viewer layout where one image is half the screen and the other half contains the remaining 10 windows.



An example of a user defined 11 window multi-viewer

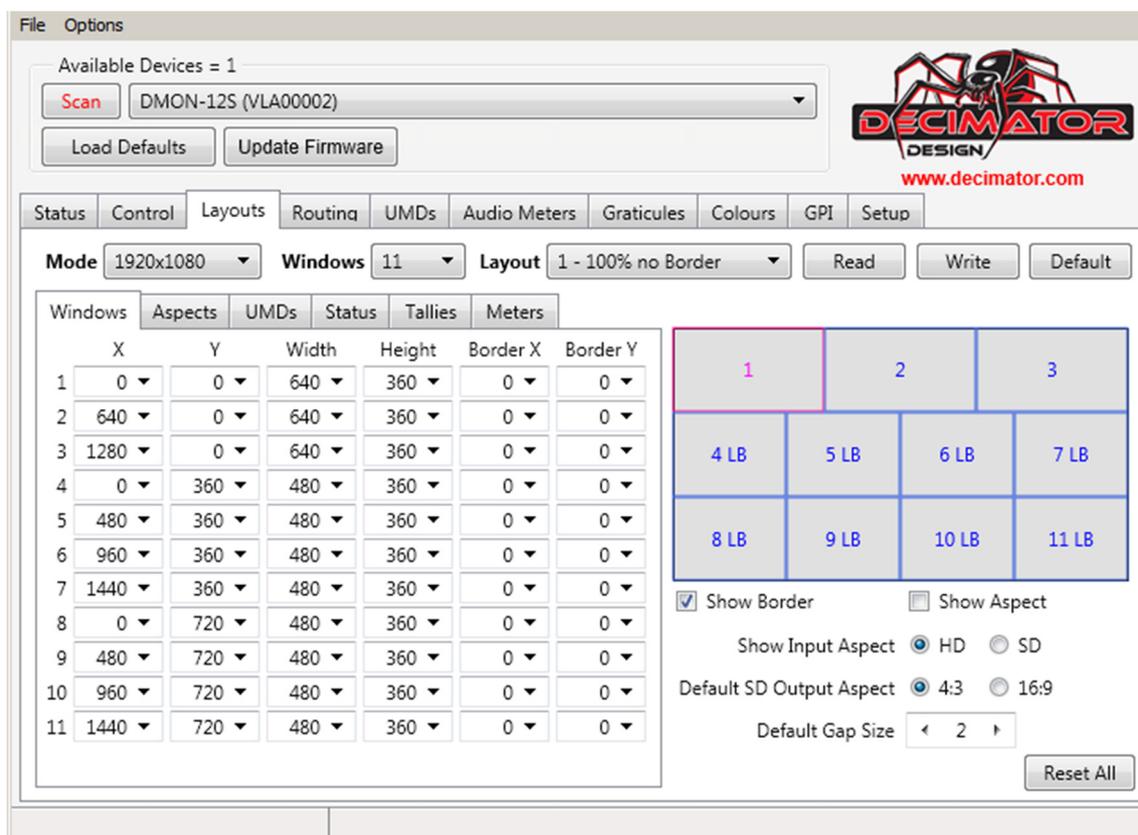
The next step is to go to the layouts tab in the USB control panel and choose the mode for the multi-viewer in this case it will be 1920 by 1080 pixels.

We then choose how big the multi-viewer will be, in this case it is 11 windows.

The layout number to be chosen can be any of the available 32 layouts. To allow for use of the other available layouts we will choose layout 9-Custom; this layout has the same parameters as layout 8.

To make changing the layout easier we check the show border box and uncheck the show aspect box.

The preview window will now look like the image below.



## 12.1 Custom Window Positioning

Since we know roughly where each window will go and we have the size of the multiviewer we wish to use we can now do a few calculations to determine the size of each box we wish to create.

Window 1:  $1920 \times (1080 / 2) = 1920$  width 540 height

Window 2:  $(1920 / 5) \times (1080 / 4) = 384$  width 270 height

5 windows across and each window is a quarter of the height to create 2 rows of 5 windows, we repeat this size for the next 9 windows.

Window 3: 384 width 270 height

Window 4: 384 width 270 height

Window 5: 384 width 270 height

Window 6: 384 width 270 height

Window 7: 384 width 270 height

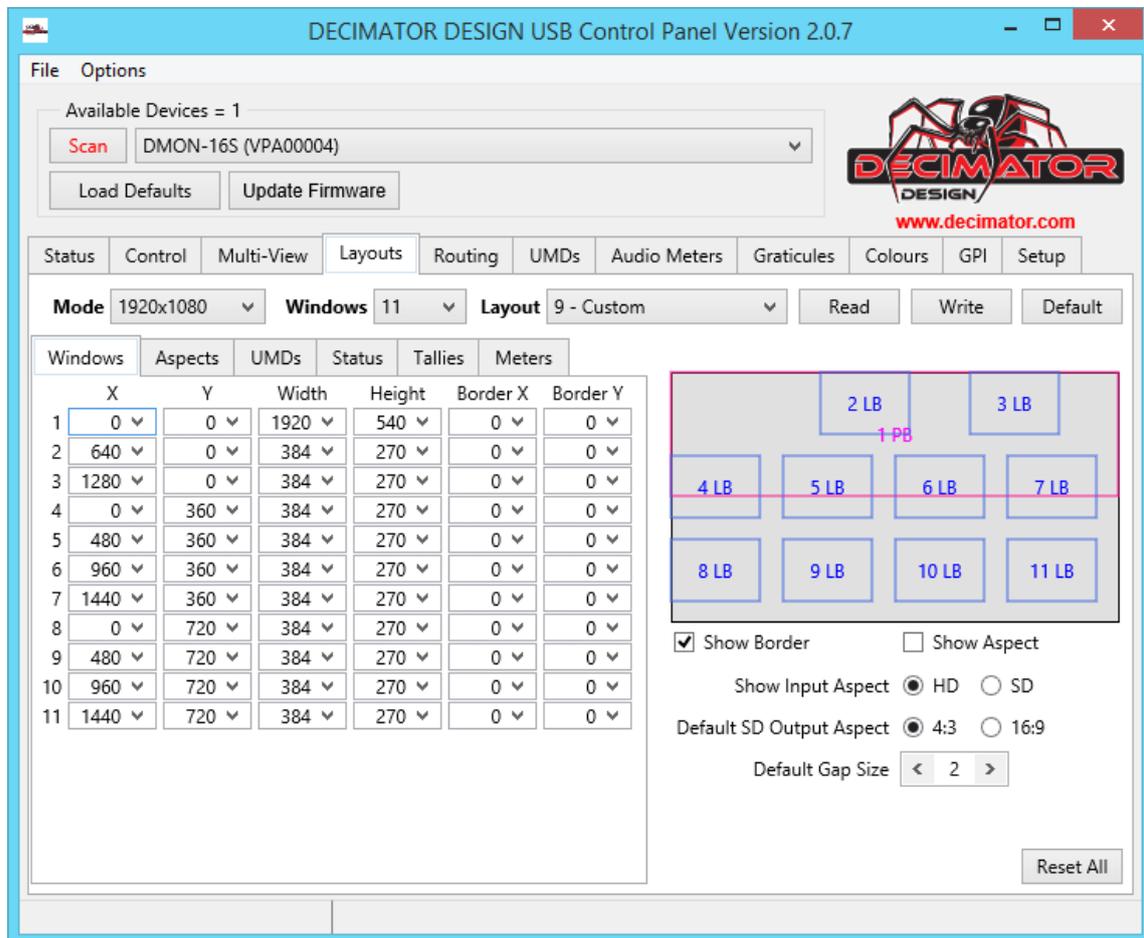
Window 8: 384 width 270 height

Window 9: 384 width 270 height

Window 10: 384 width 270 height

Window 11: 384 width 270 height

The layout tab should now look like the image below:



Here the windows are correctly sized, but their x and y positions are wrong for what we are trying to design. We now need to calculate the new starting points for each window.

We start by going through the positions of each window. Window 2 position is below window 1 and on the left of the multi-viewer and its position will be 540 pixels down and 0 pixels from the left of screen.

The starting point of window 2's height is also the same for window 4,6,8 and 10 so we enter it in the y position column for these windows too.

Next we find the location of window 3, as it is below window 2 it will have the same x position and also window 2 is 270 pixels high so the Y position of window 3 is  $540 + 270 = 810$ . This is also the Y starting point for windows 5, 7, 9 and 11.

At this point a few of the windows will appear red and be overlapping, whenever a window overlaps another window the write button will be disabled and the overlapping windows will become red.

To determine the x positions of windows 4,6,8 and 10 it is a matter of adding the width of the window 4 to the x position of window 2 to determine the position.

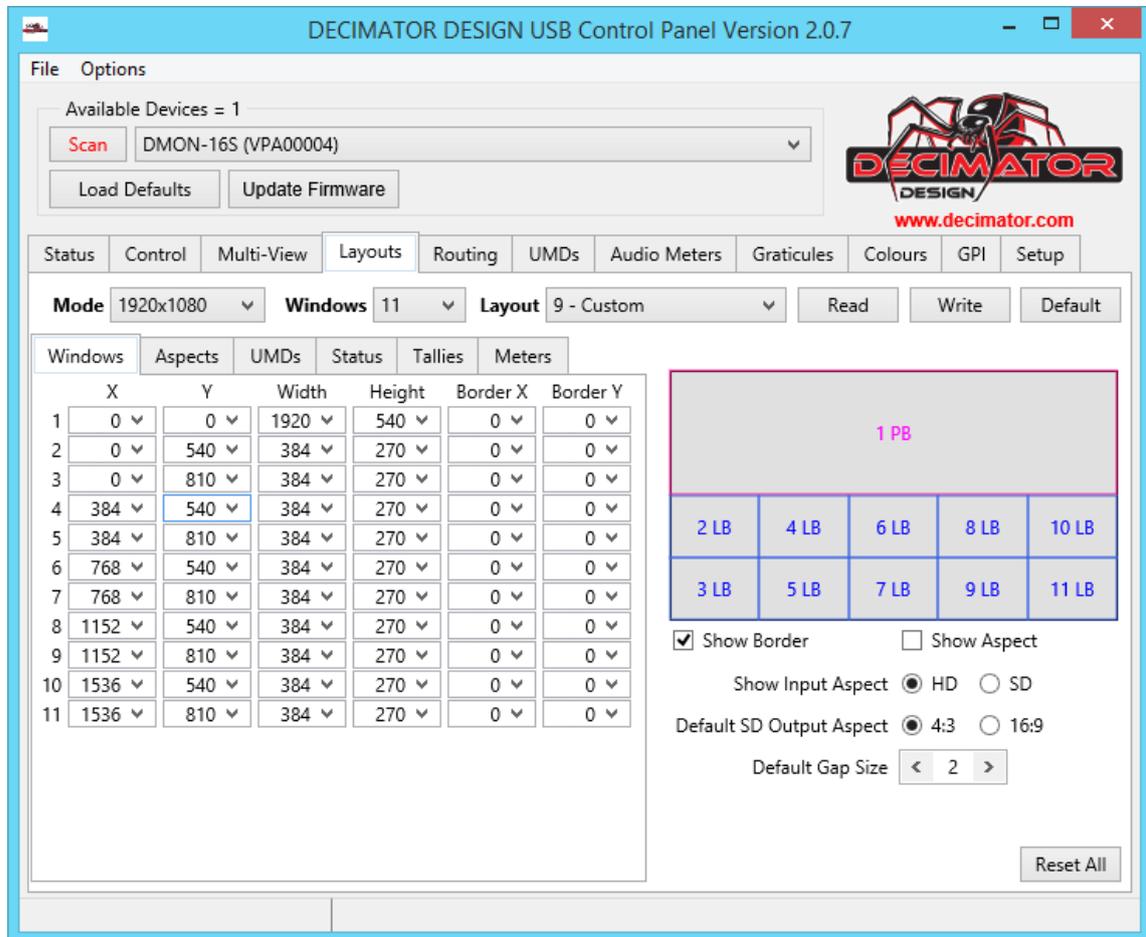
$0 + 384 = 384$  is the starting position for window 4.

$384 + 384 = 768$  for window 6.

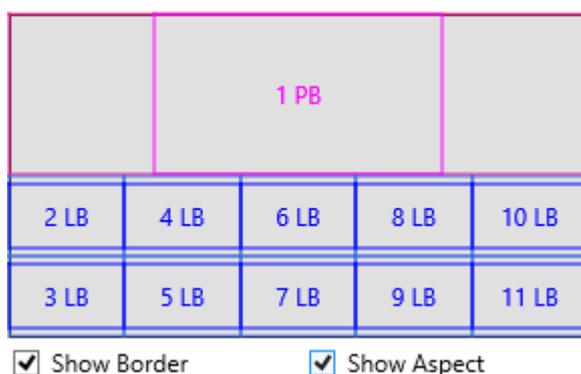
$768 + 384 = 1152$  for window 8.

$1152 + 384 = 1536$  for window 10.

These are also the X positions for windows 5,7,9 and 11 respectively.



Now that all the windows are correctly positioned as per the above picture the user can now select how they want the sources aspect to be displayed in each window.



In the picture above when the show aspect box is checked, each window will display a smaller window inside them indicating how the source will be displayed.

The picture above shows us that currently when the inputs are all HD window one will be displayed as a pillar-box and the remaining images will be letterbox. When a signal is detected it will be displayed as a

16:9 image on a 4:3 window and the background will be black around it as per the settings from the colour tab.

## 12.2 Custom UMD Positioning

Now that the windows are positioned its time to align the UMDs to their new locations. In this example the UMDs will be positioned to the bottom middle of each window and all UMDs will be of size 16 except for window 1 which is larger and size 32 will be chosen for the text size.

To determine the locations for the UMDs we go by the Formulas:

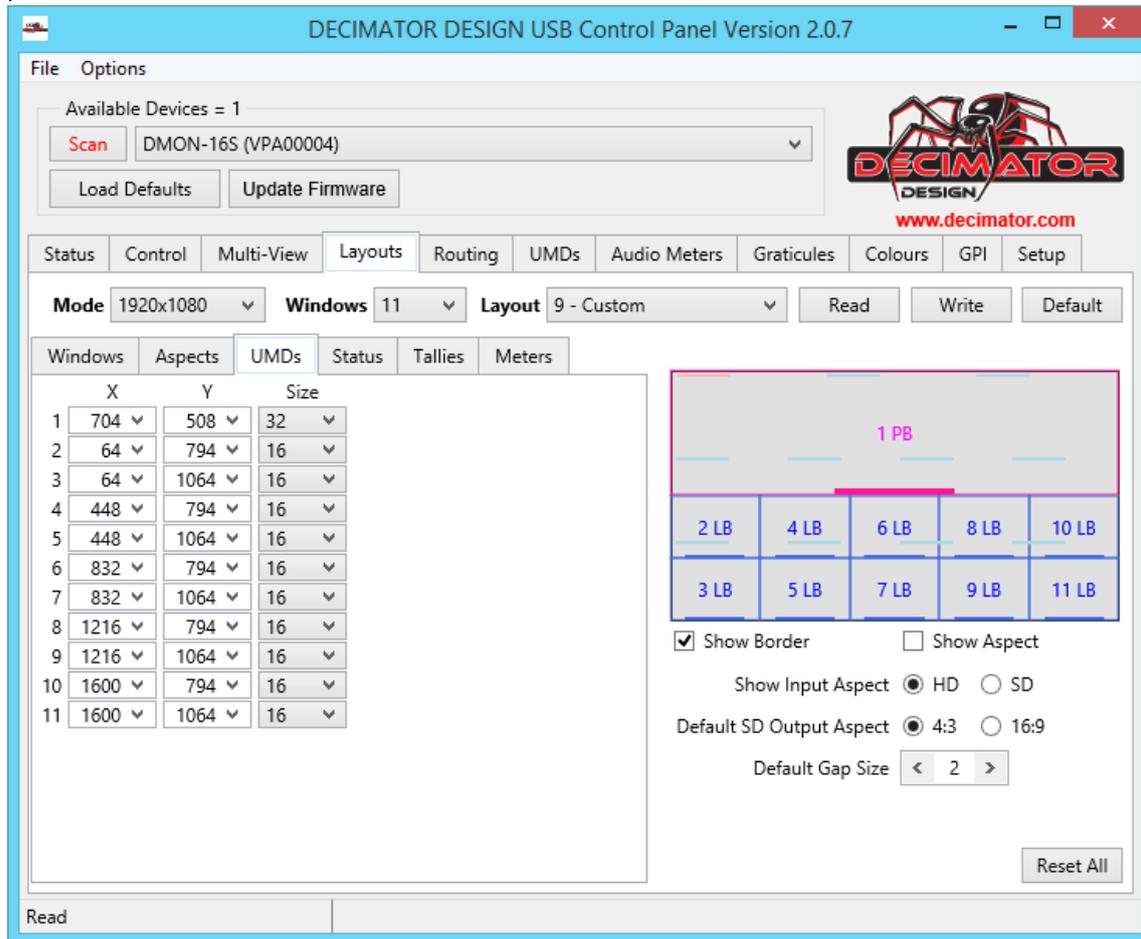
$$X = \text{Window's X starting point} + \frac{\text{Window Width}}{2} - \frac{\text{Size} \times 16}{2}$$

$$Y = \text{Window's Y starting point} + \text{Window Height} - \text{Size}$$

	X Starting position	Y Starting position
Window 1	$0 + (1920/2) - ((32 \times 16)/2) = 704$	$0 + 540 - 32 = 508$
Window 2	$0 + (384/2) - ((16 \times 16)/2) = 64$	$540 + 270 - 16 = 794$
Window 3	$0 + (384/2) - ((16 \times 16)/2) = 64$	$810 + 270 - 16 = 1064$
Window 4	$384 + (384/2) - ((16 \times 16)/2) = 448$	$540 + 270 - 16 = 794$
Window 5	$384 + (384/2) - ((16 \times 16)/2) = 448$	$810 + 270 - 16 = 1064$
Window 6	$768 + (384/2) - ((16 \times 16)/2) = 832$	$540 + 270 - 16 = 794$
Window 7	$768 + (384/2) - ((16 \times 16)/2) = 832$	$810 + 270 - 16 = 1064$
Window 8	$1152 + (384/2) - ((16 \times 16)/2) = 1216$	$540 + 270 - 16 = 794$
Window 9	$1152 + 384/2) - ((16 \times 16)/2) = 1216$	$810 + 270 - 16 = 1064$
Window 10	$1536 + (384/2) - ((16 \times 16)/2) = 1600$	$540 + 270 - 16 = 794$
Window 11	$1536 + (384/2) - ((16 \times 16)/2) = 1600$	$810 + 270 - 16 = 1064$

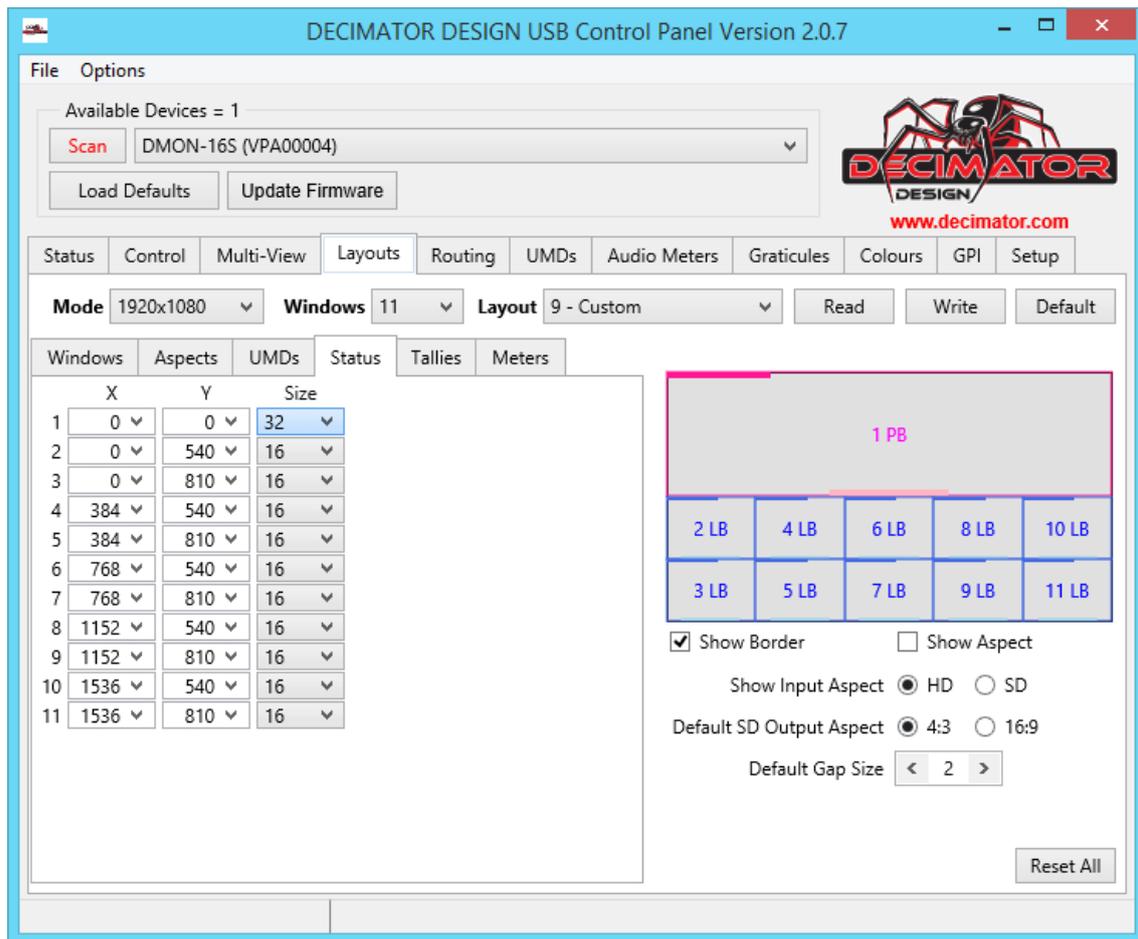
Table 1.3 UMD Coordinates calculations

After determining the values for the 11 windows our display window should look like the following picture.



### 12.3 Custom Status Positioning

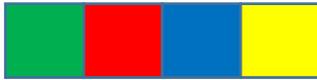
The next step is to relocate the format input status. In this example we will move them to the top left of each window. As the drawing position of each window and box is drawn from the top left first we can use the same co ordinates from the windows tab.



## 12.4 Custom Tallies Positioning

The next step is to relocate the box tallies for each window, in this example we will move them to the bottom right of each window. As window 1 is the largest we will increase the size of that tally box to 64 to compensate. The size box indicates the size of each of the 4 tally boxes and so when set at size 64 this means the total box size is 64 high and 256 pixels wide.

Each tally box is a rectangle and divided into 4 boxes for the 4 different colour tallies that can be displayed, which are green, red, blue and yellow respectively.

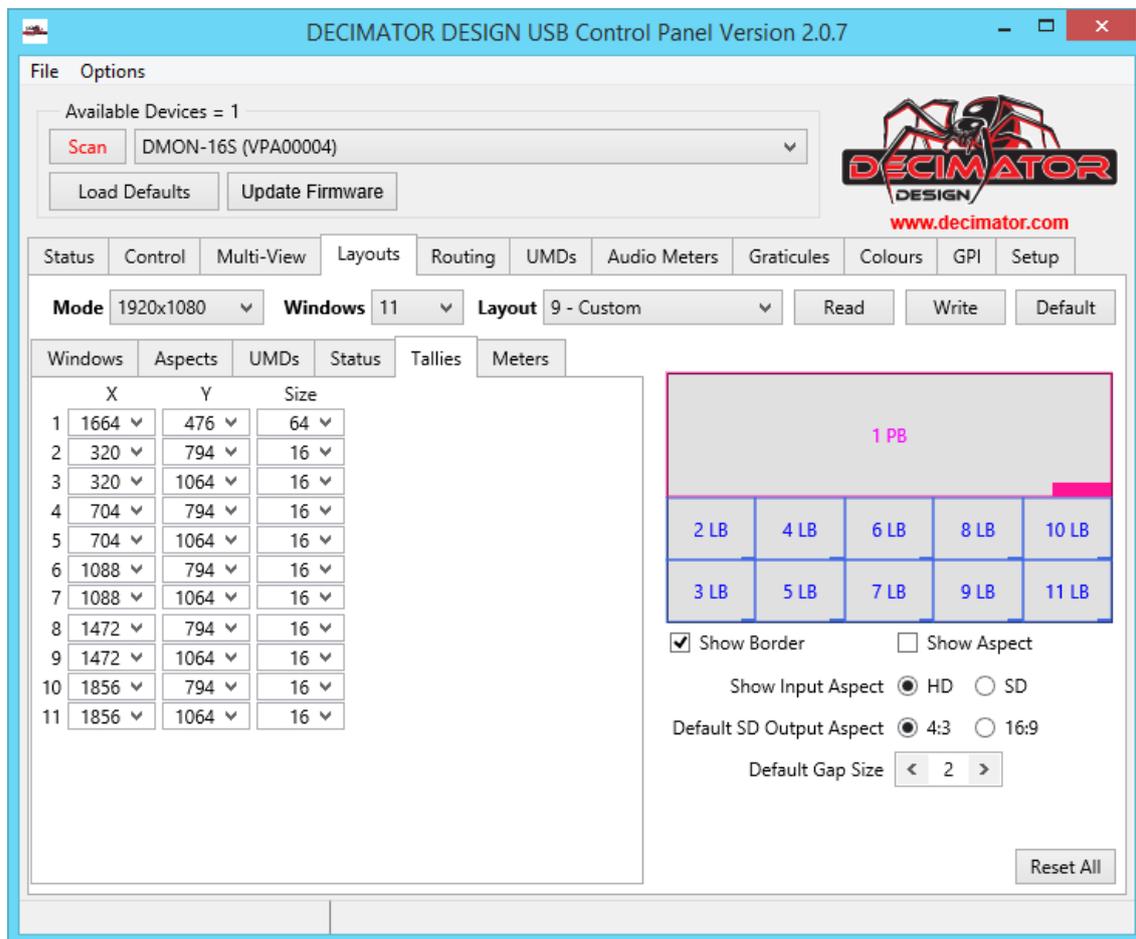


To determine the location of each tally box we take the bottom right corner location of each window and subtract the size of the tallybox to get the draw location of the tallybox.

	X Starting position	Y Starting position
Window 1	$1920 - 256 = 1664$	$(1080/2) - 64 = 476$
Window 2	$384 - 64 = 320$	$540 + 270 - 16 = 794$
Window 3	$384 - 64 = 320$	$810 + 270 - 16 = 1064$
Window 4	$768 - 64 = 704$	$540 + 270 - 16 = 794$
Window 5	$768 - 64 = 704$	$810 + 270 - 16 = 1064$
Window 6	$1152 - 64 = 1088$	$540 + 270 - 16 = 794$
Window 7	$1152 - 64 = 1088$	$810 + 270 - 16 = 1064$
Window 8	$1536 - 64 = 1472$	$540 + 270 - 16 = 794$
Window 9	$1536 - 64 = 1472$	$810 + 270 - 16 = 1064$
Window 10	$1920 - 64 = 1856$	$540 + 270 - 16 = 794$
Window 11	$1920 - 64 = 1856$	$810 + 270 - 16 = 1064$

Table 1.4 Tally Box Calculations

The Tallies window should now resemble the image below.

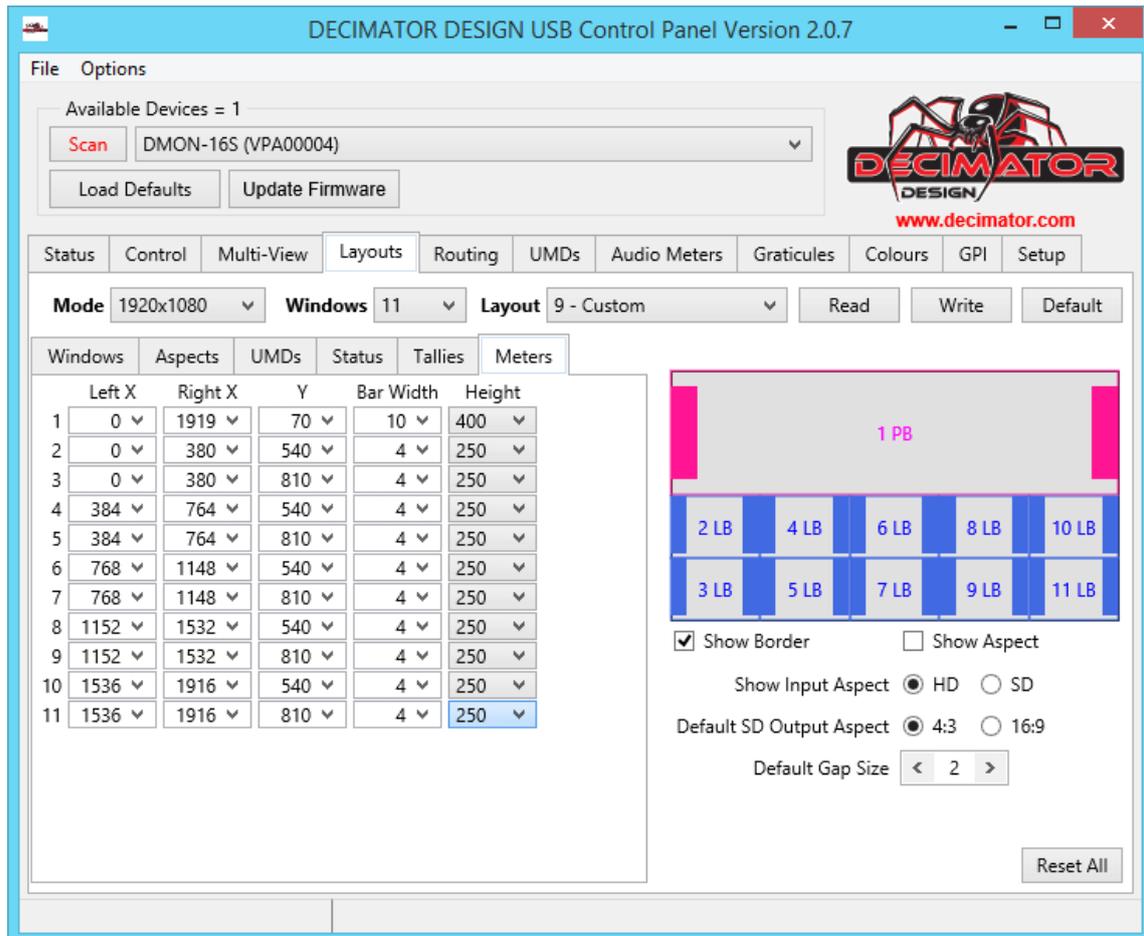


## 12.5 Custom Audio Meters Positioning

The next step is to relocate the Audio meters for the DMON-16S, in this example we will position them to the left and right of each window. When positioning the audio meters we must take note that each window has 2 groups of 8 channels to display and to avoid misplacing the left and right in different windows, they are both locked to the same y axis co ordinates.

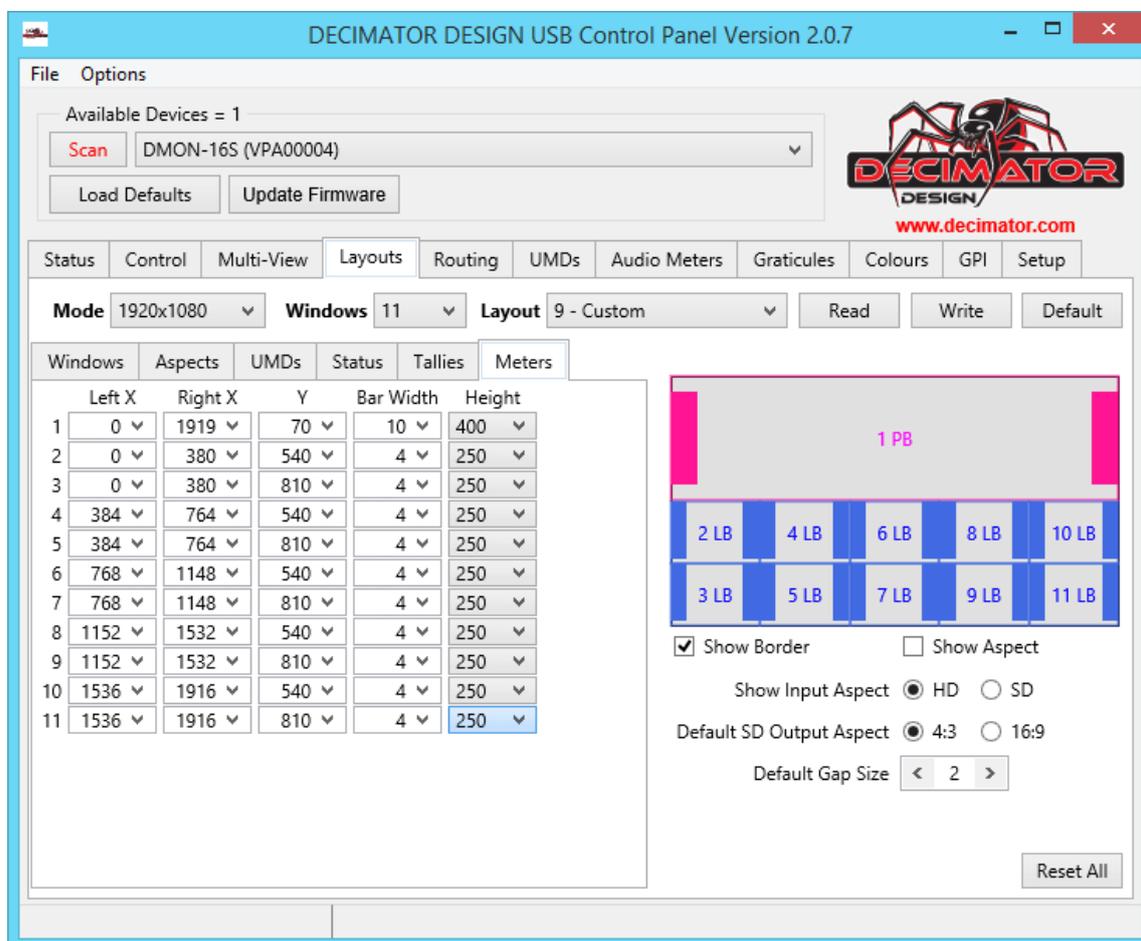
Each set of 8 channels is drawn from the top left corner for the first 8 channels and from the top right corner for the next 8 channels. With this information at hand we can then use the co ordinates of each window from the windows tab to use for the Left X coordinate and Y coordinate for each window. To determine the Right X coordinates we use the Left X coordinates add the window width and subtract 1 pixel to determine the location.

Due to the size of the windows we can increase the sizes of the audio meters in this example window 1 audio meters are made 400 pixels high and slightly larger and window 2-11 audiometers are increased to 250 pixels high to fit inside each window.



Now the Audio meters look like the preview window above but they still need one more adjustment as we need to take into account the format status text obstructing the audio meters. If the user plans to not show the format status text for longer than 5 seconds or not at all then the next step would be disregarded. For the purpose of this example we will have it appear always on.

As window 1 is not clashing it is ignored and windows 2-11 will be modified. Looking at the status tab we see the text is 16 pixels high so the Y position of each window must have 16 added on to each number, but first we check to see if moving each set of Audio meters down 16 pixels wont cause any conflicts with each other. Going by the formula window height – Audio meter height – 16 which is  $270 - 250 - 16 = 4$  we see that there is a gap of 4 pixels and there will be no clashes.



The final touch to the layout we change the background colour to red to make the windows stand out in the colours tab and we change the name of each UMD to window 1, window 2 etc in the UMDs tab.

Here we are satisfied with the Layout that was designed and so now we click the Write button and download the layout into the DMON-16S memory. All Layouts are saved to the DMON-16S, if at any time the user needs to change the layout they can connect the device to their computer; and using the control panel when they select the layout that they require, the UCP will load the parameters from the DMON-16S memory.

When the Layout has been written to memory and the user wishes to see this layout the user must go to the control panel and set the format to a resolution that is 1920 x 1080 and set Multi-viewer Number of Windows to 11 and set the layout to 9 in order for the DMON-16S to output this unique layout. The final image of the Multi-viewer should now resemble the image below.

