Title: Shape Tips and Tricks

Product: OrCAD PCB Designer / (Allegro PCB Editor) 16.6 QIR9 (HF51) and later

Summary: Shows the functionalities to create and modify shapes

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1 Introduction

This document gives an overview of how and which shapes can be created and modified. It introduces the new Shape mode that was added with QIR9 / Hotfix 51 in SPB16.6. The document shows different ways to achieve a certain result and the usage to become as efficient as possible by using the PCB Editor. Some menus might look different in Allegro PCB Editor, but in general it works the same.

2 Place a Shape

2.1 Place a Circle

Shape -> Circular

or click on

Select the shape Type:

A cooper (Etch) Shape can be assigned to a net

A shape can also be created off-grid

Define the Radius and click to define Center

Select the Class and Subclass where the shape should be created

Click on Center Position and click on extent

Define Radius and the Center Position and click on [Create]

To keep the shape, finish the command by

RMB -> done

2.2 Place a Rectangular Shape

Shape -> Rectangular

or click on

Class, Subclass, shape type and assigning net behaves as described in chapter “Place a Circle”
Note: There are two symbols that look like [Image]. One activates the command ‘add rect’ the other ‘shape add rect’. Described here is the 'shape add rect'.

2.3 Place a Polygone

Shape -> Polygon

or click [Image]

The kind of line that should be used can be chosen

Settings to influence the behavior of the arc line
3 Shape Mode

Shape Edit Application Mode was introduced with QIR9 and is included since HotFix51.

The Shape Edit Application mode is a tuned editing environment primarily designed to increase efficiency with shape boundary editing. It is available in all back-end PCB and Packaging products. This object-action environment simplifies the actions of sliding a shape edge, adding a notch or chamfering/rounding the corners. Note the similarities with existing application modes but also the new function that allows customization of single pick and drag operations.

To activate the Shape Mode select the icon in the menu bar or choose at the bottom of the window.

Context Sensitive Pop-Up on Right-Click
Hovering the mouse pointer over a shape segment (edge) produces the following pop-up menu on right-click.
**Toggle between elements**
Use the [TAB] key to cycle between elements on your cursor. In the following example, hovering over the shape edge (left graphic) provides datatip information about the line segment. Press the [TAB] key to cycle to the shape element (right graphic). Context-sensitive menus will vary based on the highlighted element.

![Datatip example](image)

3.1 **Customize Mouse Click and Drag Functionality**
You can customize settings in the Options panel for mouse click, drag, and vertex operations. The behavior of the mouse click or click and drag can be set in the Options to your needs.

3.1.1 **Click on a Line Segment of a Shape**
The function for clicking on a line segment of a shape can be chosen in the Options.

![Options panel](image)
3.1.1.1 **Segment Command / Click / Add notch**

First click

Second click

Drag to the desired size of the notch and click to end the command

3.1.1.2 **Segment Command / Click / Move**

Select a shape segment

The selected shape segment is attached to the mouse pointer and can be moved to any place. The joining segments follow. Click to place the shape segment.

3.1.1.3 **Segment Command / Click / Slide**

Select a shape segment

The selected shape segment is attached to the mouse pointer and can be moved in parallel. Click to place the shape segment.

With the option Extended Selection activated it is possible to slide a line segment of a shape together with the round vertexes.
With the option Auto Join selected the sliding line will collect parallel adjacent lines.
3.1.1.4 **Segment Command / Click / Remove/Extend**

This function can also be used to remove rounded vertexes.

### 3.1.2 Click and Drag a Line Segment of a Shape

The function for clicking on a line segment of a shape and dragging on it can be chosen in the Options.
3.1.2.1 *Segment Command / Drag / Move*

Select a shape segment and hold the mouse button pressed.

The selected shape segment can be moved to any place. The joining segments follow. Release the mouse button to place the shape segment.

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3.1.2.2 *Segment Command / Drag / Slide*

Select a shape segment and hold the mouse button pressed.

The selected shape segment can be moved in parallel. Release the mouse button to place the shape segment.

The slide Options Auto Join and Extended Selection behave the same as described in chapter 3.1.1.3 Segment Command / Click / Slide.

3.1.3 **Click on a Vertex (Corner)**

The function for clicking on a Vertex (corner) can be chosen in the Options.
The vertex can be selected when the cursor looks like a square with four arrows.

3.1.3.1 **Vertex Command / Click / Move**

The two touching line segments slide in parallel.

Select Move / Free Vertex and the lines are not slid but change the angle to follow the vertex.
3.1.3.2 **Vertex Command / Click / Chamfer/Round**

By clicking on a Vertex it gets modified according to the setting in the Options.

- The corner will be straight cut off
- The corner will be rounded
- Define length of cut back
- Define length of new line segment or radius
- Set the size of the chamfer or radius manually and individually
### Examples:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corners:</td>
<td><img src="image1" alt="Corners" /></td>
<td><img src="image2" alt="Before" /></td>
</tr>
<tr>
<td>Active Class and Subclass:</td>
<td>Etch</td>
<td><img src="image4" alt="Before" /></td>
</tr>
<tr>
<td>Trim (T): 5.00</td>
<td>Radius (R): 5.00</td>
<td></td>
</tr>
</tbody>
</table>

**Examples:**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corners:</td>
<td><img src="image6" alt="Corners" /></td>
<td><img src="image7" alt="Before" /></td>
</tr>
<tr>
<td>Active Class and Subclass:</td>
<td>Etch</td>
<td><img src="image9" alt="Before" /></td>
</tr>
<tr>
<td>Trim (T): 5.00</td>
<td>Radius (R): 5.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Setting</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corners:</td>
<td><img src="image11" alt="Corners" /></td>
<td><img src="image12" alt="Before" /></td>
</tr>
<tr>
<td>Active Class and Subclass:</td>
<td>Etch</td>
<td><img src="image14" alt="Before" /></td>
</tr>
<tr>
<td>Trim (T): 5.00</td>
<td>Chamfer (C): 5.00</td>
<td></td>
</tr>
</tbody>
</table>
Note: To remove a rounded vertex use Segment Commands /Click/Remove/Extend

3.1.3.3 **Vertex Command / Click / Delete**
This will remove the selected vertex and connect the two other vertexes with a straight line:

Note: To remove a rounded vertex use Segment Commands /Click/Remove/Extend

3.1.4 **Click and Drag a Vertex (Corner)**

3.1.4.1 **Vertex Command / Drag / Move**
The function for clicking on a vertex of a shape and dragging on it can be chosen in the Options. The settings lead to the same behavior as described in 3.1.3.1 Vertex Command / Click / Move.
4 Shape Menu
5 Different Right Mouse Button Menus
As the RMB (Right Mouse Button) menu is context sensitive you can get different functions listed up in the RMB menu:

<table>
<thead>
<tr>
<th>RMB menu in General Edit Mode after selecting a shape:</th>
<th>RMB menu in all Edit Modes after selecting a shape with ‘Shape select’</th>
<th>RMB menu in Shape Edit Mode after selecting a shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Utilities</td>
<td>Done F5</td>
<td>Quick Utilities</td>
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<tr>
<td>Move</td>
<td>Oops o</td>
<td>Expand/Contract</td>
</tr>
<tr>
<td>Copy</td>
<td>Cancel Esc</td>
<td>Trim corners</td>
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<tr>
<td>Delete</td>
<td>Next n</td>
<td>Move</td>
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<tr>
<td>Spin</td>
<td>Reject</td>
<td>Copy</td>
</tr>
<tr>
<td>Expand/Contract</td>
<td>Delete Vertex</td>
<td>Delete</td>
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<tr>
<td>Change to layer</td>
<td>Move</td>
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</tr>
<tr>
<td>Add connect</td>
<td>Copy</td>
<td>Add to group</td>
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<tr>
<td>Assign net</td>
<td>Copy to Layers</td>
<td>Fix</td>
</tr>
<tr>
<td>Add to group</td>
<td>Edit Boundary</td>
<td>Property edit</td>
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<tr>
<td>Assign to region</td>
<td>Defer Dynamic Fill</td>
<td>Show element</td>
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<tr>
<td>Fix</td>
<td>Change Shape Type</td>
<td>Application Mode</td>
</tr>
<tr>
<td>Property edit</td>
<td>Assign Net</td>
<td>Super filter</td>
</tr>
<tr>
<td>Show element</td>
<td>Assign Region</td>
<td>Customize</td>
</tr>
<tr>
<td>3D View</td>
<td>Raise Priority</td>
<td>Selection set</td>
</tr>
<tr>
<td>Drafting</td>
<td>Lower Priority</td>
<td></td>
</tr>
<tr>
<td>Net</td>
<td>Update Shape</td>
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</tr>
<tr>
<td>Application Mode</td>
<td>Parameters</td>
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<tr>
<td>Super filter</td>
<td>Report...</td>
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<tr>
<td>Customize</td>
<td>Snap pick to</td>
<td></td>
</tr>
<tr>
<td>Selection set</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6 How to Create Complicate Shapes-

6.1 Change the Outline

Shape -> Edit Boundary or the corresponding symbol from menu bar
Select a shape and start drawing the new outline
And then go back to boarder of the shape to close the outline.

6.2 Create a cut-out in a shape

6.2.1 Use Voids

Select the needed cut-out type:

- Shape -> Manual Isolation/Cavity -> Polygon
- Shape -> Manual Isolation/Cavity -> Rectangular
- Shape -> Manual Isolation/Cavity -> Circular

Or use the symbols in the menu bar.

Select a shape and draw the desired cut-out.
6.3 Put together a Shape from other Shapes

Create simple shapes and go to Shapes -> merge shapes -> and select one shape after the other -> RMB -> done

6.4 How to change Size of a Shape and copy to an other Layer

Shape -> Copy Shape
Choose the settings in the Options as desired and click on the shape you want to copy.
RMB -> Done

Note: The function is also known as z-copy.

7 How to...

7.1 How to change Shape Priority
Shape -> Select Shape... -> click on the desired shape
RMB -> Raise Priority

RMB -> done
To update shape:
Shape -> Global Dynamic Parameters... -> /Shape fill/ -> [Update to Smooth]
Note: Raise Priority and Lower Priority can be used to sequence the shapes as desired.

7.2 How to select a shape that is covered by another shape

During the Shape Select it is possible to select a static shape at all its surface. If a smaller static shape is underneath, it cannot be selected. Use reject for this purpose.

Shape -> Select Shape or Void/Cavity -> click on smaller shape
The bigger shape is selected -> RMB -> Reject -> The smaller shape is selected now

When there are more than two shapes overlaying each other and reject is used, a window open where the desired shape can be selected. The selected shape is blinking.
Select the needed shape -> [OK]

8 General Information
When the desired function is not described in this AN please check also the FloWare Modules Shape Utilities.

For further information and more details please check also the help function.

9 Bibliography
What’s New in 16.6-2015 from Cadence
All Documentation in Cadence Help