cadence™

Symbol Editor User Guide

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Contents

Preface

About This Guide

The Symbol Editor User Guide explains the tasks with which you can edit symbols and its objects.

Related Documentation

You can refer to the following documentation to know more about the related tools and methodologies:

- For information on the new features, see *Allegro PCB Librarian: What's New in Release 23.1*.
- For information on using Part Developer, see *Part Developer User Guide*.

Typographic and Syntax Conventions

This list describes the syntax conventions used for this document:

`literal`	Non-italic words indicate keywords that you must enter literally. These keywords represent command (function, routine) or option names.
`argument`	Words in italics indicate user-defined arguments for which you must substitute a name or a value.
|	Vertical bars (OR-bars) separate possible choices for a single argument. They take precedence over any other character.
`[]`	Brackets denote optional arguments. When used with OR-bars, they enclose a list of choices. You can choose one argument from the list.
`{}`	Braces are used with OR-bars and enclose a list of choices. You must choose one argument from the list.

1

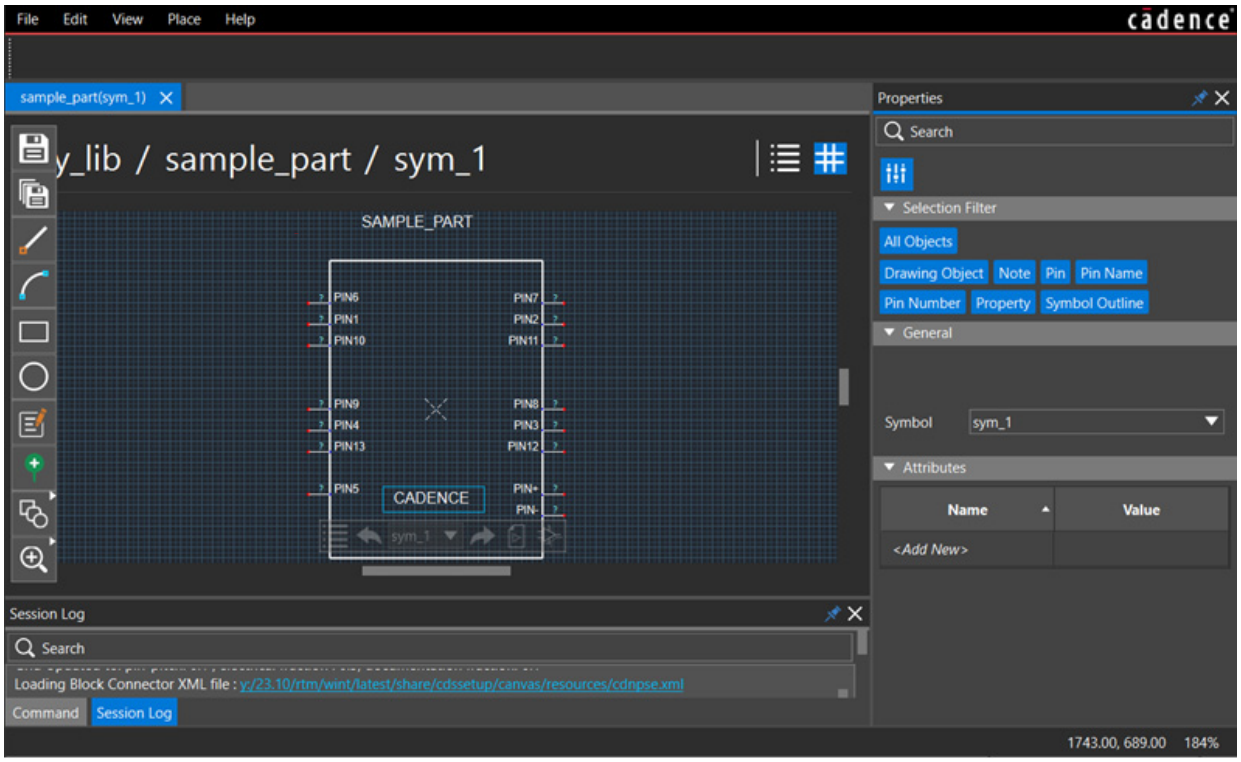
Introduction

Symbol Editor is the graphical interface of Part Developer that allows you to easily edit part symbols. This tool has a very simple user interface where you can quickly edit an existing symbol by adding pins, properties, and custom shapes.

Symbols are graphical representation of parts that include a shape of a part and one or more pins. A part can also include multiple symbols where each symbol represents a logic (AND or NAND gate).

Symbol Editor User Interface

When you launch Symbol Editor from Part Developer, the symbol is displayed on the canvas with the name of the project in the title bar.



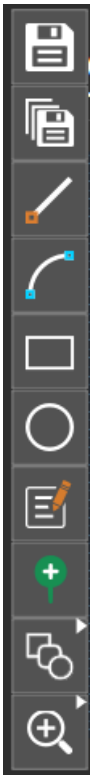
The Symbol Editor user interface has following elements:

Menu Bar

The menu bar provides commands to add pins, notes, and images. You can also format objects, such as pin text, custom shapes and perform zoom operation from the menu bar.

Toolbar

The toolbar of Symbol Editor contains frequently used commands, such as save, save all, place line, place arc, place circle, place rectangle, place note, place pin, auto shapes.



Properties Panel

The *Properties* panel can be opened by choosing *View – Properties* from the menu bar. The contents of this panel vary depending on the object selected on the canvas.

Tip

You can also make this panel auto hide by clicking the Auto Hide ( ) icon on the title of the panel. To restore the auto hide feature, click the Auto Hide icon again.

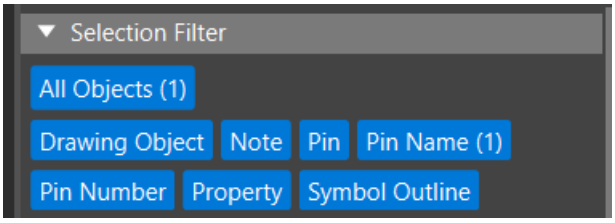
The properties panel has the following sections:

- Selection Filter
- Arrange

- Attributes
- Formatting
- Pin

Selection Filter

Selection Filter helps in selecting specific type of objects such as symbol, notes, pins, pin text, and property. For example, using *Selection Filter*, you can choose the *Pin Name* filter so that only pin names are selected on the canvas.



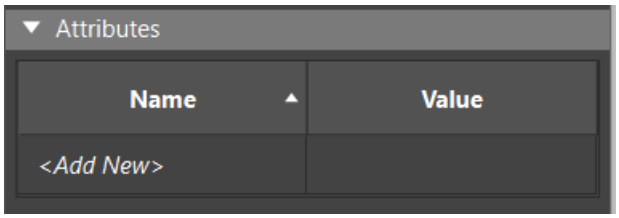
Arrange

The *Arrange* section of the tab provides options to align, rotate, and flip objects.

Attributes

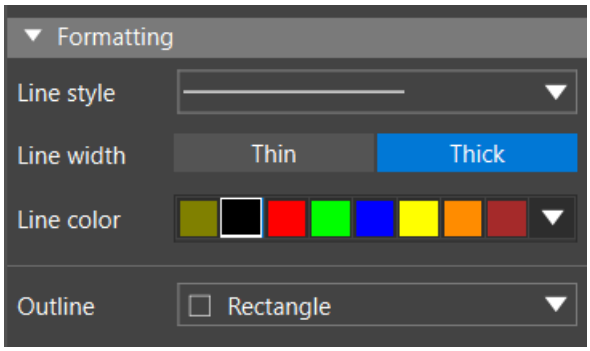
The *Attributes* section displays all the properties associated with the selected object (pins, note, shapes, and symbols). You can add property to a selected object by specifying the

property in the *Name* column and the value of the property in the *Value* column.

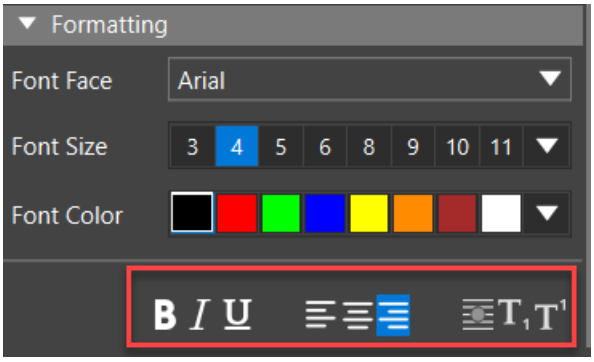


Formatting

You can change the width, style, and color of the selected line, arc, or symbol outline from the *Formatting* section. You can also change the symbol outline from the Outline drop-down list of this section.

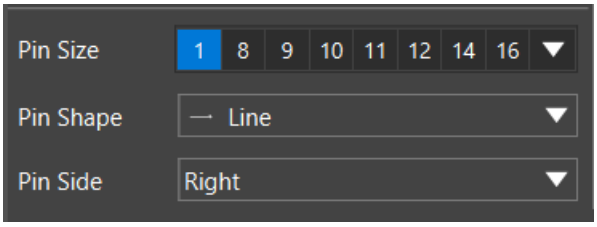


You can change the text size, color and font of selected text object from the *Text Box* section.



Pin

This section provides options to change the pin length and shape.

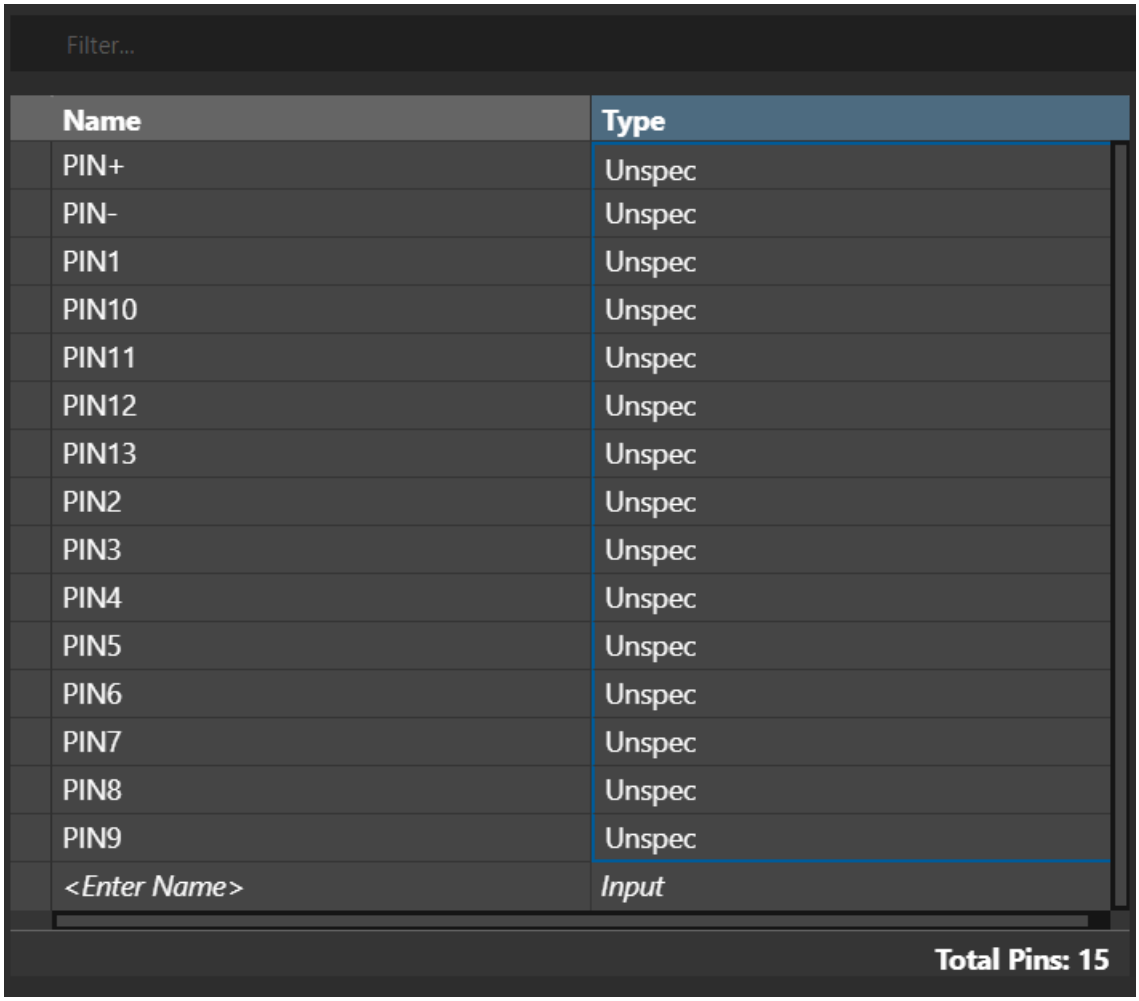


Canvas

In Symbol Editor, the canvas is at the center of the application window.The canvas supports two types of grids: Electrical Grid and Documentation Grid.

Table View

Table View can be displayed by clicking the *Symbol Pin Table View* ( ) icon on the toolbar. You can add, delete, and edit pins from Table View.



Canvas Grid Settings

Symbol Editor ensures that all the objects on the canvas are always placed on the grid to avoid any off-grid components in the design. A grid helps you place objects easily on the canvas, which, in turn, helps in correct connectivity of symbols and pins. You can configure the grid settings, such as grid units, grid style, and grid spacing from the *Symbol Grid* dialog box.

The Symbol Editor canvas supports two types of grids: Electrical Grid and Documentation Grid.

Electrical Grid

The Electrical Grid is used for placement of electrical objects on the canvas. Electrical objects include symbol outline, pins, and connection points of pins. Setting up a grid ensures that all the pins of the components are on the grid. If you try to add a part that does not have its pins on the grid, you are prompted to change the grid to a value that ensures that the component pins are on the grid.

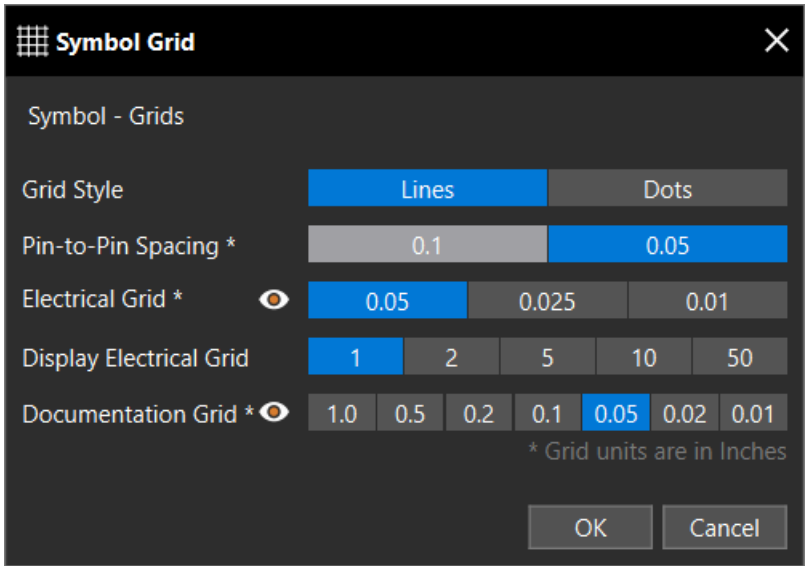
Documentation Grid

The Documentation Grid is used for placement of all documentation objects on the canvas. The documentation objects include text, notes, drawing objects, and images. These objects do not contribute to the electrical connectivity of the design, but help in better documentation of the design. The documentation objects require a finer control for placement of objects, therefore, the Documentation Grid is set to a finer value than the Electrical Grid.

By default, both Electrical and Documentation grids are displayed, the grid spacing is set to `1`, and *Grid Style* is set to *Lines*. You can choose to view the grid as Lines or Dots. To set the grid style and grid spacing:

1. Right-click the canvas and choose *Grid Settings*.

The *Symbol Grid* dialog box is displayed.



2. Set any of the following options:

   a. From *Grid Style*, set the grid style to lines or dots.

   b. From *Pin-to-Pin Spacing*, set the pin spacing.

   c. From *Electrical Grid*, set to display or hide the electrical grid and set the electrical grid spacing.

   d. From *Display Electrical Grid*, set to display or hide the display electrical grid and set the display electrical grid spacing.

   e. From *Documentation Grid*, set to display or hide the documentation grid and set the documentation grid spacing.

3. Click *OK*.

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Modifying Part Symbols

You need to modify a symbol to meet changed requirements. Using Symbol Editor, symbol modifications can be done quickly and effectively. This chapter will cover some of the common tasks that are required to modify a symbol.

In this chapter:

Adding Pins

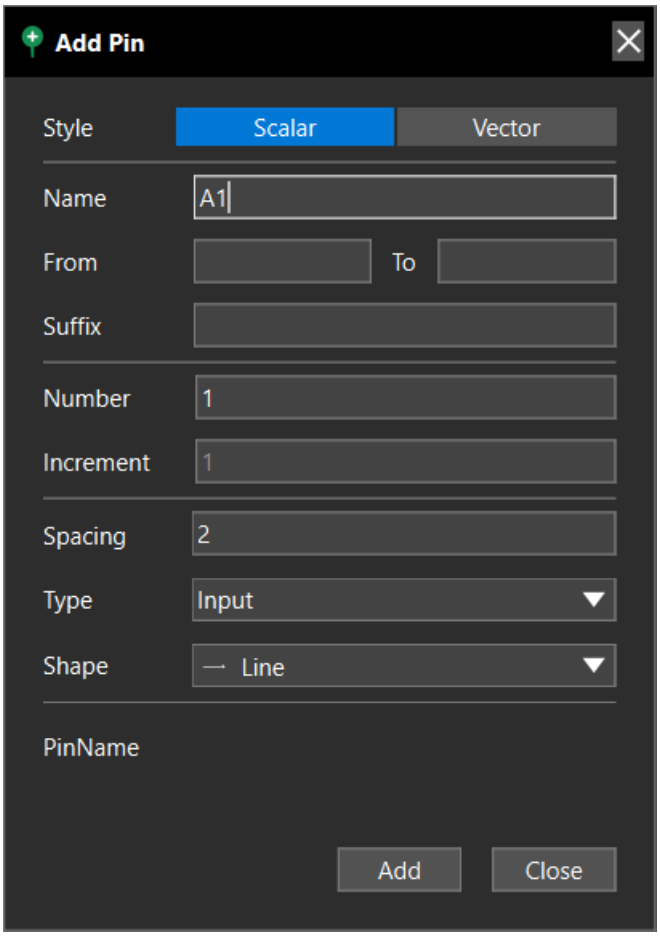
You can add single scalar pin, multiple scalar pins, and vector pins to a symbol using Symbol Editor. You can also add pins using Table View of Symbol Editor.

Adding Scalar Pins

To add a single scalar pin:

1. Do one of the following:
   - ❑ Choose *Place – Pin*.
   - ❑ Click the *Place Pin* ( ) icon on the toolbar.

   The *Add Pin* dialog box is displayed.



2. Enter the name of the pin in the *Name* field.
3. Enter pin number in the *Number* field.
4. Select the type of pin from the *Type* drop-down list.
5. Click *Add*.

   The pin is attached to the cursor.
6. Click the symbol outline to attach the pin to the symbol.
7. Do one of the following:

   a. Right-click and choose *Esc*.

   The pin is attached to the symbol.

   b. Click the symbol boundary again to add another pin.

   Pin name is automatically incremented by 1.

Quick Pin Addition

Symbol Editor allows you quickly add scalar pins by double-clicking the symbol outline or dragging an already added pin.

To quickly add scalar pins:

1. Double-click the symbol outline.

OR

1. Select a pin.
2. Keeping the *Shift* key pressed, click and drag the selected pin.

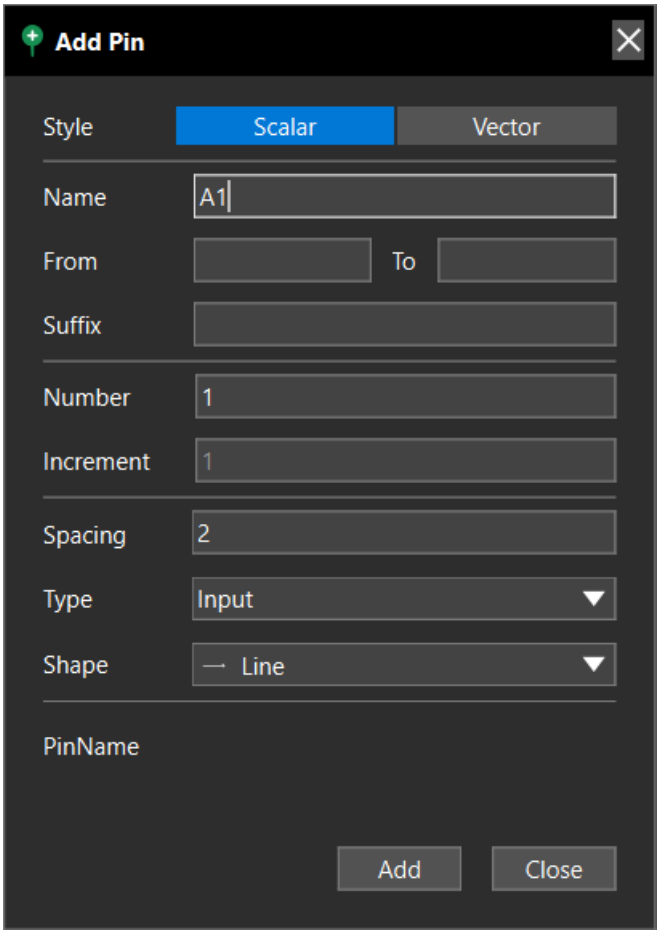
Pins are automatically added and pin names are incremented by 1.

Adding Multi-Scalar or Vector Pins

To add multiple scalar or vector pins:

1. Do one of the following:
   - ❑ Choose *Place – Add Pin*.
   - ❑ Click the *Add Pin* () icon on the toolbar.

The *Add Pin* dialog box is displayed.



2. From the *Style*, do one of the following:
   a. select *Scalar* to add multiple scalar pins.
   b. select *Vector* to add vector pins.
3. In the *Name* field, do one of the following:
   c. To add multiple scalar pins A1-A3, type `A1-A3`.
   d. To add vector pins or bits A<3..1>, type `A<3..1>`.

Tip

When you hover mouse over the *Name* field, a tool tip displays an example format of the pin names.

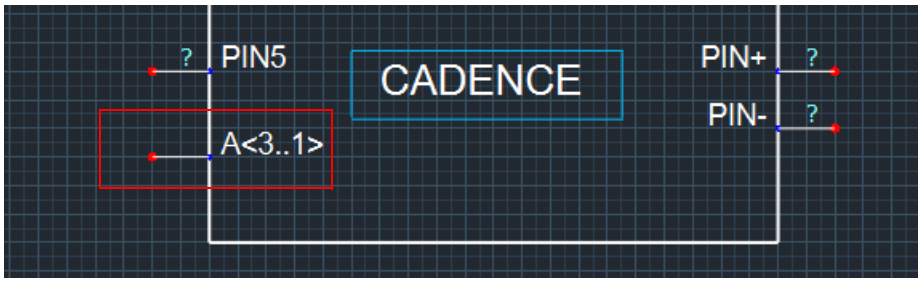
4. In the *Number* field, enter pin numbers matching the specified pin name range.

For example, to enter pin numbers for vector pins or bits A<3..1>, type `3..1`.

5. Select the type of pin from the *Type* drop-down list.
6. Click *Add*.

   Pins are attached to the cursor.
7. Click the symbol outline to attach the pins to the symbol.

   Pins is attached to the symbol.



Adding Pins using Table View

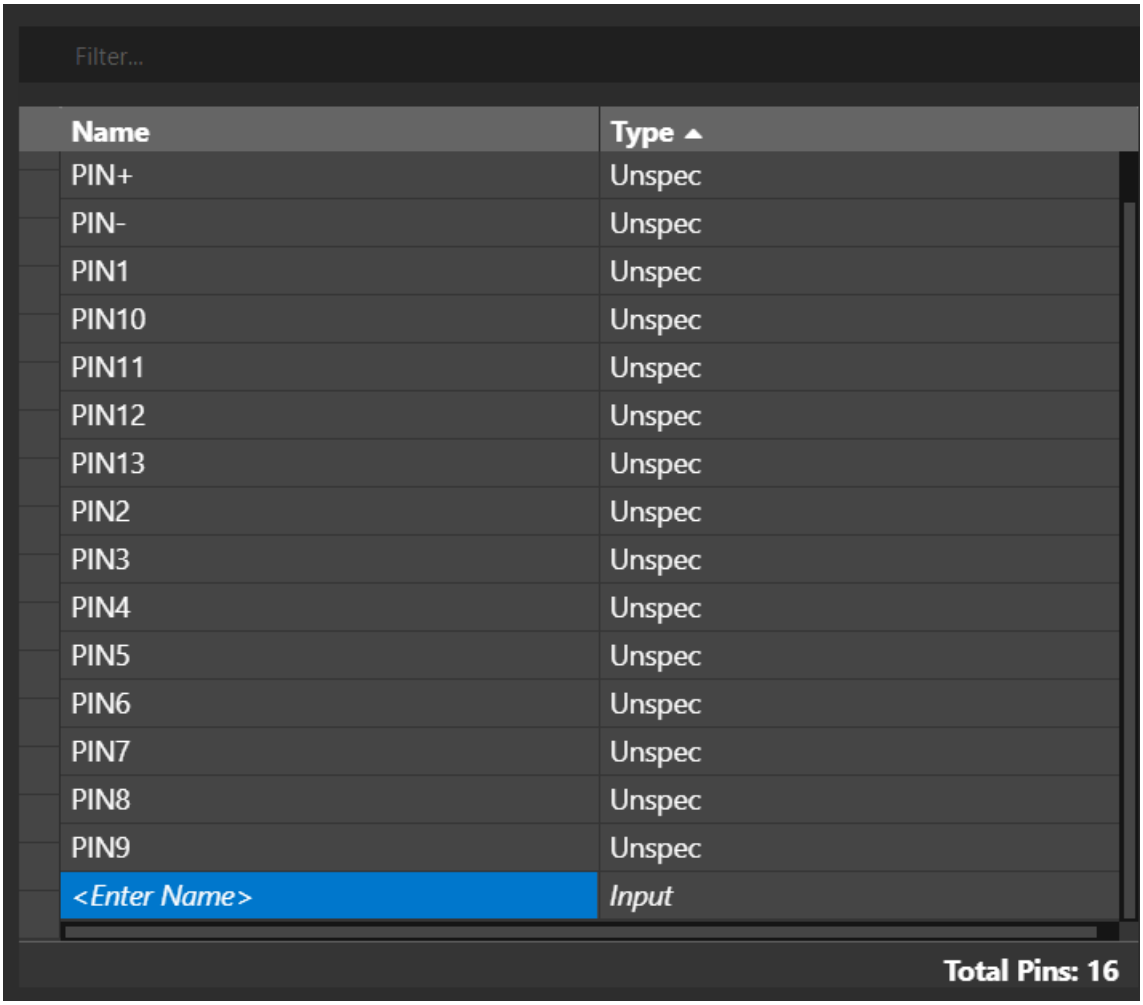
In Symbol Editor, you can also add pins using the Table View. To add pins using the Table View:

1. Click the *Symbol Pin Table View* ( ) icon on the toolbar.

   Table View is displayed.
2. Double-click *Enter Pin Text*.

   The field becomes editable.
3. Type the pin name to be displayed on the canvas and press *Enter*.

The pin is added to the symbol boundary on the canvas, and is displayed in the table. By default, pin type is selected as Input.



When you add pins using Table View, the shape of the pin is displayed as *undefined*. You can edit the shape from the in the *Shape* column.

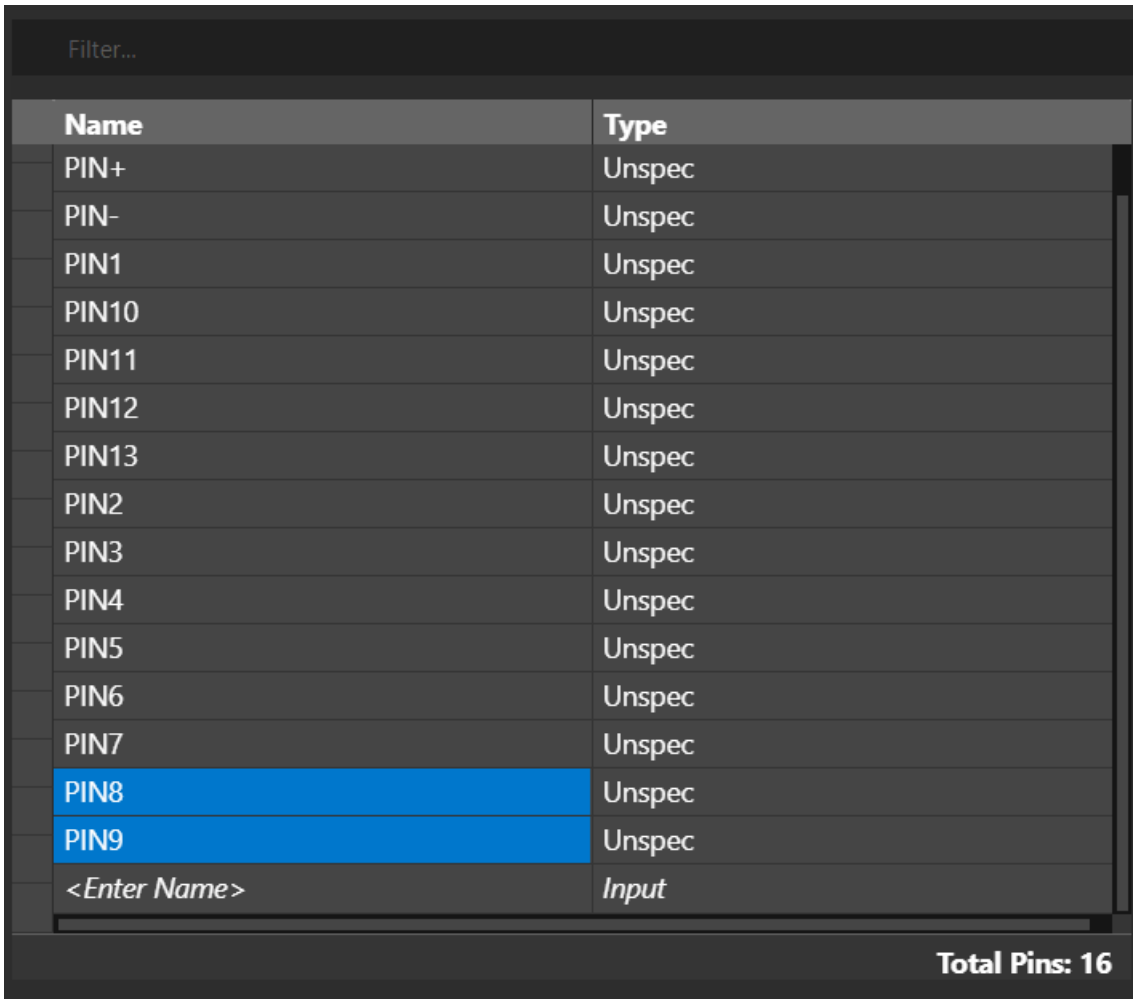
In Symbol Editor, you can also add new pins by copying and pasting a row in the Table View.

To add a pin by copying a row:

1. Select a row which you want to copy by clicking the empty box to the left of the row.
2. Press *Ctrl + C* to copy the selected row.
3. Select the *Enter Pin Name* row and press *Ctrl + V* to paste the copied row.

   The pin is added to the symbol boundary with all the details same as the copied pin. An error message appears in the *Violation* window stating that duplicate pin names are

specified for multiple pins. Symbol Editor also highlights both the rows in blue color in the table.



To resolve this error, you must change the name of the newly added pin.

4. Double-click the *Display Name* of the newly added pin.

   The field becomes editable.

5. Type a different *Display Name* and press *Enter*.

   Pin name and *Display Name* are updated in the table and on the canvas.

Deleting Pins

To delete pins:

1. On the canvas, click to select the pin you want to delete.

   You can also select multiple pins by creating a selection box around the pins.

2. Right-click the selection and choose *Delete* from the pop-up menu.

   The pins are deleted from the symbol.

Adding Properties to Symbol

Symbol Editor allows you to easily edit a property from the *Attributes* section of the *Properties* panel. This panel displays the property name, property value, and visibility of the property.

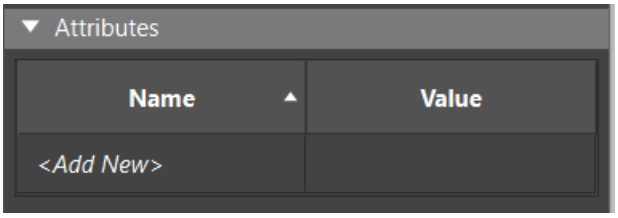
When you select multiple objects, the properties that are common to all the selected objects are displayed on this panel. You can also add the same property to multiple objects in one go.

To add properties to symbol:

1. Select the symbol.
2. Double-click *<Add New>* under the *Attributes* section of *Properties* panel.

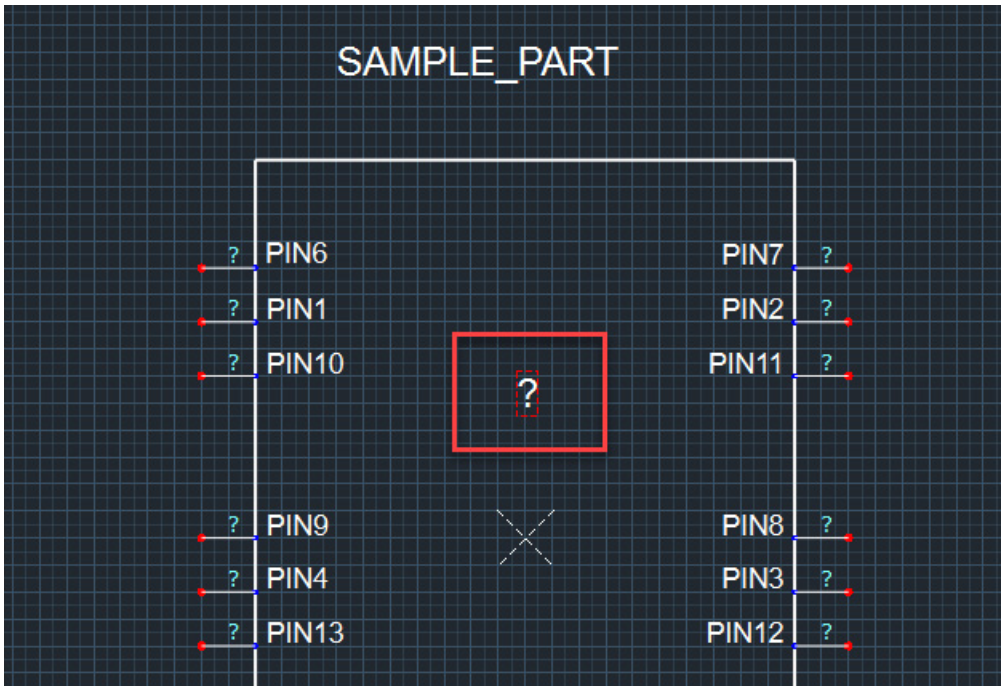
   The field becomes editable.

3. Type the property name.



4. Type the property value in the *Value* column and press *Enter*.

The property and its value are added to the symbol and the property value is displayed on the canvas.

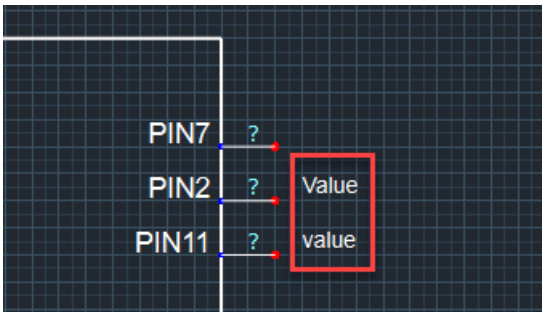


Adding Properties to Symbol Pins

To add properties to symbol pins:

1. Select the pins to which you want to add properties.
2. Type the property name in the *Name* column under the *Attributes* section of *Properties* panel.

   The property value is added to all the selected pins and displayed on the canvas.



Adding Notes

In addition to the properties and shapes, you can also add notes to the symbol. To add a note:

1. Choose *Place – Note*.
2. Click on the canvas where you want to place the note.

   A blank note is placed on the canvas.
3. Type the detail you want to add and click outside the note.

Adding Images

To add an image:

1. Choose *Place – Image*.

   The *Image* window is displayed.
2. Locate and select the image you want to add.
3. Click *Open*.

   The image is attached to the cursor.
4. Click anywhere on the canvas to place the image.

   The image is added to the canvas.

Adding Custom Shapes

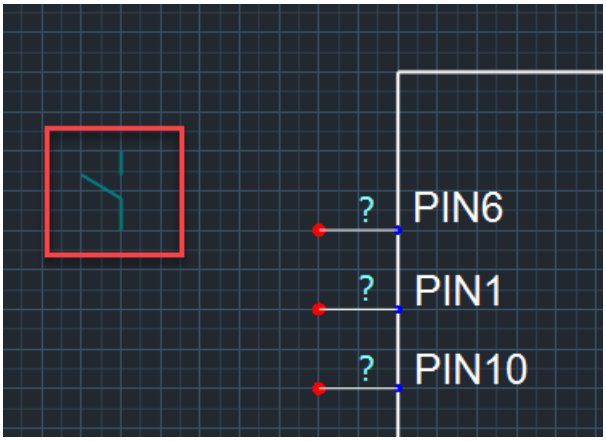
Symbol Editor makes it easy for you to understand what that pin represents by allowing you to attach a custom shape to a pin. You can also rotate and resize custom shapes using the right-click pop-up menu.

You can also flip a shape using the Mirror Vertical or Mirror Horizontal commands. These quick commands reduce the need for manual accuracy required while placing shapes.

To add the shape to symbol:

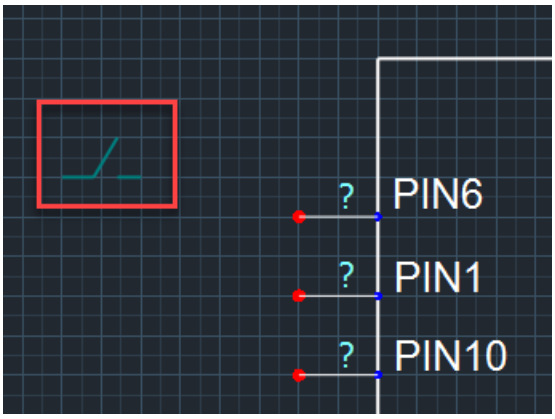
1. Click the *Auto Shapes* () button on the toolbar and select a shape.
2. Click anywhere on the canvas to place the shape.

The shape is placed on the canvas.



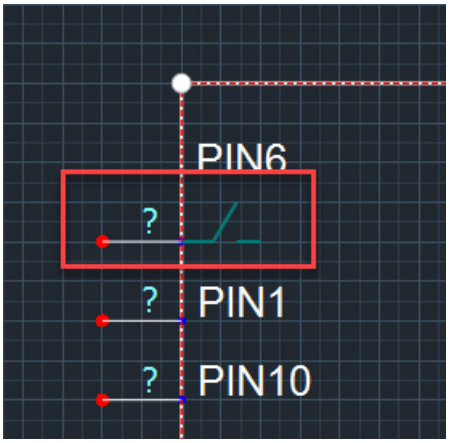
You can also rotate or resize the shape as per your requirement.

3. Right-click the shape and click the *Rotate Right* ( ) button from the pop-up menu.



4. Select and drag the shape to attach it to a pin.

The shape is attached to the pin.



5. Press *Esc* on the keyboard or right-click and select *Esc*.

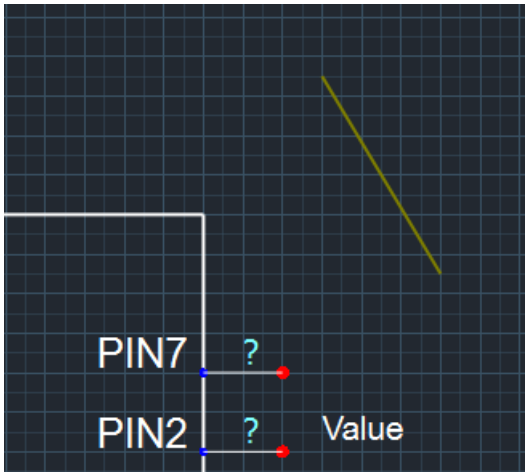
Drawing Arcs

In Symbol Editor, you can easily draw an arc of any angle using the *Place Arc* button. To draw an arc:

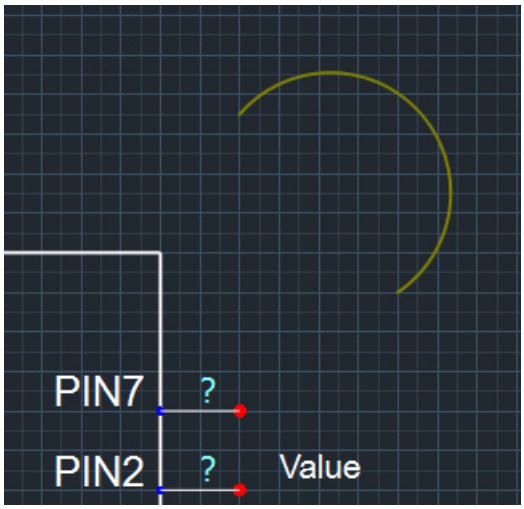
1. Click the *Place Arc* () button on the toolbar.

   The cursor changes to a cross-hair.

2. Click on the canvas to specify the start point of the arc.
3. Drag the mouse and click to specify the end point of the arc.



4. Move the cursor to adjust the angle of the arc and then click to finish creating arc.



5. Right-click and select *Esc* to dismiss the arc tool.

   You can also press *Esc* on the keyboard to dismiss the arc tool.

Drawing Lines

To draw a line:

1. Click the *Place Line* ( ) button on the toolbar.

   The cursor changes to a cross-hair.

2. Click on the canvas to specify the start point of the line.
3. Move the cursor and click to specify the end point of the line.
4. Right-click and select *Esc* to dismiss the line tool.

   You can also press *Esc* on the keyboard to dismiss the line tool.

3

Modifying Text and Symbol Objects

In this chapter:

Modifying Properties

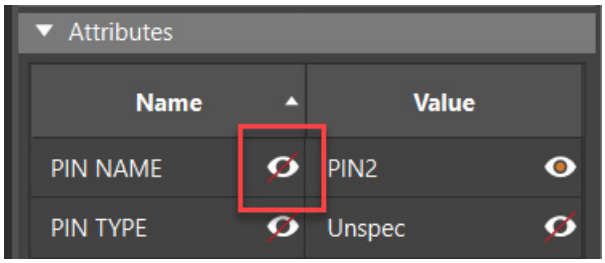
This section describes tasks that are required to modify the visibility and style of properties.

Setting Property Visibility

The visibility of properties can be set by using the visibility icon next to the object property value. You can display the property *Name–Value* pair or the *Property Value*, or make it invisible. To do this:

1. Select a property on the canvas.

2. In the *Attributes* section of *Properties* panel, click the following icon corresponding to the property you want to display or hide:



Changing Property Text Style

You can change the text size, color and font of selected properties from the *Text Box* section of the *Properties* panel. To do this:

1. Select a property on the canvas.
2. In the *Text Box* section of *Properties* panel, do one of the following:
   a. select a font style from the *Font face* drop-down list to change the font of the property text.
   b. select a size from the *Font size* list to change the size of the property text.
   c. select a color from the *Font color* list to change the color of the property text.

Rotating or Mirroring Objects

Symbol Editor allows you to rotate objects by 90-degree increments. You can also mirror objects horizontally or vertically.

To rotate or mirror objects:

1. Click to select the object you want to rotate or mirror.

   You can also multiple objects by creating a selection box around the object.
2. In the *Arrange* section of the *Properties* panel, do one of the following:
   a. click the *Rotate Right* button  or press *Ctrl + R* to rotate the object clockwise.

   The selection is rotated by 90 degrees clockwise.

b. click the *Rotate Left* button  or press *Ctrl + L* to rotate the object counter-clockwise.

The selection is rotated by 90 degrees counter-clockwise.

c. click the *Mirror Horizontal* button  or press *Ctrl + H* to mirror the object.

The selection is mirrored from side to side across Y-axis.

d. click the *Mirror Vertical* button  or press *Ctrl + T* to mirror the object.

The selection is mirrored from top to bottom and from bottom to top across X-axis.

You can also rotate or mirror multiple objects simultaneously.

Aligning Objects

Symbol Editor objects can be quickly aligned with respect to the other object. You can align horizontally (left, center, and right) and vertically (top, middle, and bottom). To align objects:

1. Select the objects you want to align by using *Ctrl + Click*.

   You can also select multiple objects by creating a selection box around the objects.

2. In the *Arrange* section of the *Properties* panel, do one of the following:

   a. click the *Align Left*, *Align Right*, or *Align Center* buttons to align the objects to left, right, or center respectively.

   b. click the *Align Top, Align Bottom,* or *Align Middle* buttons to align the objects to top, bottom, or middle respectively.

 *Tip*

To make a set of circles concentric, select all the circles and then click the *Align Middle* tool button and the *Align Center* tool button.

Modifying Symbol Outline

To increase or decrease the symbol outline.

1. Select the symbol.
2. Drag the sizing handle (▢) to increase or decrease the outline as per your requirement.

Modifying Pins

In this section:

Moving a Single Pin

To move a pin:

1. Select the pin you want to move and drag it to the desired location.

You can also move and resize multiple pins, or objects. When moving or resizing multiple pins or objects, all the selected pins or objects move the same distance and direction from their original position.

Moving Multiple Pins

To move multiple pins:

1. Select the pins you want to move by creating a selection box around the pins. The selection box selects all the objects enclosed within its boundaries.
2. Drag the selection towards the new location.

   All the pins are moved to the new location.

Note: Pins on different side of the symbol cannot be moved together.

Resizing Pins

To resize pins:

1. Select a pin you want to resize.
2. Drag the sizing handle (☐) (near to the connection point) until the pin is of required size.

Aligning Pins

In Symbol Editor, you can select pins of different sizes and quickly align them to make them equally sized. You can align pins to left, right, center, top, middle, and bottom.

For more information about aligning pins, refer to Aligning Objects.

Expanding and Collapsing Vector Pins

To collapse vector bits of a vector pin:

1. Select all the bits of the vector pin you want to collapse.
2. Right-click the selection and do one of the following:
   a. choose *Collapse All– Collapse All Ascending* to collapse the bits in the ascending order.
   b. choose *Collapse All – Collapse All Descending* to collapse the bits in the descending order.

   The bits collapse to form a vector pin.

To expand vector pins:

1. Select a collapsed vector pin.
2. Right-click the selection and do one of the following:
   a. choose *Expand – Expand Ascending* to expand the bits in the ascending order.
   b. choose *Expand – Expand Descending* to expand the bits in the descending order.

   The pin is expanded.