BreadBoard Mates

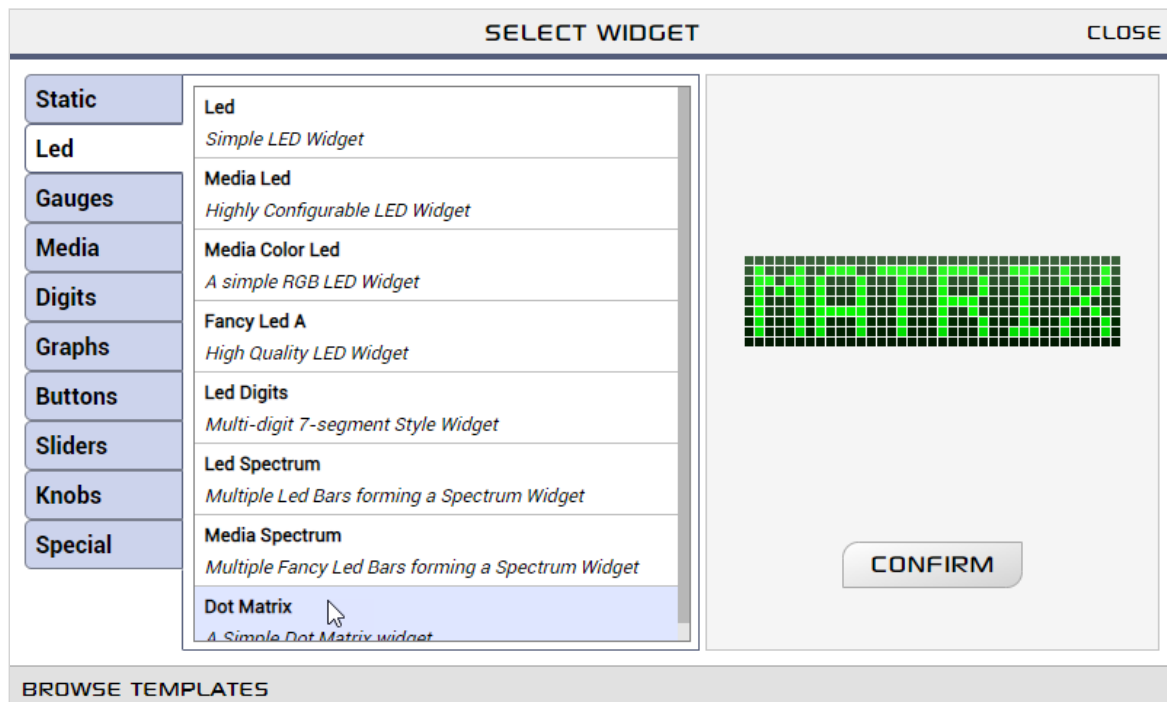# TUTORIAL

Design a Dot Matrix Widget

Contents

Introduction

The Dot Matrix widget is a simple widget that allows you to display a text in a style similar to character LCD displays.

This tutorial requires basic knowledge about using the graphics editor. This includes adding widgets and modifying widget properties during design time. For more information regarding this, refer to the Graphics Editor manual.

Widget Properties

Size, Position and Orientation

Left and Top

Position of a widgets can be changed by entering values for the *Left* and *Top* properties.

Alternatively, the widget can be positioned by simply clicking and dragging into the desired position.

If the width or height of the Dot Matrix widget is set to the maximum size of the display top or left dragging will not function.

Width and Height

For the Dot Matrix widget, the size properties, *Width* and *Height*, can be changed by entering the value of a known width and Height in pixels.

Preview Text

The Preview Text property allows you to enter text that is shown when the widget is first activated. This text can be changed dynamically.

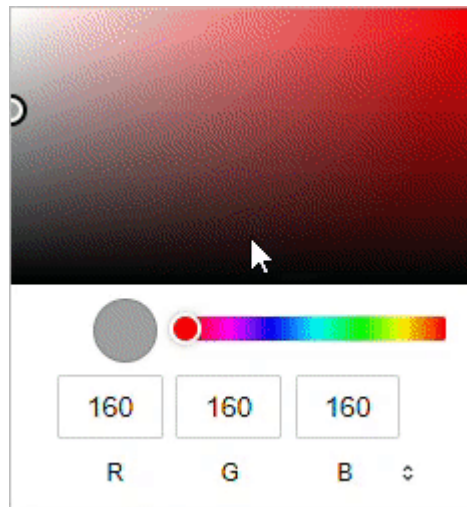| Property	Value
Name	DotMatrix0
Left	10
Top	10
Width	90
Height	45
Preview Text	HelloWorld
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Flat Square
Pixel On Color	#32FA28 [0x37C5]
Pixel Off Color	#054605 [0x0220]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	3
Highlight Enable	No
Left Offset	0
Top Offset	0

Bezel

Enable

The Dot Matrix widget can be displayed with an attractive bezel in any colour by clicking on Yes as the property value. The Bezel will be drawn within the bounds of the width and height and it may be necessary to adjust these dimensions for the text to display correctly.

| Property	Value
Name	DotMatrix0
Left	10
Top	10
Width	109
Height	61
Preview Text	HelloWorld
Bezel Enable	Yes
Bezel Color	Yes
Pixel Style	No
Pixel On Color	#32FA28 [0x37C5]
Pixel Off Color	#054605 [0x0220]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	3
Highlight Enable	No
Left Offset	0
Top Offset	0

Color

The colour of the Bezel can be selected by clicking on the property value and the colour selector will appear.

Pixel

Style

The Dot Matrix widget has 4 different styles for drawing the On and Off pixels. These styles can be selected by clicking on the property value. Flat square is the default style which draws the pixels as squares without gradient. Gradient circle draws raised On circular pixels and sunken Off circular pixels. This style is only effective with large pixels sizes.
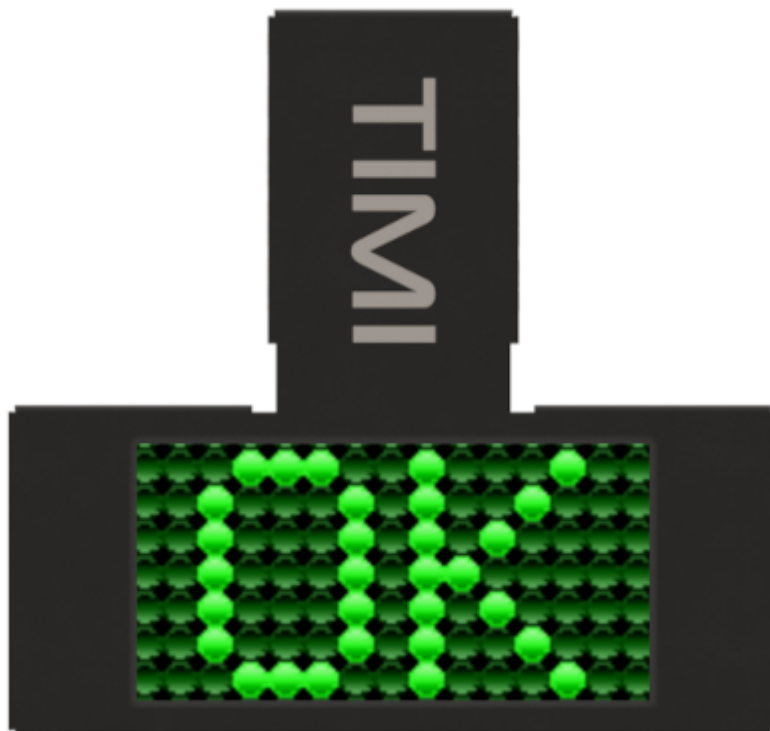
Full Gradient square draws the pixels with a raised look over the entire widget.

Partial Gradient Square will apply a sunken gradient only at the top and the bottom which creates a sunken look with a flat centre area.

Due to the Dot Matrix pixels being drawn transparently, the area between pixels will be any previously drawn object or background. By adding a Dot Matrix widget on top of a Media Panel different styles can be achieved.


On / Off

The Pixel On and Pixel Off colours can be changed by clicking on the property value and using the colour selector.

Property	Value
Name	DotMatrix0
Left	1
Top	1
Width	161
Height	81
Preview Text	HelloWorld
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Flat Square
Pixel On Color	#FAB829 [0xFDC5]
Pixel Off Color	#3D2D00 [0x3960]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	5
Highlight Enable	No
Left Offset	1
Top Offset	0

Gradient Color

When using the Gradient Circle Pixel Style a third colour is used to select a gradient colour which is the centre area of the Off Pixel. The colour can be changed by clicking on the property value and using the colour selector.
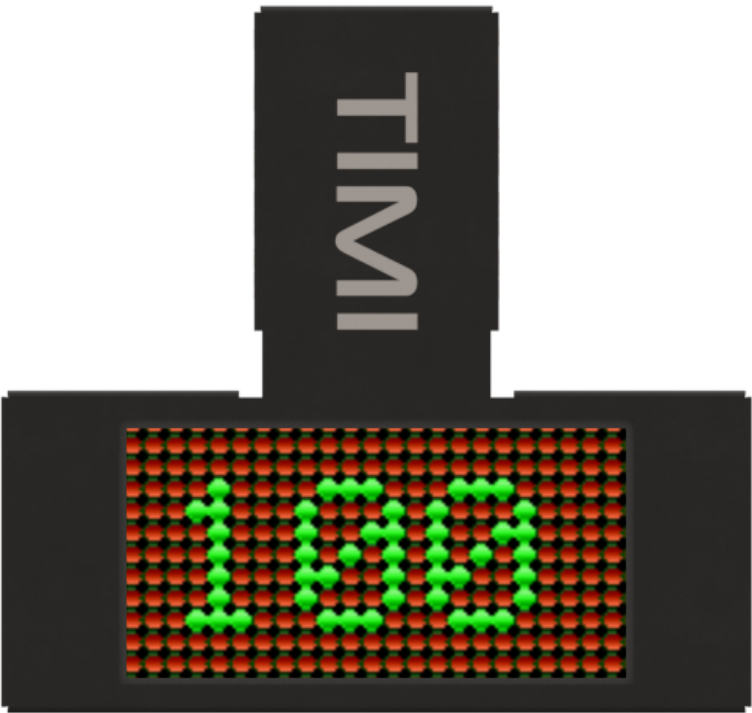
Property	Value
Name	DotMatrix0
Left	-2
Top	-5
Width	178
Height	92
Preview Text	100
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Gradient Circle
Pixel On Color	#32FA28 [0x37C5]
Pixel Off Color	#054605 [0x0220]
Pixel Gradient Color	#BB2B07 [0xB940]
Pixel Size	7
Highlight Enable	No
Left Offset	2
Top Offset	3

Size

The Individual Pixels can be set to any size from 3 upwards. Changing the pixel size will affect the size of the displayed font.

Highlight Enable

The Highlight Enable property will swap Pixel On and Pixel Off colours by selecting Yes as the property value. This will give the Dot Matrix text a highlighted effect.

Property	Value
Name	DotMatrix0
Left	1
Top	1
Width	161
Height	81
Preview Text	HelloWorld
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Flat Square
Pixel On Color	#FAB829 [0xFDC5]
Pixel Off Color	#3D2D00 [0x3960]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	5
Highlight Enable	Yes
Left Offset	Yes
Top Offset	No

Left/Top Offset

The Left Offset and Top Offset properties allow you to position the start of text by entering the values in Dot Matrix pixels as the property value.
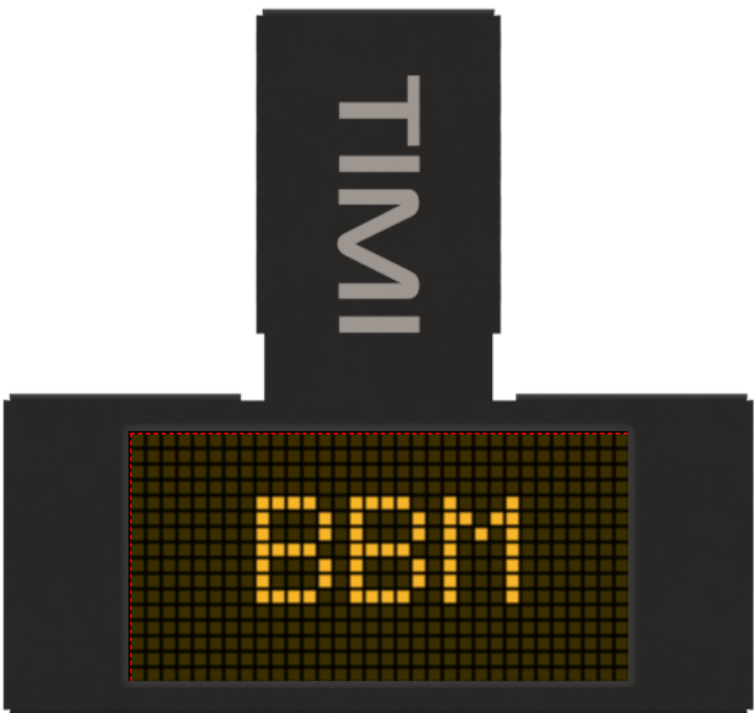
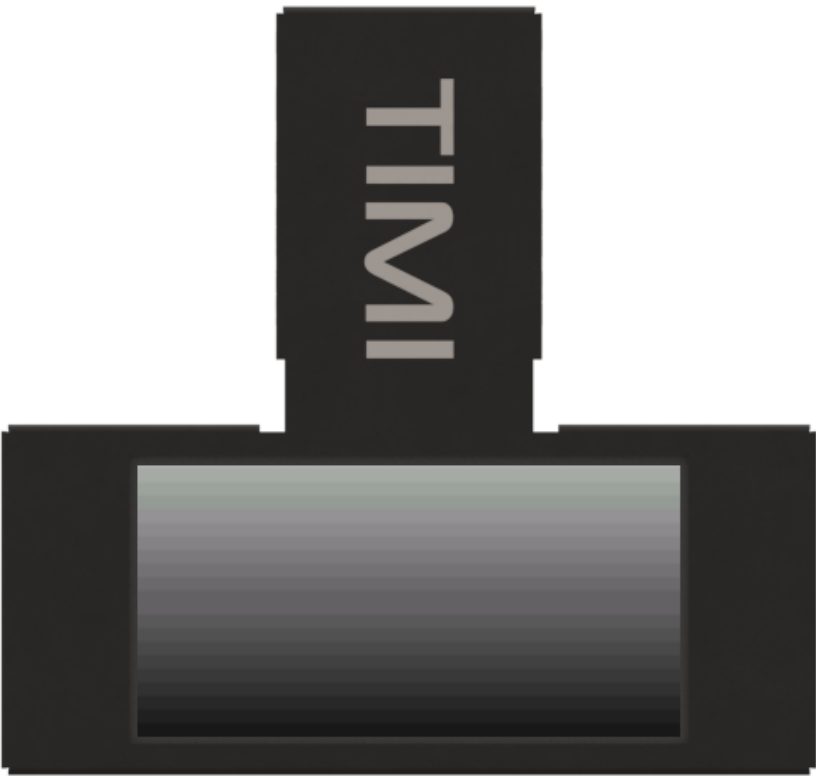| Property	Value
Name	DotMatrix0
Left	1
Top	1
Width	161
Height	81
Preview Text	BBM
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Flat Square
Pixel On Color	#FAB829 [0xFDC5]
Pixel Off Color	#3D2D00 [0x3960]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	5
Highlight Enable	No
Left Offset	8
Top Offset	4

Demonstration

For this demonstration we will using a Media Panel, 2 Dot Matrix widgets, 2 Text Areas, 2 Gauges and a Label widget to make a real analogue reading display. For instructions on how to add a widget, refer to this discussion.

Add a Media Panel widget from the Static tab.
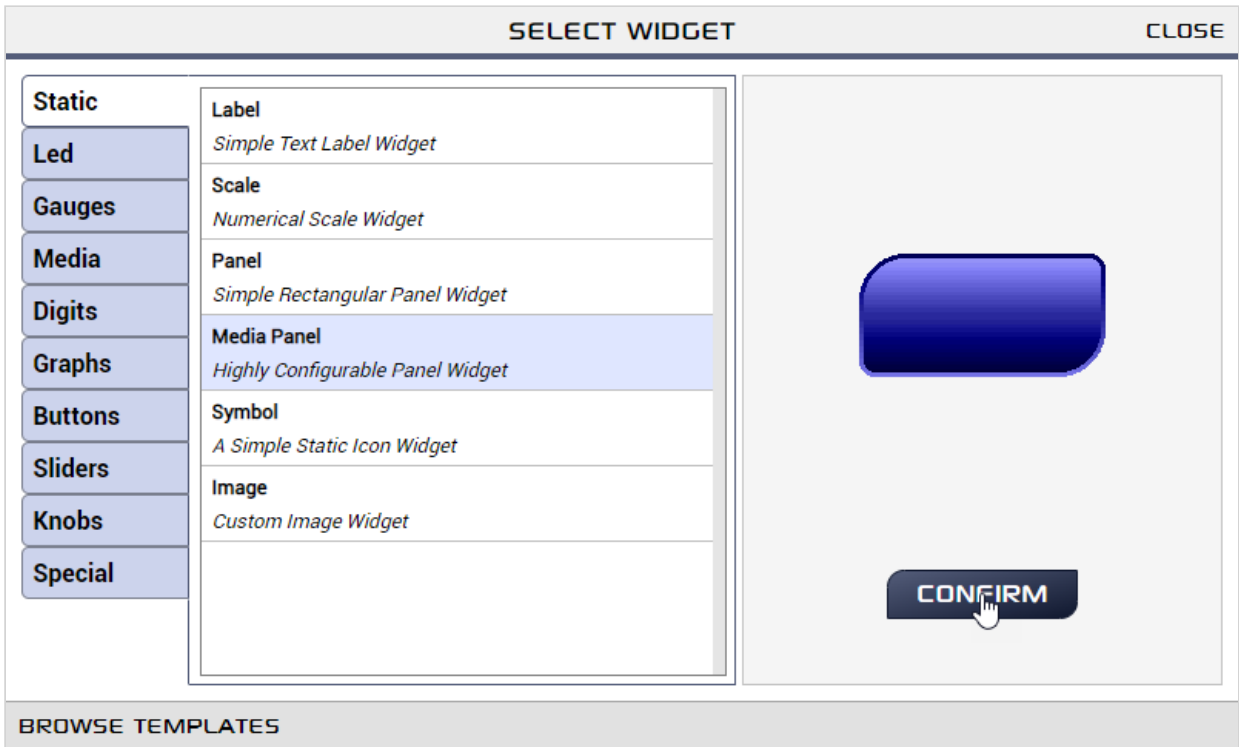
and then set the properties as shown.

Property	Value
Name	MediaPanel0
Left	0
Top	0
Width	160
Height	80
Panel Color	■ #2828A0 [0x2954]
Panel Style	Raised ▼
Panel Gradient Level	30
Bevel Color	■ #646464 [0x632C]
Bevel Style	Raised ▼
Bevel Gradient Level	20
Bevel Thickness	41
Top Left Corner Radius	1
Top Right Corner Radius	1
Bottom Left Corner Radius	1
Bottom Right Corner Radius	1

Next, add a Text Area widget from the Special tab and set the properties as shown.

Property	Value
Name	TextArea0
Left	5
Top	13
Width	150
Height	30
Alignment	Left ▼
Default Text	IO1_PIN
Preview Text	
Maximum Length	10
Font Style	Built-in FONT1 ▼
Font Color	🟩 #2CCC24 [0x2E64]
Font Size	1
Panel Color	⬛ #000000 [0x0000]
Panel Style	Raised ▼
Panel Gradient Level	30

Property	Value
Bevel Color	⬛ #646464 [0x632C]
Bevel Style	Sunken ▼
Bevel Gradient Level	20
Bevel Thickness	2
Top Left Corner Radius	7
Top Right Corner Radius	7
Bottom Left Corner Radius	7
Bottom Right Corner Radius	7
Left Offset	6
Top Offset	5
Right Offset	5
Bottom Offset	5

Add another Text Area widget and set the properties as shown.

Property	Value
Name	TextArea1
Left	5
Top	46
Width	150
Height	30
Alignment	Left ▼
Default Text	IO2_PIN
Preview Text	
Maximum Length	10
Font Style	Built-in FONT1 ▼
Font Color	🟩 #2CCC24 [0x2E64]
Font Size	1
Panel Color	⬛ #000000 [0x0000]
Panel Style	Raised ▼
Panel Gradient Level	30

Property	Value
Bevel Color	⬛ #646464 [0x632C]
Bevel Style	Sunken ▼
Bevel Gradient Level	20
Bevel Thickness	2
Top Left Corner Radius	7
Top Right Corner Radius	7
Bottom Left Corner Radius	7
Bottom Right Corner Radius	7
Left Offset	6
Top Offset	5
Right Offset	5
Bottom Offset	5

Next, add a Dot Matrix widget from the Led or Special tab and set the properties as shown.

Property	Value
Name	DotMatrix0
Left	66
Top	17
Width	81
Height	22
Preview Text	0.0v
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Full Gradient Square
Pixel On Color	#32FA28 [0x37C5]
Pixel Off Color	#054605 [0x0220]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	3
Highlight Enable	No
Left Offset	2
Top Offset	0

Add another Dot Matrix widget and set the properties as shown.

Property	Value
Name	DotMatrix1
Left	66
Top	50
Width	81
Height	22
Preview Text	0.0v
Bezel Enable	No
Bezel Color	#646464 [0x632C]
Pixel Style	Full Gradient Square
Pixel On Color	#32FA28 [0x37C5]
Pixel Off Color	#054605 [0x0220]
Pixel Gradient Color	#0F5A0F [0x0AC1]
Pixel Size	3
Highlight Enable	No
Left Offset	2
Top Offset	0

Next, add a Gauge A widget from the Gauges tab and set the properties as shown.

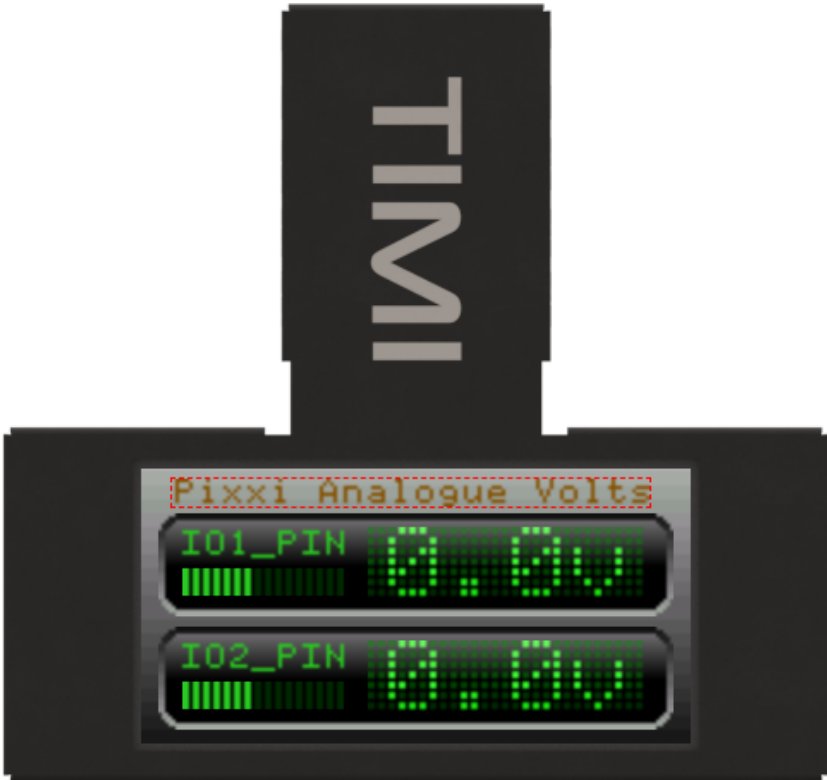| Property	Value
Name	GaugeA0
Left	12
Top	29
Width	47
Height	8
Minimum Value	0
Maximum Value	33
Bar Spacing	1
Bar Thickness	2
Base Color	⬛ #000000 [0x0000]
Partition 1 Percentage	50
Partition 1 Inactive Color	🟩 #002800 [0x0140]
Partition 1 Active Color	🟩 #2CCC24 [0x2E64]
Partition 2 Percentage	75
Partition 2 Inactive Color	🟩 #002800 [0x0140]
Partition 2 Active Color	🟩 #2CCC24 [0x2E64]
Partition 3 Inactive Color	🟩 #002800 [0x0140]
Partition 3 Active Color	🟩 #2CCC24 [0x2E64]
Fill Start Location	Bottom/Left ▾

Add another Gauge A widget and set the properties as shown.

Property	Value
Name	GaugeA1
Left	12
Top	62
Width	47
Height	8
Minimum Value	0
Maximum Value	33
Bar Spacing	1
Bar Thickness	2
Base Color	⬛ #000000 [0x0000]
Partition 1 Percentage	50
Partition 1 Inactive Color	🟩 #002800 [0x0140]
Partition 1 Active Color	🟩 #2CCC24 [0x2E64]
Partition 2 Percentage	75
Partition 2 Inactive Color	🟩 #002800 [0x0140]
Partition 2 Active Color	🟩 #2CCC24 [0x2E64]
Partition 3 Inactive Color	🟩 #002800 [0x0140]
Partition 3 Active Color	🟩 #2CCC24 [0x2E64]
Fill Start Location	Bottom/Left ▼

Finally, add a Label widget from the Static tab and set the properties as shown.

Property	Value
Name	Label0
Left	9
Top	3
Width	139
Height	8
Text	Pixxi Analogue Volts
Font Style	Built-in FONT1 ▼
Font Size	1
Foreground Color	🟫 #815304 [0x8280]
Background Type	Transparent ▼
Background Color	⬛ #000000 [0x0000]

If the Genius environment is being used the demonstration can be tested by entering simple code in the code window.

Or copy and paste the code below.

```
var valstring[3];

/* User Setup Function */
func setup()
    pin_Set(ANALOGUE, IO1_PIN);
    pin_Set(ANALOGUE, IO2_PIN);
endfunc

/* User Loop Function */
func loop()
    var v;
    v := AnalogToString(pin_Read(IO1_PIN));
    updateDotMatrix(DotMatrix0, valstring);
    setWidgetValue(GaugeA0, v);
    v := AnalogToString(pin_Read(IO2_PIN));
    updateDotMatrix(DotMatrix1, valstring);
    setWidgetValue(GaugeA1, v);
endfunc

func AnalogToString(var val)
    var v10, h, l;
    v10 := val / 124;
    h := v10 / 10;
    l := v10 - (h * 10);
    to(valstring);
    print(h);
    to(APPEND);
    print(".");
    to(APPEND);
    print(l);
    to(APPEND);
    print("v");
    return v10;
endfunc
```
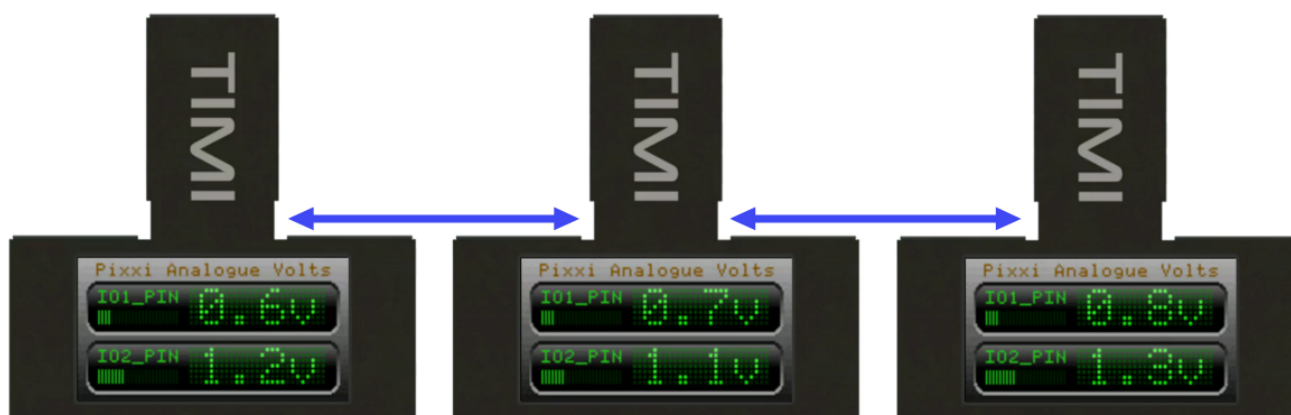
Ensure that the Port is set to the correct port that the TIMI module is connected to.
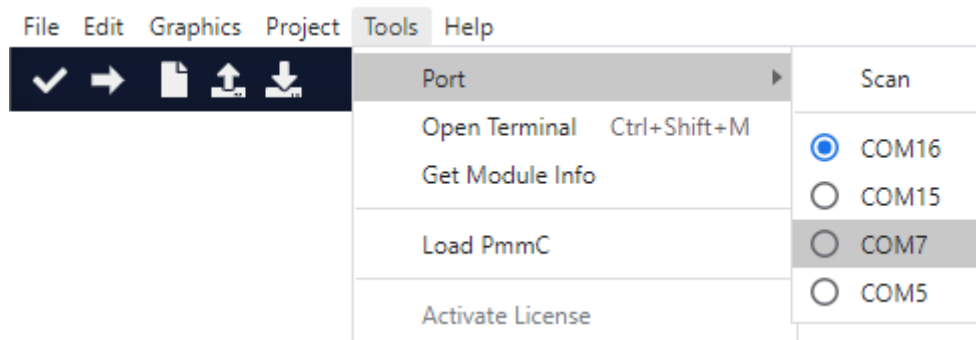
and then click on the Upload Button to Upload the entire project to the display.
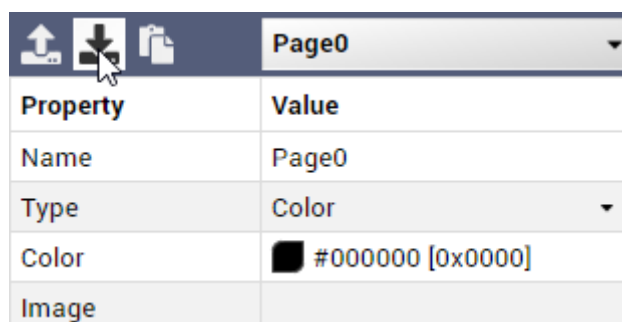

When the Upload has completed you should see the Dot Matrix widgets and Gauges displaying analogue readings from the Input pins.
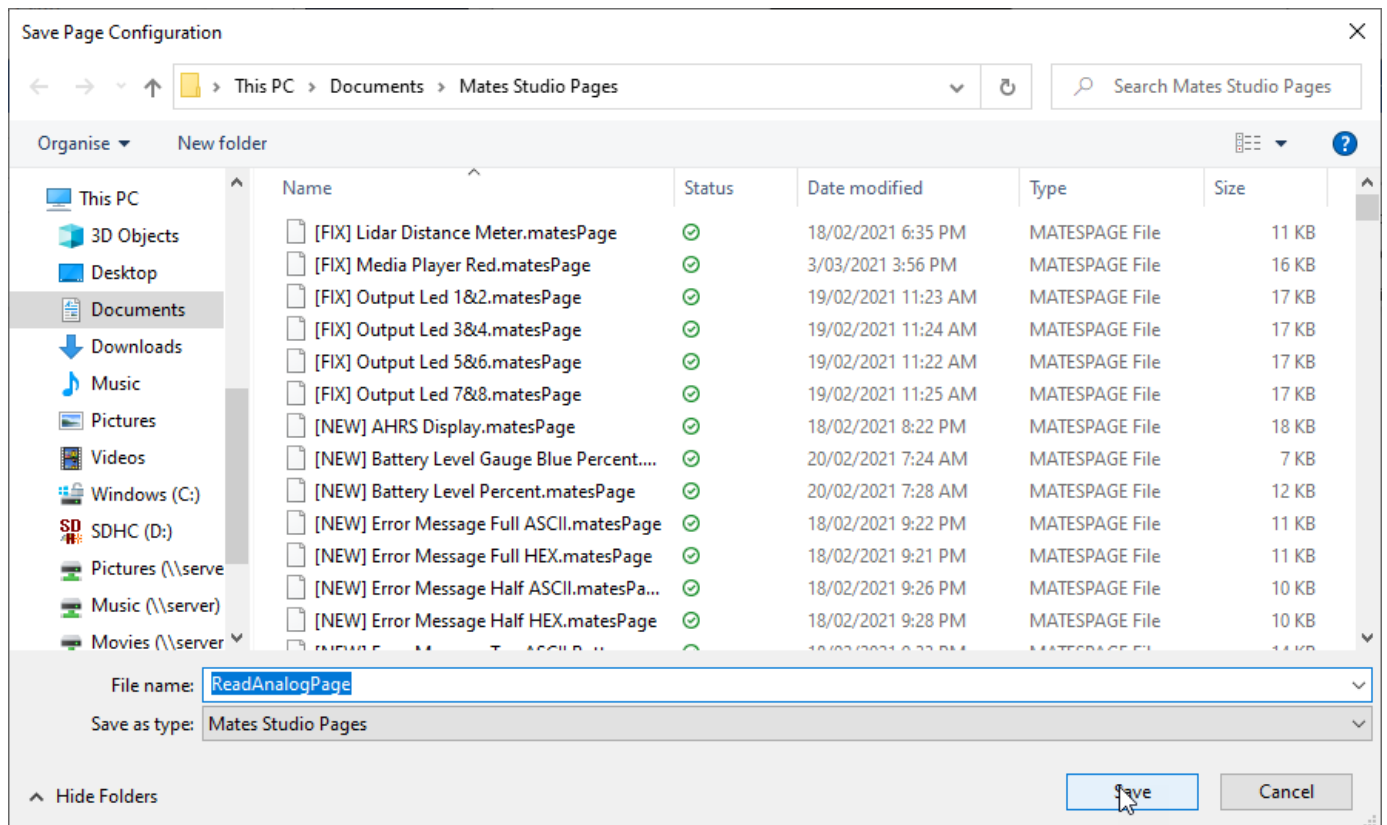

Or the page can be used in the Commander environment by saving the Page and clicking in the Object Selector to choose Page0.
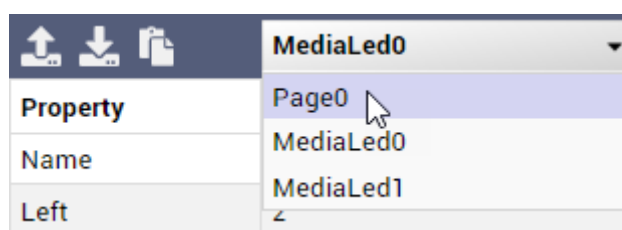
Then Click on Save Configuration.

A Save Dialogue Window will appear. Enter a filename (ReadAnalogPage) then click on Save

You can find out further information about the Commander Environment in the Getting Started with the Commander Environment tutorial.