

EVE Screen Designer 4.19.6 Widget Guide

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A. Preface

Purpose

The purpose of this document is to explain the functionalities and attributes of the widgets available in the **EVE S**creen **D**esigner (**ESD**) **4.19.6**.

Intended Audience

This documentation is targeted towards **ESD** users who wish to develop embedded GUI applications for the EVE-based platform.

Document References

Document Name	Document Type	Document Format
BT81X Series Programming Guide	Application Note (Programming Guide)	PDF
BT81X Advanced Embedded Video Engine Datasheet	Datasheet	PDF
FT81X_BT88X Series Programmers Guide	Application Note (Programming Guide)	PDF
FT81x Embedded Video Engine Datasheet	Datasheet	PDF
FT800 Series Programmer Guide	Application Note (Programming Guide)	PDF
FT9xx Toolchain Installation Guide	Application Note (Installation Guide)	PDF
EVE Screen Designer User Guide	Application Note (User Guide)	PDF

Feedback

Every effort has been taken to ensure that the document is accurate and complete. However, any feedback on the document may be emailed to <u>docufeedback@brtchip.com</u>. For any additional technical support, refer to <u>http://brtchip.com/contact-us/.</u>



B. Widget Overview

A widget is a logic node that is visually rendered by the Embedded Video Engine (EVE) and can be accessed through the library browser window of ESD. There are two types of widgets: ESD Widgets (built-in widgets) and User Widgets (custom widgets defined by users).

Advanced users may create custom widgets using the C source files directly. It is important to note that the first member in a custom widget must always be a predefined structure "ESD_Widget" to ensure that the ESD Widget framework function properly.

Widget is serialized into xml file format or C file format, depending how it is constructed. If widget is created by connecting the nodes in logic node editor, it is in xml format.



Figure 1 - Widgets

Certain widgets are compatible only with specific EVE series. Details are provided in Table 1.

Widget	EVE 1 (FT80x)	EVE 2 (FT81x/BT88x)	EVE 3 (BT815/816)	EVE 4 (BT817/818)
All widgets (except below)	~		~	
ESD Video	×			
ESD Animation	×	×		
Table 1 - FVF Series Widget Compatibility				

EVE Series Widg

What's new in ESD 4.19.6 Widget

Update existing widgets:

Enhance compatibility of ESD Arc Line, ESD Circle Line, ESD Polygon, and ESD • Textbox widgets for IDM2040-21R (FT800) platform.



Basic Widgets

ESD Basic widgets are introduced in ESD 4.0. These widgets are the widget wrappers for the Elemental and Primitive Rendering functions which include drawing lines, rectangles, points (circles) and bitmaps.

ESD Line Widget

ESD Line Widget allows the user to display a line as widget instead of a render function on the screen.

 ESD Widgets Basics 	Line Wi	idget
 ESD Arc Line ESD Circle ESD Circle Line ESD Circle Raised ESD Circle Sunken ESD Circular Gradient Line Widget ESD Multi Gradient (Rou 	 linewidth color Active X Y Width Height 	Pointer ● 5 ● #5bfa21 ○ true ○ 250 ○ 191 ○ 242 ○ 0 ○

Figure 2 - ESD Line Widget

Description
The pointer reference of the widget object
The thickness of a line widget
Select background colour
Set true to activate this widget
x coordinate of central point, in pixels
y coordinate of central point, in pixels
Width of the widget
Height of the widget

Table 2 - ESD Line Widget Properties



ESD Circle (Raised and Sunken) Widgets

The *ESD Circle* Widgets allow the user to display a circle as widget instead of a render function on the screen. ESD Circle will display a flat circle while ESD Circle Raised has raised border and ESD Circle Sunken has sunken border.





Property Name	Description	
Pointer	The pointer reference of the widget object	
Active	Set true if this widget is active.	
Color	RGB value to be rendered inside the circle	
Х	x coordinate of central point, in pixels	
Υ	y coordinate of central point, in pixels	
Width	Width of the circle	
Height	Height of the circle	
Table 2 ESD Circle Element Drepartice		

Table 3 - ESD Circle Element Properties

ESD Circle Line Widgets

The *ESD Circle Line* Widgets allow the user to display circle line with a hollow centre. ESD Circle Line has configurable border and colour.



Figure 4 - ESD Circle Line Widgets

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Property Name	Description	
Pointer	The pointer reference of the widget object	
Active	Set true if this widget is active.	
Х	x coordinate of central point, in pixels	
у	y coordinate of central point, in pixels	
Border	The border of the circle line widget	
Color	ARGB value to be rendered as the circle line widget	
Table 4 ESD Circle Line Element Dreparties		

 Table 4 - ESD Circle Line Element Properties

ESD Arc Line Widgets

The *ESD Arc Line* Widgets allow the user to display arc line which can cover 0 to 360 degrees of arc segment. ESD Arc Line has configurable border, colour, and origin of arc direction, value of arc segment in degree, clockwise directional flag, start point and end point settings.



Figure 5 - ESD Arc Line Widgets

Property Name	Description	
Pointer	The pointer reference of the widget object	
Active	Set true if this widget is active.	
Х	x coordinate of central point, in pixels	
Υ	y coordinate of central point, in pixels	
Border	The border of the arc line widget	
Color	ARGB value to be rendered as the arc line widget	
Origin	The origin of the arc direction, range from 0 to 360	
Angle	The arc segment angle value, range from 0 to 360	
IsClockwise	The Boolean to set for the arc's direction. Set true as clockwise	
	direction.	
Show Start Point	The Boolean to enable rendering start point	
Show End Point	The Boolean to enable rendering end point	
Show Point Shadow	The Boolean to enable rendering point shadow on start and end points	
Table 5 - ESD Arc Line Element Properties		



ESD Gradient Arc Line Widgets

The *ESD* Gradient Arc Line Widgets allow the user to display arc line which can cover 0 to 360 degrees of arc segment with gradient colour. ESD Gradient Arc Line has configurable border and origin of arc direction, value of arc segment in degree, clockwise directional flag, start point and end point settings. Additionally, the widget provides options to customize the gradient colour effect by specifying start and end colour.

ESD Widgets	ESD Gradient ArcLine
	Pointer 🔘
Basics	♦ Active
🖙 ESD Gradient ArcLine	♦ X
S ESD Arc Line	♦ Y
	• Width •
🐡 ESD Circle	Height O
ESD Circle Line	Border
ESD Circle Daired	Start_Color
ESD CITCle Raised	Crisin
	IsClockwise
	ShowEndPoint
	ShowStartPoin

Figure 6 - ESD Gradient Arc Line Widgets

Property Name	Description
Pointer	The pointer reference of the widget object
Active	Set true if this widget is active.
X	x coordinate of central point, in pixels
Υ	y coordinate of central point, in pixels
Width	Widget width
Height	Widget height
Border	The border of the arc line widget
Start_Color	Select the starting colour of the gradient effect
End_Color	Select the ending colour of the gradient effect
Origin	The origin of the arc direction, range from 0 to 360
Angle	The arc segment angle value, range from 0 to 360
IsClockwise	The Boolean to set for the arc's direction. Set true as clockwise direction.
Show Start Point	The Boolean to enable rendering start point
Show End Point	The Boolean to enable rendering end point

Table 6 - ESD Gradient Arc Line Element Properties

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ESD Panel and Panel Color Widgets

The *ESD Panel* Widgets allow the user to display panel as widget instead of a render function on the screen. *ESD Panel* background color can be configured by the theme selectable by the user. *ESD Panel Color* widget allows the user to select the background color of user choice unlike the theme selection offered by *ESD Panel* widget.



Figure 7 - ESD Panel and Panel Color Widgets

Description
The pointer reference of the widget object
Select the theme which affects the background colour
Set true for raised border, else it will be sunken border
x coordinate of central point, in pixels
y coordinate of central point, in pixels
Radius of the point

Table 7 - ESD Panel Widget Properties

Property Name	Description
Pointer	The pointer reference of the widget object
Color	Select background colour
Active	Set true to activate this widget
Х	x coordinate of central point, in pixels
Υ	y coordinate of central point, in pixels
Radius	Radius of the point
Raised	Set true for raised border, else it will be sunken border
	Table 8 - ESD Panel Color Widget Properties



ESD Touch Panel Widget

The ESD Touch Panel Widget allows the user to display panel as widget with touch event handler together. It consists of one ESD Panel, one touch tag and one touch area when it is applicable.



Figure 8 - ESD Touch Panel Widgets

Property Name	Description
Color	Select the background colour
Raised	Set true for raised border, else it will be sunken border
Radius	Radius of the point
ShowBorder	Show border of the touch panel
Include default tag	Set true to include default tag
Active	Set true to activate this widget
X	x coordinate of central point, in pixels
Y	y coordinate of central point, in pixels
Width	Widget Width
Height	Widget Height

Table 9 - ESD Touch Panel Widget Properties

er reference of the widget object
event signal
wn event signal
event signal
t of touching status
t of touch inside status
t of X coordinate of the touch point
t of Y coordinate of the touch point
t of X difference between last two touch points
t of Y difference between last two touch points
t of touch tag ID

 Table 10 - ESD Touch Panel Widget Output/Signal



ESD Circular Gradient Widget

The ESD Circular Gradient Widget allows the user to display a circular gradient in two different styles. User is able to select any gradient style by choosing it from the gradient type of property as mentioned in the Table 11 - ESD Gradient Circular Widget Properties. In the Gaussian style, the central circle inscribed in the outer square. In Pythagorean style, the central circle is larger and is partially obscured by the four sides of the outer square.



Figure 9 - ESD Circular Gradient Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Outer color	Select the outer colour of the gradient effect
Inner color	Select the inner colour of the gradient effect
Gradient Type	Set the gradient style to either ESD_PYTHAGOREAN to get Pythagorean Style, or ESD_GAUSSIAN to get Gaussian style
Active	Set true to activate this widget
Х	x coordinate of central point, in pixels
Υ	y coordinate of central point, in pixels
Width	Width of the widget
Height	Height of the widget

Table 11 - ESD Circular Gradient Widget Properties

ESD Rectangle Widget

The *ESD Rectangle Widget* allows the user to display a rectangle. User needs to specify the top right coordinates along with the height, width, border width and border color of the rectangle.



Figure 10 - ESD Rectangle Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Radius	Radius of the vertex point
Color	Select the inner colour of the polygon
Active	Set true to activate this widget

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Х	x coordinate of the top right coordinate, in pixels
Υ	y coordinate of the top right coordinate, in pixels
Width	Width of the widget
Height	Height of the widget
Border Width	Set the width of a rectangle's border
Border Color	Select the border colour of the polygon
	Table 10 - FOD Daster als Widest Description

Table 12 - ESD Rectangle Widget Properties

ESD Polygon Widget

The *ESD Polygon Widget* allows the user to display a polygon. User can draw up to 20-sided polygons. User can also select the inner color and the border color.

Properties x_i , y_i (x0, y0 ~ x2, y2) represent vertices coordinate of a polygon. These coordinates relative to the top-left pixel of the widget, rather than the screen. The values of (x_i , y_i) are not absolute. Users can modify the vertices property to add or remove a vertex. The number of vertices ranges from 1 to 20.





Property Name	Description
Pointer	The pointer reference of the widget object
Border_Width	Select the border width of the polygon
Border_Color	Select the border colour of the polygon
Fill_Color	Select the inner colour of the polygon
Active	Set true to activate this widget
Х	x coordinate of central point, in pixels
Υ	y coordinate of central point, in pixels
Vertices	Specify the number of vertices in the polygon
Xi	x coordinate of the i-th vertex, in pixels
y i	y coordinate of the i-th vertex, in pixels
Width	Width of the widget



Height of the widget Height

Table 13 - ESD Polygon Widget Properties

ESD Multi Gradient (Rounded) Widget

The ESD Multi Gradient (Rounded) Widget allows gradient rectangle with a user selectable color at all the vertex of the rectangle. User can also choose to round the edges.



Figure 12 - ESD Multi Gradient (Rounded)

Property Name	Description
Pointer	The pointer reference of the widget object
Active	Set true to activate this widget
Х	x coordinate of central point, in pixels
Υ	y coordinate of central point, in pixels
Width	Width of the widget
Height	Height of the widget
Alpha	Level of transparency or opacity of the widget
Radius	Radius for the rounding at the edge of the rectangle
Top left	Color at the top left of the rectangle
Top right	Color at the top right of the rectangle
Bottom left	Color at the bottom left of the rectangle
Bottom right	Color at the bottom right of the rectangle
	Table 14 - FSD Multi Gradient Widget Properties

ladie 14 ESD Multi Gradient widget Prop

Webstyle Widgets

This section covers a new series of webstyle widgets that are introduced in ESD 4.14. The widgets are built with the combinations of the different widgets and utilities to provide user with webstyle effect type of widgets. These widgets also serve as a demonstration to show how the existing widgets can be used as the fundamentals to create more customized widgets.

Webstyle widgets are not included by default as part of project. To include webstyle widgets into the project, users need to choose the "Esd WebStyle Widgets (Optional)" option in the "New Project" dialog as Figure 13.





Figure 13 – Include webstyle widget into project

ESD Web Outline Button Widget

The ESD Web Outline Button allows the user to add an outline of the specified width to the button. At the time of activation, the background and text color will toggle.



Figure 14 - ESD Web Outline Button Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Radius	Radius for the rounding at the edge of the rectangle
Border width	The width of the outline
Theme	Theme applied for the button
Alpha	Adjust the transparency
Font	Fonts used in the button. Same as bitmap handle defined in EVE
Font resource	Sets the font resource.
Text	The text content of the button. By default, "Button"
Text	The text content of the batton. By deladit, batton

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Height	Height of the widget
Width	Width of the widget
Υ	y coordinate of central point, in pixels
Х	x coordinate of central point, in pixels
Active	Set true to activate this widget
	OPT_ALIGN_TOP: Top, OPT_ALIGN_CENTER: Center, OPT_ALIGN_BOTTOM: Bottom
AlienY	OPT_ALIGN_LEFT. Left, OPT_ALIGN_CENTER: Center, OPT_ALIGN_RIGHT: Right
AlignX	Horizontal alignment of text

Table 15 - ESD Web Outline Button Properties

Output / Signal	Description
Pushed	Output signal when the push button is in pushed state
Table 16 - ESD Web Outline Button Output/Signal	

It is also possible to achieve a rounded button style by adjusting the radius parameter that is provided. The height and width shall be the same while the radius would approximately be half of the width.





ESD Web Text Button Widget

The ESD Web Text Button displays a text button that changes the text and background color when activated.



Figure 15 - ESD Web Text Button Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Primary	Primary state of the button –
	Set to True to use the Primary color from theme
	Set to False to use the default color from theme
Theme	Theme applied for the button
Font	Fonts used in the button. Same as bitmap handle defined in EVE
Font resource	Sets the font resource
Text	The text displayed on the button
Active	Active state of the button, set to true to appear on the screen
X	x coordinate of top-left point, in pixels
Υ	y coordinate of top-left point, in pixels
Width	Button width, in pixels
Height	Button height, in pixels

Table 17 - ESD Web Text Button Properties

Output / Signal	Description
Down / Up / Pushed	Output signal when the push button is Down/Up or Pushed state
Pushed	Output signal when the push button is in pushed state
Table 19 FCD Web Tast Button Output (Signal	

 Table 18 - ESD Web Text Button Output/Signal



ESD Web Text Transparent Button Widget

The ESD Web Text Transparent Button displays a text button with a transparent background. Upon activation, the specified background color will be shown as an indication of 'clicked'.





Property Name	Description
Pointer	The pointer reference of the widget object
Text	The text displayed on the button
Font	Fonts used in the button. Same as bitmap handle defined in EVE
Theme	Theme applied for the button
Primary	Primary state of the button –
	Set to True to use the Primary color from theme
	Set to False to use the default color from theme
Font resource	Sets the font resource to use custom font. Example: Arial, Times New Roman,
AlignX	Horizontal alignment of text
	OPT_ALIGN_LEFT: Left, OPT_ALIGN_CENTER: Center, OPT_ALIGN_RIGHT: RIGHT
AlignY	Vertical alignment of text
	OPT ALIGN TOP: TOD.
	OPT ALIGN CENTER: Center,
	OPT_ALIGN_BOTTOM: Bottom
Active	Active state of the button, set to true to appear on the screen
Х	x coordinate of top-left point, in pixels
Y	y coordinate of top-left point, in pixels
Width	Button width, in pixels
Height	Button height, in pixels
Background	Sets the background color used

Table 19 - ESD Web Text Transparent Button Properties

Output / Signal	Description
Down / Up / Pushed	Output signal when the push button is in Down/Up or Pushed state
Pushed	Output signal when the push button is in pushed state
Table 20 - ESD Web Text Transparent Button Output/Signal	



Other Widgets

This section describes more complex widgets which may be composed of the basic widgets and uses other utilities provided by the ESD. These widgets serve as the guide for user to create custom widgets.

ESD Arc Slider

The *ESD Arc Slider* displays the arc line and, in addition, allows the user to control the value by dragging the slider. It also supports configurable border width and color.



Figure 17 - ESD Arc Slider Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Clockwise	The Boolean to set the arc's direction. Set true as clockwise direction.
Origin	The origin direction of the ring, range from 0 to 360.
Ring width	Defines the ring width
Inner border	Defines the inner border width, set -1 to disable it
Outer border	Defines the outer border width, set -1 to disable it
Border color	Set the ring's inner and outer border color in RGB
Selection color	Set the ring's selection color in RGB
Background color	Set the ring's background color in RGB
Active	Set true if this widget is active.
X	Coordinate of button, top-left, in pixels
Υ	Coordinate of button, top-left, in pixels
Width	Widget width, in pixels
Height	Widget height, in pixels
Max angle	Defines the max angle of the selection, range from 1 to 360.
Value	Indicates the current value of the slider
Max value	Indicates the maximum value allowed for the slider, range from 10 to 1024.

 Table 21 - ESD Arc Slider Widget Button Properties



ESD Check Box

The *ESD Check Box* is a widget which has two states and toggles its own state based on user's touch input.



Figure 18 - ESD Check Box Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Toggle	Slot function to toggle the state of check box
Theme	Get theme (background/text/default/ color)
Font	Fonts used in the label. Same as bitmap handle defined in EVE
Font Resource	Sets the font resource
X	Absolute X position on the horizontal axis
Y	Absolute Y position on the vertical axis
Width	Widget width
Height	Widget height
Alpha	Adjust the transparency
Text	The display label next to the check box
Value	Checked/Unchecked
Table 22. FOR Charle Raw Wildret Respective	

Table 22 - ESD Check Box Widget Properties

Users can connect the *ESD Check Box* with other widgets in order to get user's input via a signal mechanism.

Please note that the 'Toggled' signal of the widget should not be connected to its own 'Toggle' slot because this will cause the widget not to function properly.



ESD Circular Slider

The ESD Circular Slider functions are similar to the ESD Arc Slider widget, except that it allows for the sliding of a complete circle instead of just a portion of it. The colour of the inner border will reflect the value of the slider.

ESD Widgets	ESD Circula	r Slider	
Basics		Pointer 🔘	
Webstyle	Clockwise	true 🔘	
SD OBCode	Origin	270 🔘	
	Ring Width	50 💽	
ESD Animation	 Inner Border 	10 🔘	
🛋 ESD Arc Slider	Outer Border	4 🔘	
ESD Check Box	Border Color	#d0cec6 O	
SED Circular Slider	Selection Color	#c55a11 🔾	
	Background	#060504 🔾	
ESD Clock	O Value Color	#35ac39 🔘	
🍯 ESD Color Picker	 Active 	true O	
T ESD Fixed Point Label	X	213 0	
	V Y	870	
esb Gauge		300 0	
Gradient Widget	Height	300 0	
📼 ESD Image	Value		
ESD Image Button	Unit value	100 0	
		200.0	

Figure 19 - ESD Circular Slider Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Clockwise	The Boolean flag to set the direction. Set true as clockwise direction.
Origin	The origin direction of the ring, range from 0 to 360.
Ring width	Defines the ring width
Inner border	Defines the inner border width, set -1 to disable it.
Outer border	Defines the outer border width, set -1 to disable it.
Border color	Set the ring's inner and outer border color in RGB
Selection color	Set the ring's selection color in RGB
Background color	Set the ring's background color in RGB
Value color	Set the display value color in RGB
Active	Set true if this widget is active.
X	Coordinate of button, top-left, in pixels
Y	Coordinate of button, top-left, in pixels
Width	Widget width, in pixels
Height	Widget height, in pixels
Value	Indicates the current value of the slider
Unit value	Unit value for one complete round of the selection circle
Max value	Indicates the maximum value allowed for the slider, range from 10 to 1024.
—	able 22 FCD Cinesian Cliden Widnet Duenestice

Table 23 - ESD Circular Slider Widget Properties



ESD Circular Gradient Slider

The ESD Circular Slider displays the arc gradient line in a complete circle. In addition, it allows the user to control the value by dragging the slider.



Figure 20 - ESD Circular Gradient Slider Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Origin	The origin direction of the ring, range from 0 to 360.
Border	Defines the border width
Color1	Select the starting colour of the gradient effect
Color2	Select the ending colour of the gradient effect
Active	Set true if this widget is active.
Х	Coordinate of button, top-left, in pixels
Y	Coordinate of button, top-left, in pixels
Width	Widget width, in pixels
Height	Widget height, in pixels
Angle	The arc segment angle value, range from 0 to 360
Table 24 - ESD Circular Gradient Slider Widget Properties	

Table 24 - ESD Circular Gradient Slider Widget Properties

ESD Clock

The ESD Clock is a basic widget based on EVE built-in widget. It can be accessed from the library browser under the ESD Widgets folder.



Figure 21 - ESD Clock Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied on the widget



Adjust the transparency
The Hour hand position
The Minute hand position
The Second-hand position
The time expressed in milliseconds unit
Currently not in use
Set true if this widget is active.
x coordinate of the top-left of the widget, in pixels
y coordinate of the top-left of the widget, in pixels
Widget width
Widget height
Set Widget Auto resize mode
Set true to show background

Table 25 - ESD Clock Widget Properties

Users can connect the ESD clock with other widgets, such as ESD toggle or ESD timer via hours/minutes/seconds or milliseconds properties. The figures here depict the process of using an ESD Toggle widget to start or stop a clock, along with the relevant logic node connection.





Figure 22 - ESD Clock Widget Use Case - Logic Node Editor

ESD Color Picker

The ESD Color Picker widget features a circular-style color picker that is linked to a circular bitmap. It enables users to interact with the widget through touch and generates an RGB color value as output based on the corresponding touch point. By adding the "circular_colorwheel.png" bitmap from the "Ft_Esd_Widget" library into their project, users can easily connect the widget. Although the bitmap can be replaced, it must maintain the same style and only differ in radius, which can be modified using the Property Editor. Additionally, users can decrease the brightness of the RGB value output by adjusting the Lightness property.





Figure 23 - ESD Color Picker Widget

Property Name	Description
Pointer	The pointer reference of the widget object
X	x coordinate of the top-left point, in pixels
Υ	y coordinate of the top-left point, in pixels
Width	Widget width
Height	Widget height
Bitmap	The bitmap cell used in the colour picker
Radius	The radius of the circular image (in pixels)
Lightness	Select the brightness for the output color
Table 26 - ESD Color Picker Widget Properties	

Output / Signal	Description
Color	The current colour based on the user's touch and selected bitmap
Table 27 - ESD Color Picker Widget Output/Signal	

The "colorpicker" example project showcases how to use ESD Color Picker widget. In Figure 24, the Hue and Saturation (H, S) of rectangle color come from the color picker widget, while the lightness (L) comes from the value of slider bar. Upon touching the color wheel, the color of the rectangle will change accordingly.





Figure 24 - Color Picker Example Project



ESD Gauge

The *ESD Gauge* is a circular widget which is based on the **EVE** built-in widget. The needle within the gauge is a visual representation of the input value. The widget is not designed to interact with touch input from the user.



Figure 25 - ESD Gauge

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied to this widget
Alpha	Adjust the transparency
Value	Current value that the needle is pointing to
Range	Value range
Major	Major Division
Minor	Minor Division
Show Ticks	Set true to show ticks and vice versa
Show Pointer	Set true to show needle and vice versa
Show Background	Set true to show background and vice versa
X	x coordinate of the top-left point, in pixels
Y	y coordinate of the top-left point, in pixels
Width	Widget width
Height	Widget height
AutoResize	Set Widget Auto resize mode

 Table 28 - ESD Gauge Widget Properties



ESD Gradient Widget

The *ESD* Gradient Widget allows the user to display gradient rectangle as widget instead of a render function on the screen.





Figure 26 - ESD Gradient Widget

Property Name	Description	
Pointer	The pointer reference of the widget object	
Start color	Select the starting colour of the gradient effect	
End color	Select the ending colour of the gradient effect	
Direction	Set the gradient effect's direction in degrees. The degree and value range are from 0 to 359	
Active	Set true to activate this widget	
Х	x coordinate of central point, in pixels	
Υ	y coordinate of central point, in pixels	
Width	Width of the widget	
Height	Height of the widget	
Perpendicular Style	Set the gradient effect's direction based on the selected options. When turned on, it shall overwrite the above direction stated and employs a different calculation for the gradient effect. ESD_PERPENDIDULAR_STYLE_OFF: Off, ESD_PERPENDIDULAR_STYLE_0: 0, ESD_PERPENDIDULAR_STYLE_90: 90, ESD_PERPENDIDULAR_STYLE_180: 180, ESD_PERPENDIDULAR_STYLE_270: 270	
Manual	Manual mode control. This feature takes precedence over the above settings when activated	
Hide Cursor	Show anchor point for manual mode control	
Point_1_X	x-coordinate of Point 1	
Point_1_Y	y-coordinate of Point 1	
Point_2_X	x-coordinate of Point 2	
Point_2_Y	y-coordinate of Point 2	

Table 29 - ESD Gradient Widget Properties

To use the manual mode feature, the user is required to enable the 'Manual' option in the property editor. Disabling the 'Hide Cursor' option will display the anchor points at the specified location specified by Point 1 and 2 coordinates. The corresponding coordinates will also be displayed.





Figure 27 - Gradient Widget Manual Mode

It is required to run the simulation to adjust the anchor points. Click and drag the individual point to adjust the gradient effect. Once done, the user will need to manually enter the value of the coordinates into the corresponding fields (Point_1 and Point_2) in the property editor. The settings will be saved after the user saves the project.

ESD Image Widget

The *ESD Image widget* is the standard image widget that allows users to display a bitmap resource. To rotate an image, use the ESD Image widget.



Figure 28 - ESD Image Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Bitmap Cell	The bitmap cell to be displayed on the widget
Alpha Filter	Alpha Filter setting, set 0 to disable it, or 1-255 for alpha function filtering
Active	Set true if this widget is active.
Х	x coordinate of the image button, top-left, in pixels
Υ	y coordinate of the image button, top-left, in pixels
Width	Image button width, in pixels
Height	Image button height, in pixels
Color	Default colour
Align	Set Image alignment mode
Scaling	Set Image scaling mode
AutoResize	Set Widget Auto resize mode
ScaleX	X Scale value for the image
ScaleY	Y Scale value for the image

Table 30 - ESD Image Properties

Output / Signal	Description
RenderComplete	Output signal when bitmap render is completed
Table 31 - ESD Image Output/Signal	



ESD Image Button Widget

The *ESD Image Button* widget allows the user to add a button in the form of a bitmap.



Figure 29 - ESD Image Button Widget

Description
The pointer reference of the widget object
Alpha Filter setting. Set 0 to disable it, or 1-255 for alpha function filtering
Bitmap cell to display in the normal state
Bitmap cell to display in the pressed state
Active state of the image button, set to true to appear on the screen
x coordinate of the image button, top-left, in pixels
y coordinate of the image button, top-left, in pixels
Image button width, in pixels
Image button height, in pixels
When the button is clicked, toggle Bitmap Normal and Bitmap Pressed
Default colour
Colour of button when button is pressed.
Set Image alignment mode
Set Image scaling mode
Set Widget Auto resize mode
Scale X ratio to the original for the image
Scale Y ratio to the original for the image

Table 32 - ESD Image Button Properties

Output / Signal	Description
Down / Up / Pushed	Output signal when image button is in Down/Up or Pushed state
Pushing	Output value indicated (true) if the image button is in pressed state
Table 33 - ESD Image Button Output/Signal	

The following example illustrates how to add/ use an image button.

Add new image buttons and assign "Bulb Off Image" and "Bulb On Image" (refer to the bitmap pictures below) to "Bitmap Normal" and "Bitmap Pressed" properties.



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Bulb Off image (bitmap cell name is bulb1Off_0)



Bulb On image (bitmap cell name is bulb1On_0)

Property	Value		
(ESD Image Button)			
Name	ESD Image Button		
Active	✓ True		
Theme	Ft_Esd_Theme_GetCurrent		
Х	400		
γ	200		
Bitmap Normal	bulb1Off_0		-
Bitmap Pressed	bulb1On_0	Normal State	Pressed State

Figure 30 - ESD Image Button Example

The following examples illustrate the use case of Alpha Filter.



All the available images (numerals, tick sign etc) are available as image resources (e.g., Bitmap, PNG etc.). These image resources are typically available in two-dimensional rectangular image containers/files.

Use case 1: Image in red (numeral 3)

When a user draws a numeral (say, numeral 3) image resource, all the pixels in the red box are painted. Thus, all the drawn pixels are identified with the tag associated with the number 3. Such an approach has a drawback. The non-colour portion of the image are also drawn and are associated with the tag, thus even clicking on the black portion of the numeral 3 will trigger the associated tag for numeral 3 which is not desired.

Solution: Since tagging is associated with the pixels that are drawn, ESD Image/ ESD Image Button can be configured to draw only pixels which are above *Alpha Filter* value. The black portion of the image resource can be set to alpha value 0. With an *Alpha Filter* value set to 255, only the portion with alpha greater than or equal to 255 will be rendered and can be tagged.



Use case 2: Image in green (tick sign)

This can be achieved by

- (i) Selectively applying alpha to the image resource
- (ii) Setting the Alpha Filter

For example, alpha can be set to below 200 for portions outside the circle, and above 200 for inside the circle. With an *Alpha Filter* value set to 200, only the inner portion of the circle will be rendered and it can be associated with a tag. This can help achieve a desired alpha blend along with the desired tagging behaviour.

ESD Image Rotate Widget

The *ESD Image Rotate widget* is similar to the ESD Image widget that allows the user to display a bitmap resource with the rotation angle.



Figure 31 - ESD Image Rotate Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Bitmap Cell	The bitmap cell to be displayed on the widget
Active	Set true if this widget is active.
X	x coordinate of the image button, top-left, in pixels
Υ	y coordinate of the image button, top-left, in pixels
Width	Image button width, in pixels
Height	Image button height, in pixels
Colour	Default colour
Rotate Angle	The Rotation Angle, range: 0 to 65535
ScaleX	Scale X ratio to original.
ScaleY	Scale Y ratio to original.

Table 34 - ESD Image Rotate Properties



ESD Joypad Widget

The ESD Joypad widget allows the user to control the movement/direction of elements that are connected to the output of the widget. It supports 360° direction movement achievable by using the control knob which is at the centre of the widget.

▼ 📕 ESD Widgets	ESD Joyp	ad
		Pointer 🔘
Webstyle	Knob Radius	25 🔘
ESD QRCode	Knob Color	ŏ
ESD Animation		true O
🍓 ESD Arc Slider	✓ Active	202
ESD Check Box	× A	302 0
🍓 ESD Circular Slider	V Y	146 0
🕒 ESD Clock	Width	140 0
🕨 🍯 ESD Color Picker	Height	140 🔾
${f T}$ ESD Fixed Point Label	Lock X Axis	false 🔾
🕒 ESD Gauge	Lock Y Axis	false 🔘
Gradient Widget	DefaultBack	true 🔾
ESD Image	Background	0
📼 ESD Image Button		Angle 🔘
📼 ESD Image Rotate)istFrCenter 🔘
🏝 ESD Joypad		KnobX 🔘
T ESD Label		KnobY 🔘

Figure 32 - ESD Joypad Widget

Property Name	Description	
Pointer	The pointer reference of the widget object	
Knob Radius	The radius of the control knob	
Knob Color	The color of the control knob	
Active	Set true if this widget is active.	
X	x coordinate of the Joypad, top-left, in pixels	
Υ	y coordinate of the Joypad, top-left, in pixels	
Width	Joypad width, in pixels	
Height	Joypad height, in pixels	
Lock X Axis	Locked the X axis for a better control in Y axis only	
Lock Y Axis	Locked the Y axis for a better control in X axis only	
DefaultBackground	Display default background of the widget	
BackgroundImage	Display user's selected image as background	
Table 35 - FSD Joynad Properties		

Table 35 - ESD Joypad Properties

Output / Signal	Description
Angle	Angle of control knob from centre, range from 0 to 359
DistFrCenter	Distance of control knob from centre, range from 0 to size of Joypad
KnobX	x coordinate of knob, centre, in pixels
KnobY	y coordinate of knob, centre, in pixels

Table 36 - ESD Joypad Output/Signal



ESD Label Widget

The ESD Label widget allows the user to add a Text Label with customized size and text.





Figure 33 - ESD Label Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme applied on the label
Alpha	Adjust the transparency
Font	Fonts used in the label. Same as bitmap handle defined in EVE
Font resource	Sets the font resource.
Text	The text content of the label. By default, "Label"
AlignX	Horizontal alignment of text
	OPT_ALIGN_LEFT: Left, OPT_ALIGN_CENTER: Center, OPT ALIGN RIGHT: Right
AlignY	Vertical alignment of text
	OPT_ALIGN_TOP: Top, OPT_ALIGN_CENTER: Center, OPT_ALIGN_BOTTOM: Bottom
Active	Active state of the label. Set to true to appear on the screen
Х	x coordinate of label, top-left, in pixels
Y	y coordinate of label, top-left, in pixels
Width	Label width, in pixels
Height	Label height, in pixels
AutoResize	Set Widget Auto resize mode
BackGroundAlpha	Adjust background transparency of the label
	Table 27 ESD Label Dreparties

Table 37 - ESD Label Properties



ESD Numeric Label Widget

The *ESD Numeric Label* widget allows the user to add a numeric label i.e., with value in **integer**. ESD Numeric Label outputs are similar to C printf("%d'') and printf("%x'') functions.

📼 ESD Image Button	ESD Nume	ric Label	Decimal N	Numbers		
📮 ESD Image Rotate		Pointer 🔘			. .	Diaht
🚨 ESD Joypad	O Theme	Ft_Esrrent O		Left	Center	Right
T ESD Label	O Alpha	255 🔘	Normal	123	-456	47
ESD Label Button	Font Font Font	27 🔘				
🎒 ESD Linear Roller	AlignX	OPTLEFT O	Padding	123	-156	780
👜 ESD Number Pad	O AlignY	OPTNTER O			-400	109
T ESD Numeric Label	AutoResize Integer value	ESDIGHT O	0Padding	00123	-0456	00789
🂐 ESD Partial Ring		false O				
ESD Progress Bar	No Of Digits	5 O				
ESD Push Button	 IsZeroLeading 	false O	Hex Numb	bers		
ESD RSSI Bar	 IsHexDisplay Active 	true Q	Normal	0x7B	0x1C8	0x2F
ESD Radio Button	♦ x	0 0				
	🔷 Ү	0 🔾	Padding	0x 7B	0x 1C8	0 215
ESD Radio Group	♦ Width	120 O	. aaanig	on 12	07 100	08 315
 ESD RangeSlider 	 Height 	36 🔾		00070	0001.00	
 ESD RangeSliderInterval 		FontHeight O	OPadding	0X007B	000108	0x00315

Figure 34 - ESD Numeric Label

Property Name	Description		
Pointer	The pointer reference of the widget object		
Theme	Theme applied on the label		
Font	Fonts used in the label. Same as bitmap handle defined in EVE		
Font resource	Set the font resource.		
AlignX	Horizontal alignment of text		
	OPT_ALIGN_LEFT: Left,		
	OPT_ALIGN_CENTER: Center,		
	OPT_ALIGN_RIGHT: Right		
AlignY	Vertical alignment of text		
	OPT_ALIGN_TOP: Top,		
	OPT_ALIGN_CENTER: Center,		
	OPT_ALIGN_BOTTOM: Bottom		
AutoResize	Set Widget Auto resize mode		
Integer Value	The integer value of the numeric label.		
EnablePadding	Set true to enable padding		
No Of Digits	Number of digits, padding will be applied when the number of digits is less.		
IsZeroLeading	Set true to enable '0' leading characters as padding		
IsHexDisplay	Set true to enable Hexadecimal display format		
Active	Active state of the label, set to true to appear on the screen		
Х	x coordinate of label, top-left, in pixels		
Y	y coordinate of label, top-left, in pixels		
Width	Label width, in pixels		
Height	Label height, in pixels		

Table 38 - ESD Numeric Label Properties



ESD Number Pad Widget

The *ESD Number Pad* widget allows the user to input numbers/digits. The value of the key input is sent out immediately after detection.



Figure 35 - ESD Number Pad Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Font	Fonts used in the widget. Same as bitmap handle defined in EVE
Font resource	Set the font resource.
Active	Set true if this widget is active.
Х	x coordinate of the Number pad, top-left, in pixels
Υ	y coordinate of the Number pad, top-left, in pixels
Width	Number pad's width, in pixels
Height	Number pad's height, in pixels
TouchPattern	When activated, connecting lines will be shown when user presses and drags between the numbers. Multi-input detection is allowed via swiping. When it is turned off, multi-input detection is not allowed via swiping. Only the first selected input is highlighted.
	<u>Note</u> : This is only graphical display and input detection mode. The numbers are sent out individually upon input detection in both cases.

Table 39 - ESD Number pad Properties



TouchPattern Off



TouchPattern On

Output / Signal	Description	
KeyReleased	Signal will be sent when touch is released from the number pad	
KeyPressed	Signal will be sent when there is a valid input on the number pad	
InputKey	The touched key value. User should rely on the 'Keypressed' signal to register the valid touched input value. Value read from this field is only valid if 'Keypressed' signal is detected.	
Table 40 - ESD Number and Output (Signal		

 Table 40 - ESD Number pad Output/Signal



ESD Fixed Point Label Widget

The *ESD Fixed Point Label* Widget allows the user to add a fixed-point label with value in fixed point. ESD Fixed Point Label outputs are similar to C function printf("%f").



Figure 36 - ESD Fixed Point Label Widget

Property Name	Description		
Pointer	The pointer reference of the widget object		
Theme	Theme applied on the label		
Font	Fonts used in the label. Same as bitmap handle defined in EVE		
Font resource	Sets the font resource.		
Align X	Horizontal alignment of text		
	OPT ALIGN LEFT: Left,		
	OPT_ALIGN_CENTER: Center,		
	OPT_ALIGN_RIGHT: Right		
Align Y	Vertical alignment of text		
	OPT ALIGN TOP: TOD.		
	OPT_ALIGN_CENTER: Center,		
	OPT_ALIGN_BOTTOM: Bottom		
AutoResize	Set Widget Auto resize mode		
Float Value	The float value of the fixed-point label.		
EnablePadding	Set true to enable padding		
No Of Digits	Number of digits, padding will be applied when the number of digits is less.		
NoOfDigitsAfterDot	Number of digits after the dot.		
IsZeroLeading	Set true to enable '0' leading character as padding		
Active	Active state of the label, set to true to appear on the screen		
Х	x coordinate of label, top-left, in pixels		
Y	y coordinate of label, top-left, in pixels		
Width	Label width, in pixels		
Height	Label height, in pixels		

Table 41 - ESD Fixed Point Label Properties



ESD Label Button Widget

The *ESD Label Button* widget allows the user to add a button in the form of a label.



Figure 37 - ESD Label Button Widget

Property Name	Description		
Pointer	The pointer reference of the widget object		
Theme	Theme applied on the label button		
Font	Font used in the label button. Same as bitmap handle defined in EVE		
Font resource	Set the font resource.		
Text	The text content of the label button. By default, "Label"		
Primary	Primary state of the label button – Set to True to use the Primary colour from theme Set to False to use the default colour from theme		
AlignX	Horizontal alignment of text OPT_ALIGN_LEFT: Left, OPT_ALIGN_CENTER: Center, OPT_ALIGN_RIGHT: Right		
AlignY	Vertical alignment of text OPT_ALIGN_TOP: Top, OPT_ALIGN_CENTER: Center, OPT_ALIGN_BOTTOM: Bottom		
AutoResize	Set auto resize mode: ESD_AUTORESIZE_NONE ESD_AUTORESIZE_WIDTH ESD_AUTORESIZE_HEIGHT ESD_AUTORESIZE_BOTH		
Active	Active state of the label. Set to true to appear on the screen		
X	x coordinate of label button, top-left, in pixels		
Y	y coordinate of label button, top-left, in pixels		
Width	Label button width, in pixels		
Height	Label button height, in pixels		
PressNHold	To maintain 'Pressed' state after clicked when set to true		

Table 42 - ESD Label Button Properties


The logic node connection in Figure 38 shows how a toggle changes the state upon pushing the label button. When label button is pushed, the corresponding output signal is **"Pushed"**.



Figure 38 - ESD Label Button Example

ESD Radio Button and ESD Radio Group Widgets

The *ESD Radio Button* widget is used to choose options. The *ESD Radio Button Group* widget is a utility widget which is not rendered to display. It enables multiple radio buttons to form a single group; only one radio button can be selected at a time.



Figure 39 - ESD Radio Button & ESD Radio Group

Property Name	Description
Pointer	The pointer reference of the widget object
Check	Selected or not selected
Theme	Theme to be applied to this widget
Alpha	Adjust the transparency
Radio Group	Pointer to a radio group
Font	Font Size
Font resource	Set the font resource
Text	The display label beside the radio button
Active	Enable or disable displaying this widget
X	Absolute X position on the horizontal axis
Y	Absolute Y position on the vertical axis
Width	Widget width
Height	Widget height

Table 43 - ESD Radio Button Properties



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An ESD Radio Button has 2 states: Checked or Unchecked. Checked state is selected by clicking an empty box, or by receiving an external signal from other sources (Push Button, Image Button, Checkbox, etc.).

Each Radio Button has a pointer to an ESD Radio Group; it shares the same context. Only one Radio Button can be checked at a time. When an ESD Radio Group receives a Reset signal, it will reset all states of its children Radio Buttons. Refer to Figure 40.

ESD Pusi	h Button						
	Pointer O						
	Down						
	Up 🗆						
	Pushed						
O Theme	Ft Esrrent O						
 Font 	27 🔘	\					
 Text 	Clear 🔘						
O Primary	1 O						
Active	true 🔘						
♦ x	60 🔘	ESD Rad	lio Group				
🔷 Ү	200 🔘	Reset					
🔷 Width	120 🔘	La never	Pointer				
Height	36 🔘						
	Pushing 🔘						
ESD Radi	o Button	ESD Rad	io Button	ESD Radi	o Button	ESD Rad	io Button
	Pointer 🔎		Pointer 🔘		Pointer O		Pointer 🔘
Check		Check		Check		Check	
	Checked 🗆		Checked 🗖		Checked		Checked 🗖
O Theme	Ft_Esrrent O	O Theme	Ft_Esrrent 🔘	O Theme	Ft_Esrrent O	O Theme	Ft_Esrrent 🔾
Radio Group	0	Radio Group	•	🖲 Radio Group	0	🗕 🔴 Radio Group	•
Font	27 🔘	Font	27 🔘	Font	27 🔾	Font	27 🔾
Text	Option 🔘	 Text 	Option 🔘	 Text 	Option 🔘	Text	Option 🔘
Active	true O	Active	true O	Active	true O	Active	true O
♦ x	60 🔘	♦ X	60 🔘	♦ x	60 🔘	♦ x	60 🔘
 У 	80 🔘	♦ Y	110 O	♦ Y	140 🔘	<u></u>	170 O
♦ Width	20 🔾	🔷 Width	20 🔘	Width	20 🔘	Width	20 🔾
Height	20 🔾	Height	20 🔾	 Height 	20 🔘	 Height 	20 🔾
 Height 	20 O Value O	Height	20 O Value O	 Height 	20 O Value O	 Height 	20 O Value O

Figure 40 - ESD Radio Button & ESD Radio Group Example

Please note that the 'Checked' signal of the widget should not be connected to its own 'Check' slot. This will cause the widget not to function properly.



Radio Button Groups

🏏 Option

Option

) Option

Option

) Option

Option

) Option

) Option



ESD Push Button

The *ESD Push Button* widget allows the user to add a 3D effect rectangle button with customized size and text label.



Figure 41 - ESD Push Button Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme applied for the button
Font	Fonts used in the label
Font Resource	Set the font resource
Text	The label displayed on the button
Primary	Primary state of the button: Set to True to use the Primary color from theme Set to False to use the default color from theme
Active	Active state of the button. Set to true to appear on the screen
X	Coordinate of button, top-left, in pixels
Y	Coordinate of button, top-left, in pixels
Width	Button width, in pixels
Height	Button height, in pixels
Style	Display Style of button ESD_OPT_3D ESD_OPT_FLAT
LongPush	When activated, 'Pushed' signal will be sent out continuously based on the set interval while button is in 'pushed' state
Interval	Interval between each 'Pushed' signal when button is pushed while 'LongPush' is activated

Table 44 - ESD Push Button Properties

Output / Signal	Description	
Down / Up / Pushed	Output signal when the push button is in Down/Up or Pushed state	
Pushing	Output value due to pushing/not pushing of the button	
Table 45 - ESD Push Button Output/Signal		



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Property Name	Description
Display Length	The display length in ticks for the displaying window
Horizontal	The Boolean flag to set the orientation of the roller. Set true as horizontal roller.
MinValue	The minimum value of the roller
Value	The current value of the roller
MaxValue	The maximum value of the roller
Trim Range	The Boolean flag for trimming according to the range
Show Grey Trim Range	The Boolean flag for showing the trimmed range as grey scales
Display Tick	The Boolean flag for displaying the tick scale
Display Minor	The Boolean flag for displaying the minor scale
Display Axis	The Boolean flag for displaying the axis of the roller
Label Padding	Defines the label padding for displaying the major label
Major Length	Defines the length of the major scale, range from 0.0 to 1.0
Major Width	Defines the line width of the major scale in pixels
Minor Length	Defines the length of the minor scale, range from 0.0 to 1.0
Minor Width	Defines the line width of the minor scale in pixels
Tick Length	Defines the length of the tick scale, range from 0.0 to 1.0
Tick Width	Defines the line width of the tick scale in pixels
Active	Enable or disable displaying this widget
X	x coordinate of the top-left, in pixels
Υ	y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height
Major	Defines major count in ticks
Minor	Defines minor count in ticks
Color Min	The minimum color for minimum value of the roller
Color Max	The maximum color for maximum value of the roller
Font	Defines the font for the label
Axis Color	Set axis color of the widget in RGB

Table 46 - ESD Linear Roller Widget Properties

Output / Signal	Description	
Pointer	The pointer reference of the widget object	
CenterColor	Output the value of the centre's color	
CenterValue	Output the current value at the centre of the roller	
Table 47 - FSD Linear Boller Widget Output/Signal		

Linear Roller Widget Output/Signal ie 4/



Figure 44 - Sample of Linear Roller Widget



In Figure 44, the roller has minimum value = 880, maximum value = 1080, display length = 40 ticks, major = 10 ticks, minor = 5 ticks. It displays major scales, minor scales and tick scales, while each type of them has different widths and lengths. It also displays roller axis line, display trimmed range as grey scales. Lastly, there are gradient color effects in the scales, both minimum and maximum colors are configured (from blue to cyan).

ESD Progress Bar Widget

The ESD Progress Bar widget allows user to visualize the progression of an operation, such as a download, file transfer, machine running,

📕 ESD Linear Roller	ESD Pr	ogress Bar	
💷 ESD Number Pad		Pointer O	
T ESD Numeric Label	O Theme	0	
ESD Progress Bar	O Value	0 0	
ESD Push Button	Range	true O	
 ESD RSSI Bar ESD Radio Button 	♦ x	50 🔘	
ESD Radio Group	♦ Y	50 O	
 ESD RangeSlider ESD RangeSliderlater al 	 Width Height 	24 O	
ESD Ring	♦ Style	ESD_OPT_3D 🔾	
ESD Ring Slider			

Figure 45 - ESD Progress Bar

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied on the progress bar
Value	Indicates the progress level and displayed as the filled portion of the progress bar. It should be within the range defined by "Range"
Range	Progress bar's values range, 0-65535
Active	Active state of the progress bar, set to true to appear on the screen
X	X coordinate of the progress bar, top-left, in pixels
Υ	Y coordinate of the progress bar, top-left, in pixels
Style	Display Style of progress bar
	ESD_OP1_FLAT
Width	Progress bar width, in pixels
Height	Progress bar height, in pixels

Table 48 - ESD Progress Bar Properties

The logic node connection in Figure 46 shows the creation of a continuous progress bar with a range from 0 to 1000, taking its input from the built-in "GetMilliseconds" function node.

Get Milliseco	onds	ESD Prog	jress Bar
	Out 🔘		Pointer 🔘
		O Theme	0
		🔎 Value	0 O
[%] Binary Operator		🔘 Range	1000 🔘
Left Value	Result 🝼	♦ Active	true 🔾
0 1000		♦ X	84 🔘
		♦ Y	231 🔾
		🔷 Width	180 🔘
		🔷 Height	24 O

Figure 46 - ESD Progress Bar Example



ESD RSSI Bar Widget

The *ESD RSSI Bar* widget is used to add a RSSI Bar and show signal strength between the bars.



Figure 47 - ESD RSSI Bar

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied to this widget
Default Color	Default Color to be applied to this widget
Fill_Color	Color to be filled in bar when strength is captured
Min_Strength	Minimum value for signal strength
Max_Strength	Maximum value for signal strength
Number_of_Bars	Number of Bars to be displayed
Current_Strength	Input to current signal strength
Signal_Search_Mode	Set true to override the current signal strength and current signal strength loops from min strength to max strength repeatedly
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left of the widget, in pixels
Υ	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget height

Table 49 - ESD RSSI Bar Widget Properties



ESD Scroll Bar Widget

The *ESD Scroll Bar* widget is used to scroll a value between minimum and maximum which is often used together with a panel forming as scrollable panel.

 ESD RangeSlider 		ESD Scroll Bar	
 ESD RangeSliderInterval 		Pointer 🔘	
🛋 ESD Ring	O Theme	Õ	·
🛋 ESD Ring Slider	O Size	256 🔘	
ESD Scroll Bar	🔘 Max	32767 🔘	
ESD Scroll Panel	O Min	0 🔘	
🛋 ESD Scroll Image	🔷 Active	true 🔘	
🧐 ESD Sketch	🔷 X	289 🔘	
 ESD Slider 	🔷 Y	166 🔘	
🛋 ESD Sliding Button	🔷 Width	180 🔘	
ESD SpinBox	A Height	24 🔘	
ESD Spinner	Style	ESD_OPT_3D O	
T ^T ESD TextBox	🔷 Value	<u> </u>	
ESD Toggle		Changed 📎	

Figure 48 - ESD Scroll Bar Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied to this widget
Size	Set knob size of the ESD Scrollbar
Max	Maximum Value of the slider
Min	Minimum Value of the slider
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left of the widget, in pixels
Y	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget height
Value	Value of the slider
Style	Display style of scroll bar
	ESD_OPT_3D
	ESD_OPT_FLAT
Та	ble 50 - ESD Scroll Bar Widget Properties

Output / Signal	Description
Changed	Output signal when the scroll bar has changed
Table 51 - ESD Scroll Bar Output/Signal	



ESD Scroll Panel Widget

The *ESD Scroll Panel* widget is a scrollable panel. *ESD Scroll Panel* widget requires a linear layout to function properly. Refer to "ScrollPanel" example project for details.



Figure 49 - ESD Scroll Panel Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Up	Touch up event
Down	Touch down event
Тар	Touch tap event
ShowPanel	Set true to display background panel
Active Scroll	Set true to override default touch tag (255)
Raise Border	Set background panel with raise border
Touching	Boolean for Touching status
Inside	Boolean for Touch inside status
Theme	Theme to be applied to this widget
Radius	The radius of the ESD Scroll Panel (in pixels)
Active	Enable or disable displaying this widget
X	x coordinate of the top-left of the widget, in pixels
Υ	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget height
ScrollX	Scroll-to x coordinate (in pixels)
ScrollY	Scroll-to y coordinate (in pixels)
Align	Set alignment mode
ScrollBars	Set scroll bar mode:

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Height Scroll...hanged Scroll...hanged



	ESD_VISIBLE_NEVER ESD_VISIBLE_WHENNEEDED ESD_VISIBLE_ALWAYS
TouchScroll	Set true to enable touch scroll
Scroll Bar size	Set the size of scroll bar if it is applicable

 Table 52 - ESD Scroll Panel Widget Properties

Output / Signal	Description
MinX	Minimum X for local X coordinate in scroll panel
MinY	Minimum Y for local Y coordinate in scroll panel
MaxX	Maximum X for local X coordinate in scroll panel
MaxY	Maximum Y for local Y coordinate in scroll panel
RangeX	X Range for local X coordinate in scroll panel
RangeY	Y Range for local Y coordinate in scroll panel
Width	Local width of scroll panel
Height	Local height of scroll panel
ScrollXChanged	Signal when X has changed
ScrollYChanged	Signal when Y has changed
Table 52 SCD Sevell Danal Output /Signal	

Table 53 - ESD Scroll Panel Output/Signal

ESD Scroll Image

The *ESD Scroll Image* widget supports scrollable image effect by both touch and slider controls. Refer to the example project **"ScrollImageWidget"** under the **"Examples -> Intermediate"** in ESD installation directory.



Figure 50 - ESD Scrollable Image

Property Name	Description
Pointer	The pointer reference of the widget object
SetXTouchScroll	Set true to enable X axis touch scroll
SetYTouchScroll	Set true to enable Y axis touch scroll
TouchOffsetThreshold	The offset threshold for activating and touch scroll. This is used to stabilize the noise in touch input.
Bitmap	Image object reference for display
H Scroll %	Set horizontal scroll's initial value in percentage
V Scroll %	Set vertical scroll's initial value in percentage
H Offset	Set image's horizontal offset

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V Offset	Set image's vertical offset
H Scale	Set image's horizontal scale
V Scale	Set image's vertical scale
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left of the widget, in pixels
Υ	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget height

Table 54 - ESD Scroll Image Widget Properties

Output / Signal	Description
SizeChanged	Trigger to update scrollable image's touch area after size was changed by its parent widget
Changed	Signal for scroll value changes from the scrollable image widget
H Scroll %	Horizontal scroll percentage value writer. Use it to update external scroll bar if there is
V Scroll %	Vertical scroll percentage value writer. Use it to update external scroll bar if there is

Table 55 - ESD Scrollable Image Output/Signal

ESD Sketch Widget

The *ESD Sketch* widget provides a canvas area that may be used to do free sketch by touch.



Figure 51 - ESD Sketch Widget

Property Name	Description
Active	Enable or disable displaying this widget
X	x coordinate of the top-left of the widget, in pixels
Υ	y coordinate of the top-left of the widget, in pixels
Width	Widget width

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Height	Widget height
PenColor	Color that is used to draw the trace
MinWidth	Minimum Widget width when resizing the bitmap
MinHeight	Minimum Widget height when resizing the bitmap
Table 56 - ESD Sketch Widget Properties	

Sketch widget Properties

Output / Signal/ Slot	Description
Pointer	The pointer reference of the widget object
OutputBitmap	Output the drawing as bitmap cell
Clear	Slot for clear sketch
Changed	Signal for change event

Table 57 - ESD Sketch Widget Output/Signal/ Slot

ESD Slider Widget

The ESD Slider widget is used to adjust the value by dragging a slider.



Figure 52 - ESD Slider Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied to this widget
Alpha	Adjust the transparency
Min	Minimum Value of the slider
Мах	Maximum Value of the slider
Active	Enable or disable displaying this widget
X	x coordinate of the top-left of the widget, in pixels
Y	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget Height
Value	Value of slider

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Touchable	Specify whether slider responds to touch event
Style	Display Style of slider:
	ESD_OPT_3D
	ESD_OPT_FLAT
Table 58 - ESD Slider Widget Properties	

Output / Signal	Description
Changed	Output signal when the slider has changed
Table 59 - ESD Slider Output/Signal	

The alpha value is adjusted by the slider and then combined with the RGB color to produce the color of the ESD Rectangle. When the value is changed, the connected variable is updated to reflect the new value. The images below demonstrate this process.



Figure 53 - ESD Slider Example

Figure 54 shows the logic node connection in the logic note editor.

ES	5D Slider		ESD Rectar	ngle Widget 2
	Pointer 🤇)		Pointer 🔘
Theme	Ft_Esrrent 🤇)	radius	4 🔾
Alpha	255 🔘)	color	#fa0000 🔾
O Min	C)	Active	true 🔘
O Max	100 🔘)	♦ x	271 🔿
 Active 	true 🖸)	<u></u>	136 🔘
♦ x	86 🔾)	 Width 	174 O
<u></u> (394 🔘)	 Height 	94 🔾
Width	160 🔾)		
 Height 	20 🔘)		
Value)		
	Changed 🛇	>		
ESD Rectangle Widget		ngle Widget		
				Pointer 🔘
	/		radius	4 🔘
Color A	+RGB Combine		🧢 color	#fafafa 🔾
• rab			Active	true 🔘
🔘 a			♦ x	333 🔾
	Out 🤇)	<u></u>	146 🔘
			 Width 	238 🔾
			Height	110 🔾

Figure 54 - ESD Slider Logic Node Connection Example



ESD Sliding Button Widget

The ESD Sliding Button widget offers users an alternative method for confirming or activating an action, distinct from the traditional approach of pressing the button.

 ESD RangeSlider 	ESD Slidin	g Button	
 ESD RangeSliderInterval 		Pointer O	
🔩 ESD Ring	ResetKnobP		
🛋 ESD Ring Slider		Activated	
ESD Scroll Bar	 Font 	29 🔘	Disclass
ESD Scroll Panel	Text Color	#000000 🔘	Display Text
🍓 ESD Scroll Image	Background	#ebecf0 🔘	
😵 ESD Sketch	Knob Color	#ffffff O	
 ESD Slider 	Active	true O	
ESD Sliding Button	♦ X	458 🔘	
ESD SpinBox	♦ Y	2557644 O	
SD Spinner	Viath	298 0	Dist
mT ESD TextBox		Dicolou Toxt	
	Text Text Text Text	12 O	
	Text Paddin	18 0	
Logic Flow	TEXT addit	0 01	

Figure 55 - ESD Sliding Button Widget

Property Name	Description	
Pointer	The pointer reference of the widget object	
ResetKnobPosition	Slot function to reset the control knob to default position after activated	
Font	Fonts used in the display text	
Text Color	Display color of the text	
Background Color	Display color of the background	
Knob Color	Display color of the control knob	
Active	Active state of the button, set to true to appear on the screen	
X	Coordinate of widget, top-left, in pixels	
Y	Coordinate of widget, top-left, in pixels	
Width	Widget width, in pixels	
Height	Widget height, in pixels	
Text	Display text	
Text Padding X	X axis padding of the display text from the left	
Text Padding Y	Y axis padding of the display text from the top	
Table 60 - FSD Sliding Button Properties		

i able 60 · ESD Sliding Button Properties

Output / Signal	Description
Activated	Output signal when the control knob is activated by sliding fully to the right. Note: Upon activation, the control knob shall remain at the
	activated position until 'ResetKnobPosition' has been triggered.
Table 61 - ESD Sliding Button Output/Signal	



ESD Spin Box Widget

The ESD Spin Box widget allows users to input a numerical value within a predefined range. It consists of a text box and two small arrow buttons (up and down) adjacent to the box.

Library	ESD SpinBox
🔻 📕 ESD Widgets	Pointer 🔘
Basics	Increase
🛋 ESD Check Box	Decrease
🕒 ESD Clock	Increased 🗖
🕨 🛋 ESD Color Picker	Decreased 🗖
T ESD Fixed Point Label	Theme Ft_Esrrent
🕒 ESD Gauge	○ Step 1 ○
🛋 ESD Image	○ Font 31 ○
ESD Image Button	Font Resource
🛋 ESD Image Rotate	Active true O
T ESD Label	◇ X 24 O
ESD Label Button	♦ Y 18 O
T ESD Numeric Label	♦ Width 180 ●
🚥 ESD Progress Bar	Height 60 O
ESD Push Button	Value O
🛋 ESD Radio Button	Style ESD_OPT_3D O
📓 ESD Radio Group	SideButtons
ESD Scroll Bar	Changed 🛇
ESD Scroll Panel	
ESD Scroll Image	фq
SD Sketch	ь Б <mark>А</mark>
 ESD Slider 	
ESD SpinBox	<u>د</u>
ESD Toggle	

Figure 56 - ESD Spin Box Widget

Property Name	Description	
Pointer	The pointer reference of the widget object	
Increase	Input slot to trigger the increase (up) event	
Decrease	Input slot to trigger the decrease (down) event	
Theme	Theme to be applied on the spin box	
Step	When arrows are used to change the spin box's value, the value will be incremented/decremented by the amount of step	
Font	Font Size	
Font resource	Set the font resource	
Active	Active state of the spin box. Set to true to appear on the screen	
Х	x coordinate of the spin box, top-left, in pixels	
Υ	y coordinate of the spin box, top-left, in pixels	
Width	Spin box width, in pixels	
Height	Spin box height, in pixels	
Value	Value of the spin box	
Style	Display style of spin box:	
	ESD_OPT_3D	
	ESD_OPT_FLAT	
SideButtons	Denotes the Spin box style	
	0 🗧 🔹 0 🔽	
	False (Default) True	

 Table 62 - ESD Spin Box Properties



Output / Signal	Description
Increased/Decreased	Output signal when the spin box is in Up (Increased)/ Down (Decreased) state
Changed	Output signal, the changed value of spin box that is written out
Table 63 - ESD Spin Box Output/Signal	

The logic node connection in Figure 57 shows the interconnection of two different styles of ESD Spin box widgets that will increase or decrease simultaneously.



Figure 57 - ESD Spin Box Example

ESD Spinner Widget

The *ESD Spinner* widget allows the user to show the spinner display as per required. It supports 4 different display styles with 4 different display scales for each style.

🚥 ESD Progress Bar	ESD Spinner	
ESD Push Button	Pointer 🔘	
ESD RSSI Bar	StopSpinner	
🍓 ESD Radio Button	StartSpinner	
ESD Radio Group	♦ Active true ●	
 ESD RangeSlider 	♦ X 202 ○	
 ESD RangeSliderInterval 	♦ Y 88 О	
🛋 ESD Ring	♦ Width 400 ●	
ESD Scroll Bar	Height 300 O	
ESD Scroll Panel	Style ESDDOT O	
ESD Scroll Image		
FSD Sketch		
- ESD Slider		
ESD Snin Roy		
T FCD ToutDay		
T. ESD TEXTBOX		
ESD loggle		
Logic Flow		

Figure 58 - ESD Spinner Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Active	Enable or disable displaying this widget
X	x coordinate of the top-left of the widget, in pixels
Y	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget height
Style	Display Style of the Spinner:
	ESD_SPINNER_CYCLE_DOT
	ESD_SPINNER_LINE_DOT
	ESD_SPINNER_ROTATE_CLOCK
	ESD_SPINNER_ORBIT_DOT
Scale	Display Scale of the Spinner:
	ESD_SPINNER_SCALE_1X



	ESD_SPINNER_SCALE_2X ESD_SPINNER_SCALE_4X ESD_SPINNER_SCALE_8X
Table 64 - ESD Spinner Properties	

Output / Signal	Description
StopSpinner/StartSpinner	Trigger to stop/start the spinner display
Table 65 - ESD Spinner Output/Signal	

ESD Text Box Widget

The ESD Text Box widget provides the user with multiline editable text box. In order to change the line, user needs to input '\' followed by 'n', which also means that Text Box cannot display '\n'.

🂐 ESD Radio Button	ESD Te	extBox	This is a multi-line editable TextBox
📋 ESD Radio Group		Pointer O	Line 2
 ESD RangeSlider 	 Font 	23 🔘	Line 3
 ESD RangeSliderInterval 	O Theme	Ft_Esrrent 🔘	
🛋 ESD Ring	 Text 	This iLine 3 🔘	
ESD Scroll Bar	O Font Resource		
ESD Scroll Panel		OPT_TOP	
ESD Scroll Image	 Active 	true O	
ESD Sketch	♦ x	196 🔾	
 ESD Slider 	🔷 Ү	97.22968 🔘	
ESD SninBoy	Width	309 🔾	
ESD Spinper	 Height 	186 🔘	
	Radius	0 0	
T ⁻ ESD TextBox	✓ Raised ▲ AdjustY		
ESD loggle	AdjustY	0	
En Logic Flow			

Figure 59 - ESD Text Box Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Font	Fonts used in the text box. Same as bitmap handle defined in EVE
Theme	Theme applied on the widget
Text	The text content of the text box
Font resource	Set the font resource
AlignX	Horizontal alignment of text
	OPT_ALIGN_LEFT: Left, OPT_ALIGN_CENTER: Center, OPT_ALIGN_RIGHT: Right
AlignY	Vertical alignment of text
	OPT_ALIGN_TOP: Top, OPT_ALIGN_CENTER: Center, OPT_ALIGN_BOTTOM: Bottom
Active	Enable or disable displaying this widget
X	x coordinate of the top-left of the widget, in pixels
Y	y coordinate of the top-left of the widget, in pixels
Width	Widget width
Height	Widget height
Radius	Radius of the vertex point
Raised	Set true for raised border, else it will be sunken border
AdjustX	Adjust the x coordinate of the text
AdjustY	Adjust the y coordinate of the text

Table 66 - ESD Text Box Properties



ESD Toggle Widget

The *ESD Toggle* widget provides the toggle switch functionality with user touch enabled.







Figure 60 - ESD Toggle Widget

Property Name	Description
Theme	Theme to be applied to this widget
Font	The font handle used by label inside the widget
Text	Toggle label
Font	Font Size
Font resource	Set the font resource
Active	Enable or disable displaying this widget
X	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height
State	The current state of the toggle widget
Style	Display Style of spin box: ESD_OPT_3D ESD_OPT_FLAT
AutoResize	Set true to enable auto resize the toggle widget

Table 67 - ESD Toggle Widget Properties

Output / Signal	Description
Pointer	The pointer reference of the widget object
Toggled	Output signal triggered by toggle action
Changed	Output value of the changed state
Table 68 - ESD Toggle Widget Output/Signal	

Figure 61 displays the creation of two toggle widgets, "*Toggle1"* and "*Toggle2"* which are connected with the same state.





Figure 61 - ESD Toggle Widget Example

Please note that the 'Toggled' signal of the widget should not be connected to its own 'Toggle' slot. This will cause the widget not to function properly.

ESD Ring Widget

The ESD Ring widget allows the user to display a ring widget. It is useful for displaying circular widgets such as circular progress bar.





Property Name	Description
Pointer	The pointer reference of the widget object
Angle	The angle value of the ring is displaying, range from 0 to 360.
Clockwise	The Boolean flag to set as clockwise direction.
Origin	The origin direction of the ring, range from 0 to 360.
Ring width	Defines the ring width
Inner border	Defines the inner border width, set -1 to disable it.
Outer border	Defines the outer border width, set -1 to disable it.
Start point	The Boolean flag to set whether to display start point
End point	The Boolean flag to set whether to display end point
Background Color	Set the ring's background color in RGB
Selection Color	Set the ring's selection color in RGB
Border Color	Set the ring's inner and outer border color in RGB

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BRT_AN_087 EVE Screen Designer 4.19.6 Widget Guide Version 1.5

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Active	Enable or disable displaying this widget
X	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height

Table 69 - ESD Ring Widget Properties

ESD Partial Ring Widget

The ESD Partial Ring widget allows user to display a partial ring widget. It is similar to ESD Ring widget except it does not require the angle range to be 360 degrees.

	🔻 📋 ESD Widgets	ESD Parti	al Ring	
7	Basics		Pointer O	
~	🛋 ESD Check Box	Andle	50 🔘	
5	🕒 ESD Clock	Max Angle	280 🔘	
п	ESD Color Picker	O Clockwise	true O	
9	T ESD Fixed Point Label	Origin	135 🔾	
С	🕒 ESD Gauge	Ring Width	45 🔘	
+	🛋 ESD Image	InnerBorder	3 🔘	
L	ESD Image Button	OuterBorder	-1 O	
t	🍓 ESD Image Rotate	Start Point	true 🔾	
~	T ESD Label	End Point	true Ο	
e	👱 ESD Label Button	BorderColor	#ffffff O	
ſ	🍓 ESD Linear Roller	Selection Color	#ff7316 O	
	T ESD Numeric Label	Background	#060504 O	
	🛋 ESD Partial Ring	Active	true O	
	ESD Progress Bar	♦ X	362 O	
	ESD Push Button	♦ Y	78.00003 O	
	🛋 ESD Radio Button	♦ Width	318 0	
	ESD Radio Group	Height	2/5 0	
	🛋 ESD Ring			
	A			

Figure 63 - ESD Partial Ring Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Angle	The angle value of the ring is displaying, range from 0 to 360.
Max Angle	Defines the max angle of the selection, range from 1 to 360.
Clockwise	The Boolean flag to set as clockwise direction.
Origin	The origin direction of the ring, range from 0 to 360
Ring width	Defines the ring width
Inner border	Defines the inner border width, set -1 to disable it
Outer border	Defines the outer border width, set -1 to disable it
Start point	The Boolean flag to set whether to display start point
End point	The Boolean flag to set whether to display end point
Background Color	Set the ring's background color in RGB
Selection Color	Set the ring's selection color in RGB
Border Color	Set the ring's inner and outer border color in RGB
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height

Table 70 - ESD Partial Ring Widget Properties



ESD Ring Slider Widget

The ESD Ring Slider widget allows user to display a partial ring with knob control. It is similar to ESD Partial Ring widget except it allows the user to control the value by dragging the control knob.

ଣ 🛛 ESD Linear Roller	ESD Ring	Slider	
T ESD Numeric Label		Pointer 🔘	
🍓 ESD Partial Ring	Clockwise	true 🔘	
ESD Progress Bar	Origin	135 🔘	
ESD Push Button	Ring Width	50 🔘	
ESD RSSI Bar	O Inner Border		
	Outer Border	3 U	
	Selection Color	=0055ff ()	/
ESD Radio Group	Background	#646464	
 ESD RangeSlider 	Knob Color	#171717 🔘	
 ESD RangeSliderInterval 	Knob Radius	25 🔘	\sim
🍓 ESD Ring	Active	true 🔘	
ଣ ESD Ring Slider	🔷 X	7950002 🔘	
ESD Scroll Bar	♦ Y	261,0006 🔘	
ESD Scroll Panel	Width	400 0	
	Max Apolo	300 0	
	Value	10 0	
	Max Value	100 0	
ESD Slider	and the second se		

Figure 64 - ESD Ring Slider Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Clockwise	The Boolean flag to set as clockwise direction.
Origin	The origin direction of the ring, range from 0 to 360.
Ring width	Defines the ring width
Inner border	Defines the inner border width, set -1 to disable it.
Outer border	Defines the outer border width, set -1 to disable it.
Border Color	Set the ring's inner and outer border color in RGB
Selection Color	Set the ring's selection color in RGB
Background Color	Set the ring's background color in RGB
Knob Color	Defines the color of the control knob
Knob Radius	Defines the radius of the control knob
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height
Max Angle	Defines the max angle of the selection, range from 1 to 360.
Value	Indicates the current value of the slider
Max Value	Indicates the maximum value allowed for the slider, range from 10 to 1024.
Tabla	71 FCD Ding Cliden Widget Duenenties

Table 71 - ESD Ring Slider Widget Properties



ESD Range Slider Widget

The *ESD Range Slider* widget allows the user to set a value by dragging a handle within a configured range. It is used to control a variable value via simple and interactive user input.



Figure 65 - ESD Range Slider Widget



EndValue Interval

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied to this widget
Alpha	Adjust the transparency
Min	Slider's minimum value
Max	Slider's maximum value
Step	Slider moves in increments of Step. If Step is 10, the slider will
	go from 0 to 10, to 20, to 30, etc.
Marker_Lines	Sets the visibility of marker lines
Value	Default value for initialization of Range Slider
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height
Output	Output value when the slider has changed

Table 72 - ESD Range Slider Widget Properties



ESD Range Slider Interval Widget

The *ESD Range Slider* Interval is a custom range-type input control. It allows user to select a value or range of values between a specified min and max.



Figure 66 - ESD Range Slider Interval Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Theme	Theme to be applied to this widget
Min	Slider's minimum value
Max	Slider's maximum value
Step	Slider moves in increments of Step in both directions. If Step value is 10, the slider handle will go 10, 20, 30, etc.
Marker_Lines	Sets the visibility of marker lines
Active	Enable or disable displaying this widget
Х	X coordinate of the top-left, in pixels
Υ	Y coordinate of the top-left, in pixels
Width	Toggle widget width
Height	Toggle widget height
StartValue	Start value when the slider has changed
EndValue	End value when the slider has changed
Interval	Output value between Start value and End Value

 Table 73 - ESD Range Slider Interval Widget Properties



ESD QR Code Widget

The ESD QR Code widget allows the user to generate a QR code in Eve bitmap format L1. It allows user to do scaling (enlarge or reduce) the size of QR code image.



Figure 67 - ESD QR Code Widget

Property Name	Description
Active	Enable or disable displaying this widget
X	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Widget width
Height	Widget height
URL	Website URL Link
Scale	Used to enlarge or reduce the size of QR code image
Table 74 ESD ODCode Widget Properties	

Table 74 - ESD QRCode Widget Properties

ESD Animation Widget

The *ESD* Animation Widget allows the user to play an animation resource (i.e., anim file).

".anim4esd" file is an EVEcompatible animation file. We use EVE Asset Builder (EAB) to convert a GIF file or a list of PNG/JPEG/BMP files into Anim file.

Animation is supported by the BT81X chip and above.



Figure 68 - ESD Animation Widget



Property Name	Description	
Pointer	The pointer reference of the widget object	
Animation Info	The animation information to be displayed on the widget	
Active	Enable or disable displaying this widget	
X	x coordinate of the top-left, in pixels	
Υ	y coordinate of the top-left, in pixels	
Width	Widget width	
Height	Widget height	
Color	Choose colour effect for the Animation Widget	
Align	Set alignment mode	
AutoResize	Set true to enable auto resize the toggle widget	
AutoPlay	Auto play animation when the widget is started	
Loop	Set true to repeat play animation	
Frame	Set a frame to display, with a range from 0 to NumFrames.	
Table	Table 75 ESD Animation Widget Dreparties	

 Table 75 - ESD Animation Widget Properties

Output / Signal/ Slot	Description
Play/Stop	Input to control the start and end of animation
Single	Slot to select single frame mode
RenderComplete	Output signal when animation render is completed
NumFrames	Output value is total frame of animation
Active	Output value is whether the widget is active or not
Table 76 - ESD Animation Widget Output/Signal	

ESD FontIcon Widget

The ESD Font Icon widget is an enhanced version of the ESD Image widget, encompassing all the properties of the ESD Image widget. It introduces an additional feature called "Font Icon," allowing users to choose an icon from the integrated icon library and incorporate it into their projects. Upon importing the icon, a PNG file is automatically included in the "Resource" folder of the project, enabling users to manipulate it in a manner similar to the ESD Image widget.



ESD Fonticon		
	Pointer 🔘 Rendeplete 🗖	
O Bitmap Cell	f2b9_r128_0 🔘	
AlphaFilter	1 🔘	
🔷 Active	true 🔘	
♦ X	271 🔘	
🔷 Y	145.429164 🔘	
🔷 Width	128 🔘	
🔷 Height	128 🔘	
🔷 Color	#ffffff 🔘	
🔷 Font Icon	f2b9-rar-128 🔘	
🔷 Align	esd_aPleft 🔘	
🔷 Scaling	ESD_SG_FIT 🔘	
🔷 AutoResize	esd_aboth 🔘	
🔷 ScaleX	1 🔘	
🔷 ScaleY	1 O	



Figure 69 - ESD FontIcon Widget



The integrated icon library boasts 1856 diverse icons sourced from <u>Font Awesome</u>. Users can locate their desired icon by Unicode or description, customize the icon size, and then import it into their projects. Just like the ESD Image widget, users need to configure the "Bitmap Cell" property to bind it with the imported icon.

Deservation	 লো চ	EVE Screen Designer
Properties	E.	• f2hq ×
Property	Value	
(ESD Fontlcon)		Width: 128 Height: 128
Name	ESD Fontlcon	
Allocation	Static	
Depth Sort	1.00	
Active	✓ True	
Х	282	
Y	146	E EVE Screen Designer -
Width	128	address book *
Height	128	
Color	[255, 255, 255]	Width : 128 Height : 128
Bitmap Cell	f2b9_regular_128_0	
Font Icon	😫 f2b9-regular- 📖	
Align	ESD_ALIGN_TOPLEFT	
Scaling	ESD_SCALING_FIT	

Figure 70 - Usage of ESD FontIcon Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Bitmap Cell	The bitmap cell to be displayed on the widget
Alpha Filter	Alpha Filter setting. Set 0 to disable it, or 1-255 for alpha function filtering
Active	Set to true if this widget is active
Х	x coordinate of the image button, top-left, in pixels
Y	y coordinate of the image button, top-left, in pixels
Width	Image button width, in pixels
Height	Image button height, in pixels
Color	Default colour
FontIcon	Choose FontIcon to display on the widget
Align	Set Image alignment mode
Scaling	Set Image scaling mode
AutoResize	Set Widget Auto resize mode
ScaleX	X Scale value for the image
ScaleY	Y Scale value for the image

Table 77 - ESD FontIcon Widget Properties



ESD Scrolling Text Widget

A Scrolling Text Widget displays text content within a confined area, allowing the text to scroll horizontally. Scrolling Text Widgets are commonly used in applications like news tickers, stock market updates, notifications, and banners to present information dynamically and efficiently. The user can customize in terms of speed, direction of the text content.



Figure 71 - ESD Scrolling Text Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Active	Set to true if this widget is active
X	x coordinate of the image button, top-left, in pixels
Y	y coordinate of the image button, top-left, in pixels
Width	Image button width, in pixels
Height	Image button height, in pixels
Theme	Theme to be applied to this widget
Font	Fonts used in the label. Same as bitmap handle defined in EVE
Font resource	Sets the font resource.
Text	The text content of the label. By default, "Welcome to EVE Screen Designer"
Position	Choose the scrolling direction for the text content: RIGHT_TO_LEFT, LEFT_TO_RIGHT, or NONE
Speed	Set fast/slow scrolling of the text content
Table 78 - FSD Scrolling Text Widget Properties	

Table 78 – ESD Scrolling Text Widget Properties



ESD Image Slide Show Widget

An Image Slide Show Widget displays a series of images in a sequential or automated manner within a designated area.



Figure 72 - ESD Image Slide Show Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Active	Set to true if this widget is active
Х	x coordinate of the image button, top-left, in pixels
Υ	y coordinate of the image button, top-left, in pixels
Width	Image button width, in pixels
Height	Image button height, in pixels
Scaling	Set Image scaling mode
AutoResize	Set widget auto resize mode
Speed	Set fast/slow scrolling of the text content
Duration	The duration of the image change in seconds
Animation	Select animation type:
	IMAGE_RIGHT_TO_LEFT
	IMAGE_LEFT_TO_RIGHT
	IMAGE_BOTTOM_TO_TOP
	IMAGE_TOP_TO_BOTTOM
	IMAGE_FADE_IN
	IMAGE_FADE_OUT

 Table 79 - ESD Image Slide Show Widget Properties



ESD Video Widget

The ESD Video Widget allows users to play video input files in formats such as .avi or .mp4. ESD then converts the video input file into MJPEG format for playback. However, it does not support audio playback. ESD Video is supported by BT815 chip and above.

	ESD	Video		
		Pointer O	Properties	 Ø X
	D Plaw		Property	Value
		님	(ESD Video)	
FSD	Stop		Name	ESD Video
ESD	Video File	babydog_0 🔘	Allocation	Static
	♦ Active	true 🔾	Depth Sort	1.00
Flay	Ó ¥	188 🔘	Active	√ True
	× n	100 0		188
Stop	Υ	62 🔾		62
	🔷 Width	527 🔘	Width	527
	🔷 Height	357 🔘	Height	357
	♦ Color	O hunder	Video File	▼
			▶ Color	[255, 255, 255] (2
	Align	ESU_AFLEFT O	Align	ESD_ALIGN_TOPLEFT
	Scaling	ESD_SRETCH O	Scaling	ESD_SCALING_STRET
	🔷 Loop	true 🔾	Loop	False

Figure 73 - ESD Video Widget

Property Name	Description
Pointer	The pointer reference of the widget object
Video File	The video to be displayed on the widget
Active	Enable or disable displaying this widget
X	x coordinate of the top-left, in pixels
Y	y coordinate of the top-left, in pixels
Width	Widget width
Height	Widget height
Color	Choose colour effect for the Video Widget
Align	Set alignment mode
Scaling	Set Video scaling mode
Loop	Set true to repeat play Video
Table 00 FCD Video Wideot Drevention	

Table 80 - ESD Video Widget Properties

Output / Signal/ Slot	Description
Play	Input to control the start of the video
Stop	Input to control the stop of the video
Table 81 - ESD Video Widget Output/Signal	



Render Forwarder

The *Render Forwarder* is an advanced layout. Purpose of this widget is forwards "Update", "Render" "Idle" slots. It's an advanced feature when developing custom widget. In the examples project dialog of ESD, you can find "RenderForwarderExample" project.



Figure 74 - ESD Render Forwarder

Property Name	Description
Active	Set to true if this widget is active
Х	x coordinate of the widget, top-left, in pixels
Υ	y coordinate of the widget, top-left, in pixels
Width	Widget width, in pixels
Height	Widget height, in pixels

 Table 82 - Render Forwarder Properties.

Slots/Outputs Name	Description
ForwarderUpdate	Forward Update slot.
ForwarderRender	Forward Render slot.
ForwarderIdle	Forward Idle slot.
GlobalX	Output global x coordinate of the widget
GlobalY	Output global y coordinate of the widget
GlobalWidth	Output global width of the widget
GlobalHeight	Output global height the widget
Tabla	02 Deviden Ferninguden elete (entruste

Table 83 – Render Forwarder slots/outputs.

Example use Render forwarder for text rendering.

1. Define a method for rendering text.

```
ESD_METHOD(FirstPage_Render_Mothod, Context = FirstPage)
void FirstPage_Render_Mothod(FirstPage *context)
{
    EVE_HalContext *phost = Esd_GetHost();
    EVE_CoCmd_text_ex(phost, 100, 100, 29, OPT_CENTER, 0, 0, 0, 0, "Text");
}
```



2. The establishment of a connection between the ForwarderRender slot and the Render Method defined earlier is shown in Figure 75.

Render	Forwarder
	Pointer 🔘
	ForwardUpdate 🔲
	ForwardRender 🖃
	Forwardidle 🔲
🔷 Active	true 🔘
♦ x	190 🔘
♦ ү	111 🔘
🔷 Width	378 🔘
🔷 Height	254 🔘
	GlobalX 🔘
	GlobalY 🔵
	GlobalWidth 🔘
	GlobalHeight 🔵

Figure 75 - FowarderRender slot

3. The Text rendering result is shown in Figure 76.



Figure 76 - RenderForwarder text rendering results



C. Custom Widgets

The ESD framework architecture allows the user to create *Custom Widgets (User-defined Widgets)* and to edit them just like you may do with standard built-in *ESD Widgets*. The *Custom Widget's* features include widget properties, outputs, signals, and slots. User can create *Custom Widget* based on standard built-in ESD Widgets or a completely new one.



How to Create a Custom Widget

1. On Project right menu, select New->Widget:



Figure 77 - Create New Widget

2. Rename the file "Usr_Widget.widget" to a name that you prefer.



Figure 78 - Rename New Widget



3. You can either include pre-existing ESD widgets or develop new ones to the rendering objects. Furthermore, you may integrate inputs, variables, logical flows, and user-defined functions to manage the widget's logic processing.

Project	App main 💥 🛛 Her. Page page 😤	AnnScreen nage 😪 🛛 Fir	rctPage page	ller Spin Tmage c 💥	llsr Snin Imane widnet* 💥	
Filter	App.main Sola_i age.page	Apporten.puge	isa age.page	osi_opiii_anage.e		
 SpinImageExample.esd 	0 80 160 240 320 400	480 560 640 720 800				
Esd Core esd	.i					
FT Esd Framework esd						
FT Esd Widgets esd	-é					
FT Eve Halesd						
Resources	0					
App main	Ĭ		R	ender	Render S	ianal
Appinian	80			Signaled 🔳	Call	
AppScreen.page						
Default I heme.theme	160					
FirstPage.page						
Usr_Page.page	240				ESD Image	Rotate
Usr_Spin_Image.c			Bitr	mapCell		Pointer O
▼	320		🔷 Value	•	🕘 Bitmap Cell	0
Actors					♦ Active	true O
Connections	400				♦ X ♦ Y	130 0
k 🕹 Nodes					Width	400 🔘
Widgets	480			nala	Height	300 🔾
FCD Image Detects			Atalaa	Allule	 Color 	#ffffff O
ESD Image Rotate	560		♦ Value		 RotateAn ScaloY 	1.0
					ScaleY	
	640					
			S	beed		
	720		Value	0		
	800					
	880					
	960					

Figure 79 - Add Widgets, Property, Logic Flow to New Custom Widget

4. Add the Custom Widget to ESD page to preview and test:



Figure 80 - Spin Image Widget Example

We will explain the details of creating the Custom widget in next section <u>Custom Widget</u> <u>Example</u>.



Custom Widget Example

In this section, we will try to create a simple Custom Widget named *Spin Image*. This *Custom Widget* uses *ESD Image Rotate widget* (a standard built-in ESD widget). In the example project dialog of ESD, you can find the "SpinImageWidget" project.

The *Spin Image Widget* follows this workflow: The user provides a Bitmap Cell and a Speed value as input, which the *Spin Image Widget* then uses to spin the Bitmap at the specified speed.

Basic Intermediate Advanced			
ESD Current Value	Text	Calabi Coner See Shaf Figal Andriante	ESD Sinstituite trivinge tabliget (surred
PagePersistence Resolution: 800x480	RenderForwarderExample Resolution: 800x480	ScreenResolution Resolution: 800x480	ScrollablelmageWidget Resolution: 800x480
ESD Back Back Back Back Back Back Back Back		ne: 05 📱	
ScrollPanel Resolution: 800x480	Searchlist Resolution: 1280x720	SignalSwitch Resolution: 800x480	SpinImageWidget Resolution: 1280x720
This is Tab 1	ESD , , , , , , , , , , , , , , , , , , ,	FSD	ESD Ministelle in 2014 (Mar 1994) 9 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
TabPaging Resolution: 800x480	VariableUpdate Resolution: 800x480	VariableWatcher Resolution: 800x480	WidgetSyncValue Resolution: 800x480

Figure 81 - Custom Widget Example

Property Name	Description
Active	Enable or disable displaying this widget
Х	x coordinate of the top-left, in pixels
Υ	y coordinate of the top-left, in pixels
Width	Widget width
Height	Widget height
BitmapCell	The bitmap cell to be displayed on the widget
Speed	Set fast/slow spin bitmap

 Table 84 - Spin Image Widget Properties

In **Error! Reference source not found.**, we can see all components of *Spin Image Widget*:

- *Spin Image Widget* uses an *ESD Image Rotate Widget to* display and rotate the bitmap.
- The BitmapCell property of the *Spin Image* is linked to the Bitmap Cell property of the *ESD Image Rotate*. This property is user-input dependent.
- The Angle variable of the *Spin Image* is linked to the Rotate Angle property of the *ESD Image Rotate*.
- Public property Speed receives input from the user.



• A render slot is used to handle render event.

Rend	er		Render	Sianal
	Signaled 🔳		Call	
			ESD Imade	e Rotate
Bitmap	Cell			Pointer 🔘
▲ Value	<u> </u>		Bitmap Cell	0
V value	U.S.	♦	Active	true 🔘
				130 🔘
		\		44 🔾
		\diamond	Width	400 🔘
		\diamond	Height	300 🔾
Anal	9	\diamond	Color	#ffffff 🔾
🔷 Value	0	•	RotateAn	0
		• • • • • • • • • • • • • • • • • • •	ScaleX	1 🔾
		\$	ScaleY	1 0
Spee	d			

Figure 82 - Spin Image components

The render slot contains code that modifies the Angle variable. The value of Angle variable depends on the speed. As the Angle variable of the Spin Image is updated, the Angle of the Image Rotate is also updated accordingly.



Figure 83 - Change Angle Property in Render Signal Handler of Spin Image Widget



Building Custom Widgets Using C Code

The ESD framework also allows user to create Custom Widgets in programmatical approach, using C code. This approach needs developer to have a certain understanding of the C programming language and the ESD framework.

How to Create a Custom Widget Using C code

On project right menu, select New->Widget (in C only):



Figure 84 - Create New Widget in C Only

The template files "Usr_Widget.h" and "Usr_Widget.c" will be generated



Figure 85 - Custom Widget Template files


We will explain the content of the template files.

In header file **Usr_Wiget.h**, define a struct **Usr_Widget**.

```
/*
Usr_Widget
Header
*/
#include "Ft_Esd_Widget.h"
ESD_WIDGET(Usr_Widget, Include = "Usr_Widget.h", Callback, X = 0, Y = 0, Width =
400, Height = 300)
typedef struct
{
    union
    {
        void *Owner;
        Ft_Esd_Widget Widget;
    };
} Usr_Widget;
```

In the source code of Usr_Widget.c, add default slots for Usr_Widget and initialize Usr_Widget object.

```
/*
Usr_Widget
C Source
*/
static Ft_Esd_WidgetSlots s_Usr_Widget_Slots = {
    (void (*)(void *))Ft_Esd_Widget_Initialize,
    (void (*)(void *))Ft_Esd_Widget_Start,
    (void (*)(void *))Ft_Esd_Widget_Enable,
    (void (*)(void *))Ft_Esd_Widget_Update,
    (void (*)(void *))Ft_Esd_Widget_Render,
    (void (*)(void *))Ft_Esd_Widget_Idle,
    (void (*)(void *))Ft_Esd_Widget_Disable,
    (void (*)(void *))Ft_Esd_Widget_End,
};
void Usr Widget Initializer(Usr Widget *context)
{
    Ft Esd Widget Initializer((Ft Esd Widget *)context);
    context->Widget.Slots = &s Usr Widget Slots;
    context->Widget.LocalX = 0;
    context->Widget.LocalY = 0;
    context->Widget.LocalWidth = 400;
    context->Widget.LocalHeight = 300;
}
```



Next, add an ESD Label to Custom Widget:

In Usr_Widget.h, declare an ESD Label in Usr_Widget struct

```
/*
Usr_Widget
Header
*/
#include "Ft_Esd_Label.h"
ESD_WIDGET(Usr_Widget, Include = "Usr_Widget.h", Callback, X = 0, Y = 0, Width =
400, \text{Height} = 300)
typedef struct
{
    union
    {
        void *Owner;
        Ft Esd Widget Widget;
    };
    Ft_Esd_Label ESD_Label;
} Usr_Widget;
```

Next, create a Label with function **Usr_Widget__ESD_Label__Initializer.** Label should be detached when **Usr_Widget_End** slot is called:

```
/*
Usr_Widget
C Source
static Ft Esd WidgetSlots s Usr Widget Slots = {
    (void (*)(void *))Usr_Widget_End,
};
void Usr_Widget__ESD_Label__Initializer(Usr_Widget *context)
{
    Ft Esd Label *object = (Ft Esd Label *)&context->ESD Label;
    Ft_Esd_Label__Initializer(object);
    object->Owner = (void *)context;
    object->Widget.Active = 1;
    object->Widget.LocalX = 0;
    object->Widget.LocalY = 0;
    object->Widget.LocalWidth = 120;
    object->Widget.LocalHeight = 36;
    Ft_Esd_Widget_InsertBottom((Ft_Esd_Widget *)object, (Ft_Esd_Widget *)context);
}
void Usr_Widget__Initializer(Usr_Widget *context)
{
    Usr_Widget__ESD_Label__Initializer(context);
}
void Usr_Widget_End(Usr_Widget *context)
{
    void *owner = context->Owner;
    Ft Esd Widget End((Ft Esd Widget *)context);
    Ft_Esd_Widget_Detach((Ft_Esd_Widget *)&context->ESD_Label);
}
```



Next, drag the newly created custom widget from the User Widgets folder of Library window to the page of layout editor window:



Figure 86 - Add Custom Widget to ESD Page



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F. Appendix C – Revision History

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