

Fritzing Parts SVG Editor
0.0.2

Generated by Doxygen 1.8.6

Sat May 11 2019 11:30:55

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Chapter 1

Fritzing Parts SVG Editor

This program is meant to fill a missing feature of the Fritzing program, an editor for creating the part graphics. Inkscape or Illustrator are really poor choices for creating these sorts of graphics or at least I found Inkscape frustrating to use to create breadboard or PCB layouts, esp. when compared to KiCAD's footprint editor. Placing accurately sized graphics in accurate locations is not really what Inkscape is specifically designed to do. It is meant for creating artwork. For my initial parts, I ended up hand editing the SVG files with a text editor, with a little scripting help. Then I wrote this program. Unlike "typical" graphics editing program, this program does not allow for placing or moving graphical elements with the pointer (mouse, etc.). Instead, to place or edit a graphical element, a dialog box is displayed and one enters the exact numerical location, size, etc. This might seem clunky to some people, but it is designed to allow direct transfer from a datasheet drawing, which after all is loaded down with actual measurements (numbers!). For people who have an aversion to their keyboards, there is always Inkscape or Illustrator.

Fritzing should eventually have its own built-in graphical part editor (much like KiCAD (and I guess EagleCAD) does. I have no problem with the Fritzing developers using this program as a basis or inspiration.

Chapter 2

Main GUI

The main gui, shown below, has standard menu bar and three tabs, one for each of the three images used in Fritzing: Breadboard view, Schematic, and PCB view.

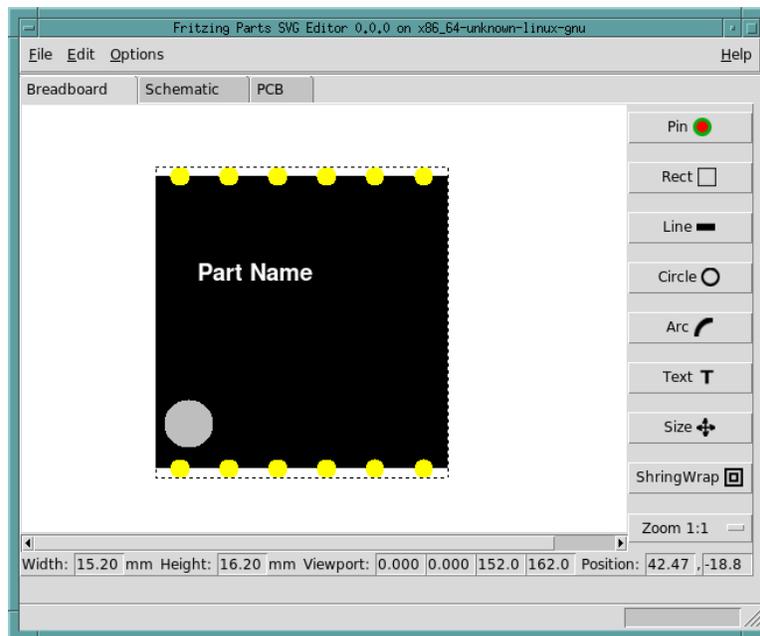


Figure 2.1: The main GUI of the Fritzing Parts SVG Editor program

There are four menus on the top menu bar, a file menu, an edit menu, an options (preferences) menu, and a help menu.

2.1 File menu

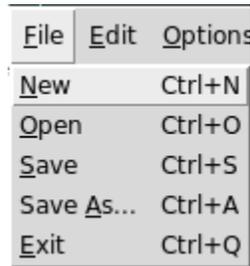


Figure 2.2: The File menu

The **File** menu has the standard items: **New**, which clears the current part, **Open**, which loads a part from disk, **Save** and **Save As...**, which saves the current part to disk, and **Edit**, which exits the program.

The **Open** and **Save** options don't take a final filename, instead they take a "prefix", to which is appended "_Breadboard.-svg", "_Schematic.svg", and "_PCB.svg" for each of the three views. In other words, opening and saving involves three files (although one or two can be omitted on input, in which case the missing files yield a blank image for those view(s)).

2.2 Edit menu

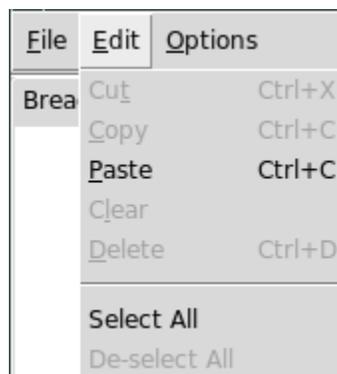


Figure 2.3: The Edit menu

The **Edit** menu has the standard editing related items.

2.3 Options menu

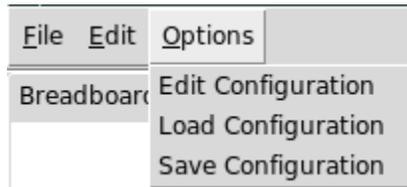


Figure 2.4: The Options menu

The **Options** menu has three items: **Edit Configuration**, **Load Configuration**, and **Save Configuration**. These items allow for editing, loading, and saving the configuration (preferences). See [Preferences](#).

2.4 Help menu



Figure 2.5: The Help menu

The **Help** menu contains a top-level index into the included help pages.

2.5 Editing tabs

The main area of the main GUI contains three tabbed panes, one for each of the three images used in Fritzing: Breadboard view, Schematic, and PCB view. All three have the same layout with the same GUI elements, but are actually independent. Each tabbed pane contains an image view area, a set of tool buttons to the right and coordinate information along the bottom. The tool buttons and the coordinate information are the same for all three views, although the details of how some of the tool buttons work are tab specific and the actual coordinate information is itself specific to each tab. See [Common GUI elements](#) for details about the common features and [Breadboard Editor](#), [Schematic Editor](#), and [PCB Editor](#) for the tab specific features and functions.

Chapter 3

Preferences

The preferences are stored in a text file in the user's home directory (folder). The file is named `.fritzingpartssvgeditor` under Linux and MacOSX and `fritzingpartssvgeditor.rc` under MS-Windows. There are five preferences:

Units The units to use for the width and height. Can be either mm (millimeters) or inch (inches)

Width The real world width (in Units above) of the viewport.

Height The real world height (in Units above) of the viewport.

Viewport Width The numerical width of the viewport

Viewport Height The numerical height of the viewport

These are the default initial values to use. When loading a file, the values stored in the file are used. The aspect ratio of the Width to Height should be the same as the aspect ratio of the Viewport Width to Viewport Height to insure square pixels. Typically the Viewport Width and Viewport Height will be a constant multiple of the Width and Height respectively. The Viewport determines the coordinate system used to place and size graphical elements. The Viewport origin (upper left corner) is always 0,0.

Chapter 4

Common GUI elements

4.1 Coordinate Information

Along the bottom of each tab pane is information about the coordinate system in use for the current pane. First (going from left to right) is the physical size, in either millimeters or inches, then the current viewport, and then finally the current pointer position in the viewport coordinate system. Additionally, a dashed box is shown on the drawing area showing the bounds of the viewport coordinate system.

4.2 Tool Buttons

To the right of the drawing display area are a collection of tool buttons. There six buttons for inserting graphical elements. These buttons are tab specific and their functionality is described in the tab-specific sections of this manual. The bottom three buttons are the same for all three tabs. The bottom three buttons are:

Size The **Side** tool button changes the coordinate system. It displays a dialog box asking for new values for the width, height, units, and viewport.

ShrinkWrap The **ShrinkWrap** tool button "shrink wraps" a (presumably) finished part. It recomputes a viewport that just encloses the part. This includes computing the exact size of the part.

Zoom The **Zoom** tool button lets you zoom in or out. See [Keyboard and mouse bindings](#).

4.3 Keyboard and mouse bindings

There are some common keyboard and pointer bindings. There is a context menu bound to the right pointer button. Right-clicking on a graphical element brings up a menu of things you can do to that element: delete or edit, with keyboard accelerators Delete and E, respectively.

Additionally, the F1 key is bound to zoom in, the F2 key is bound to zoom out, and the F3 is bound to zoom 1:1.

Chapter 5

Breadboard Editor

The breadboard editor implements six graphical elements: pins, rectangles, lines, circles, arcs, and text, using six tool buttons. Each of the tool buttons opens a dialog box where the user can enter the information about the graphical element.

5.1 Pins

Breadboard pins are always drawn as filled circles. The breadboard pin dialog box, shown below, asks for the position (center), the diameter, the color, and the pin number. Pins are automatically auto-incremented starting at the last pin entered. The position is in viewport coordinates, as is the diameter. The default color is black.

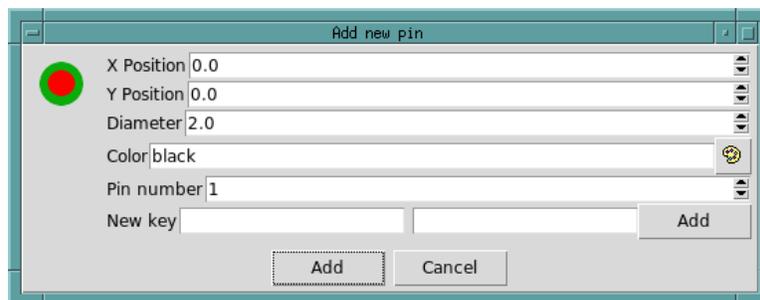


Figure 5.1: Breadboard Pin Dialog

5.2 Rectangles

Rectangles can be filled with a solid color or just be an outline. The breadboard rectangle dialog box, shown below, asks for the position (upper left corner), size (width and height), the line thickness (for outline rectangles), color, and if you want the rectangle filled or not. The position and size are in viewport coordinates. The default color is black.

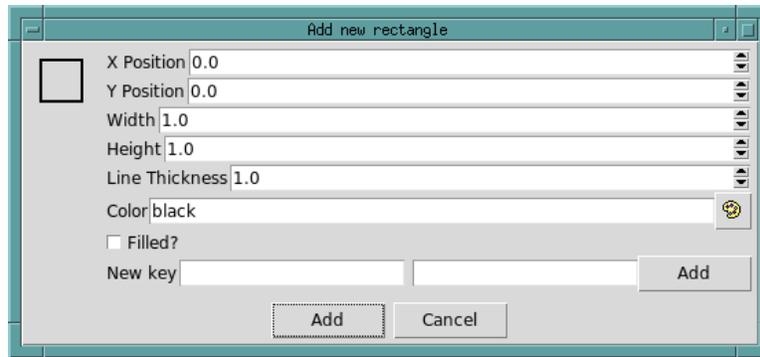


Figure 5.2: Breadboard Rectangle Dialog

5.3 Lines

The breadboard line dialog box, shown below, asks for the endpoints of the line (X1, Y1, X2, Y2), the line thickness and the color. The endpoints are in viewport coordinates. The default color is black.

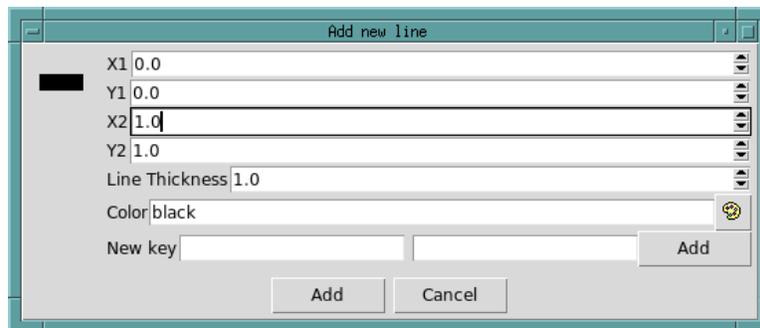


Figure 5.3: Breadboard Line Dialog

5.4 Circles

Breadboard circles can be filled or hollow. The breadboard circle dialog box, shown below, asks for the position (center), the diameter, the center size (hole diameter), and the color. The position and the diameters are in viewport coordinates. The default color is black.



Figure 5.4: Breadboard Circle Dialog

5.5 Arcs

Breadboard arcs can be either pie slices or bare arcs. If the center diameter, the arc will be a pie slice (filled), otherwise, the arc will be a bare arc. The breadboard arc dialog box, shown below, asks for the position (center), the diameter, the center size (hole diameter), and the color. The position and the diameters are in viewport coordinates. The default color is black.

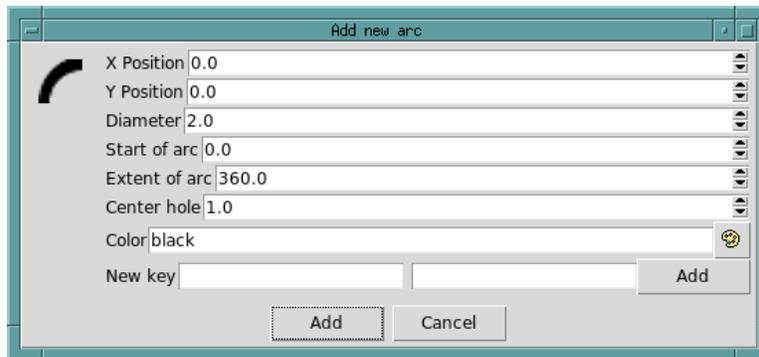


Figure 5.5: Breadboard Arc Dialog

5.6 Text

The breadboard text dialog box, shown below, asks for the position (lower left), the size in points, the font, the text, and the color. The position is in viewport coordinates. The default color is black.

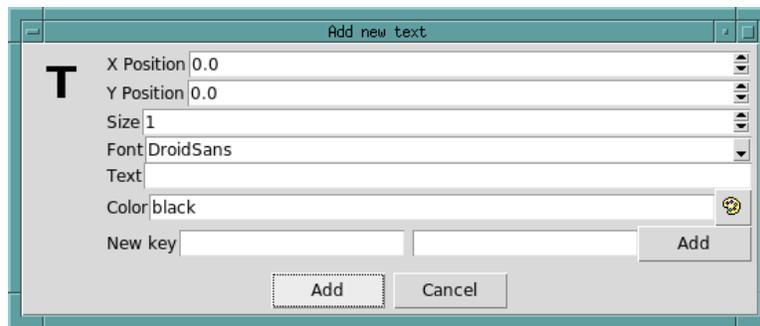


Figure 5.6: Breadboard Text Dialog

Chapter 6

Schematic Editor

The schematic editor implements six graphical elements: pins, rectangles, lines, circles, arcs, and text, using six tool buttons. Each of the tool buttons opens a dialog box where the user can enter the information about the graphical element.

6.1 Pins

The Schematic implements "pins" as short lines with a small filled circle at the end, meant to be used as a connection point. The line can have an optional larger outline circle (at the opposite end from the connection) to indicate an inverted input or output. Also pins on a schematic are labeled with at least a pin number and optionally a pin name. The schematic pin dialog, shown below, asks for the position (this is the center of the small filled circle at the end of the line), the orientation of the pin (this corresponds to the side of the part's (rectangular) body: left, right, top, bottom), whether the pin is inverted, the pin number, the (optional) pin name, the color, the line thickness, the size of the textual elements, and the font to use for the textual elements.

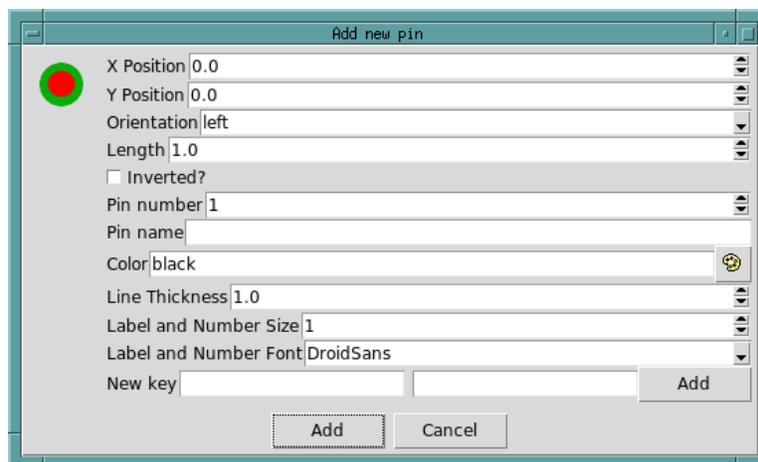


Figure 6.1: Schematic Pin Dialog

The length would always be the distance from the part's (rectangular) body to the center of the connection point, as shown here (both pins have the same length):

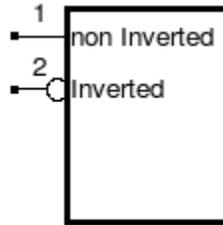


Figure 6.2: Example pins: both oriented left, both the same length.

6.2 Rectangles

Rectangles can only be an outline. The schematic rectangle dialog box, shown below, asks for the position (upper left corner), size (width and height), the line thickness, and color. The position and size are in viewport coordinates. The default color is black.

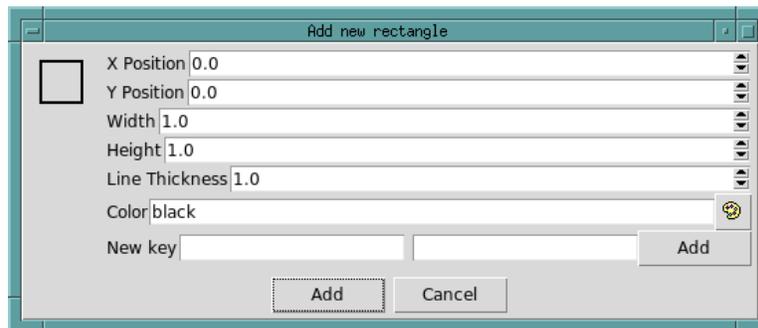


Figure 6.3: Schematic Rectangle Dialog

6.3 Lines

The schematic line dialog box, shown below, asks for the endpoints of the line (X1, Y1, X2, Y2), the line thickness and the color. The endpoints are in viewport coordinates. The default color is black.

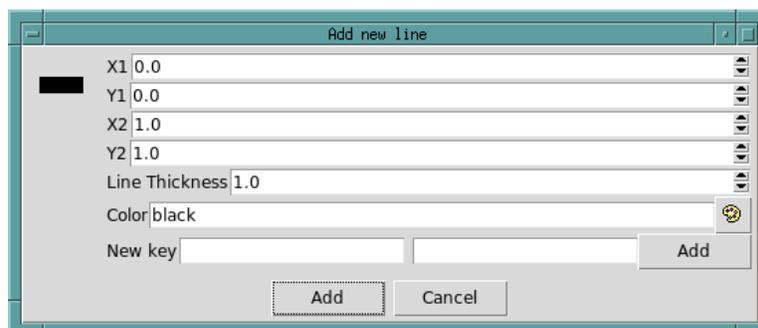


Figure 6.4: Schematic Line Dialog

6.4 Circles

Schematic circles can be filled or hollow. The schematic circle dialog box, shown below, asks for the position (center), the diameter, the center size (hole diameter), and the color. The position and the diameters are in viewport coordinates. The default color is black.

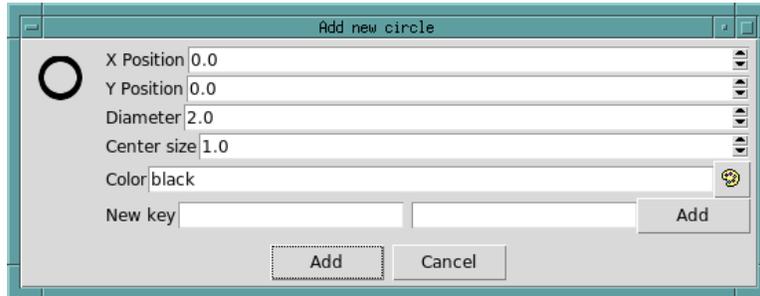


Figure 6.5: Schematic Circle Dialog

6.5 Arcs

Schematic arcs can be either pie slices or bare arcs. If the center diameter, the arc will be a pie slice (filled), otherwise, the arc will be a bare arc. The schematic arc dialog box, shown below, asks for the position (center), the diameter, the center size (hole diameter), and the color. The position and the diameters are in viewport coordinates. The default color is black.

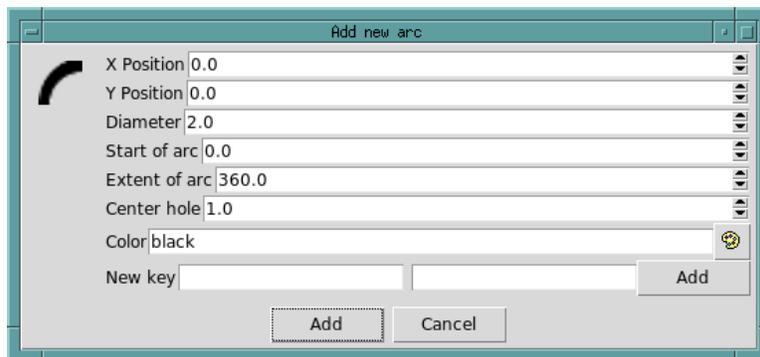


Figure 6.6: Schematic Arc Dialog

6.6 Text

The schematic text dialog box, shown below, asks for the position (lower left), the size in points, the font, the text, and the color. The position is in viewport coordinates. The default color is black.

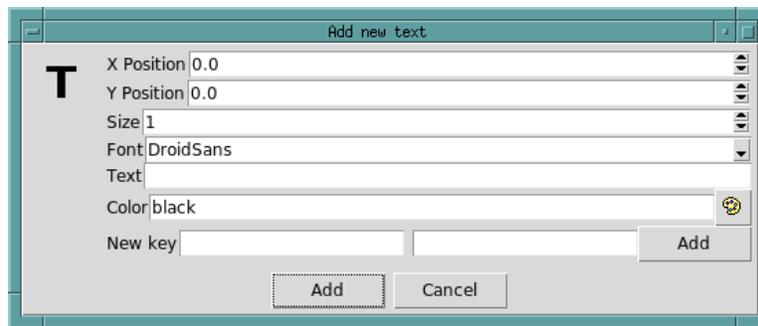


Figure 6.7: Schematic Text Dialog

Chapter 7

PCB Editor

The PCB editor implements six graphical elements: pins, rectangles, lines, circles, arcs, and text, using six tool buttons. Each of the tool buttons opens a dialog box where the user can enter the information about the graphical element.

7.1 Pins

PCB pins are always drawn as circles, with a possible hole drilled in the center. The PCB pin dialog box, shown below, asks for the position (center), the diameter, the drill size, and the pin number. Pins are automatically auto-incremented starting at the last pin entered. The position is in viewport coordinates, as are the diameters. The default color is copper and pins are always on the copper layers.



Figure 7.1: PCB Pin Dialog

7.2 Rectangles

Rectangles can only be an outline. The PCB rectangle dialog box, shown below, asks for the position (upper left corner), size (width and height), and the line thickness. The position and size are in viewport coordinates. The color is white and rectangles are always on the silkscreen.



Figure 7.2: PCB Rectangle Dialog

7.3 Lines

The PCB line dialog box, shown below, asks for the endpoints of the line (X1, Y1, X2, Y2), and the line thickness. The endpoints are in viewport coordinates. The color is white and lines are always on the silkscreen.

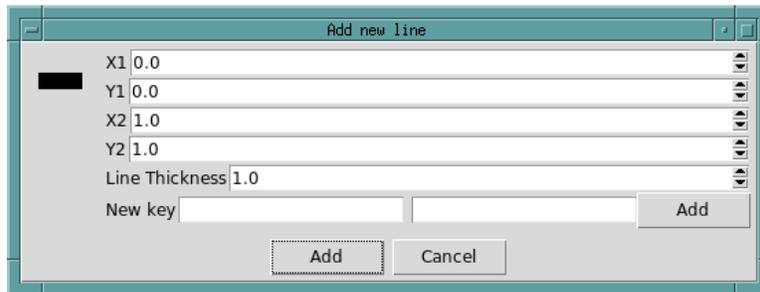


Figure 7.3: PCB Line Dialog

7.4 Circles

PCB circles can be filled or hollow. The PCB circle dialog box, shown below, asks for the position (center), the diameter, and the center size (hole diameter). The position and the diameters are in viewport coordinates. The color is white and circles are always on the silkscreen.

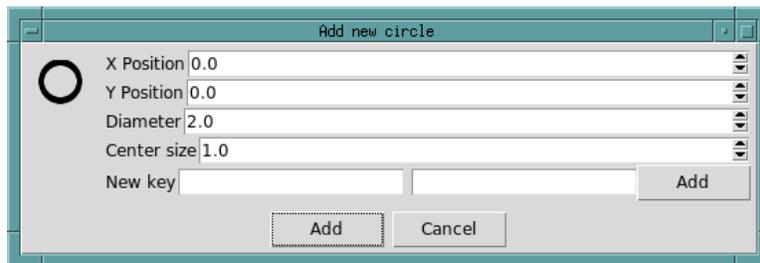


Figure 7.4: PCB Circle Dialog

7.5 Arcs

PCB arcs can be either pie slices or bare arcs. If the center diameter, the arc will be a pie slice (filled), otherwise, the arc will be a bare arc. The PCB arc dialog box, shown below, asks for the position (center), the diameter, and the center size (hole diameter). The position and the diameters are in viewport coordinates. The color is white and arcs are always on the silkscreen.

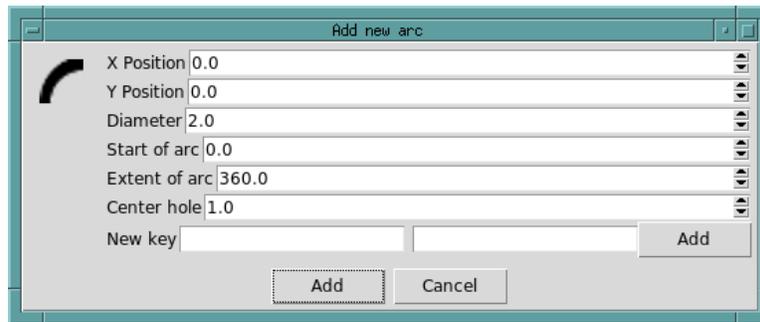


Figure 7.5: PCB Arc Dialog

7.6 Text

The PCB text dialog box, shown below, asks for the position (lower left), the size in points, the font, and the text. The position is in viewport coordinates. The color is black and text is always on the silkscreen.

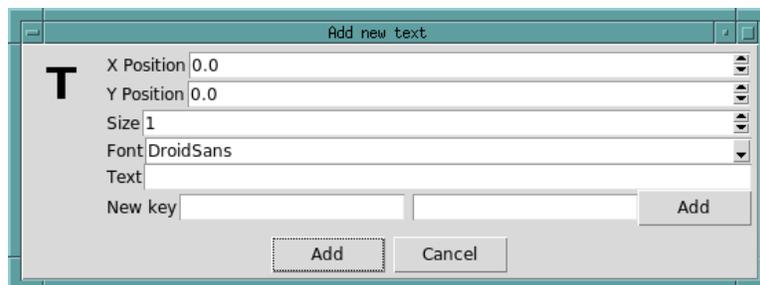


Figure 7.6: PCB Text Dialog

Chapter 8

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Chapter 9

Help

This help window contains some basic navigation features. There are buttons for traversing the history stack. There are also key bindings within the help window itself:

- **s** Search forward. Searches forward in the text for the next occurrence of the specified text.
- **r** Search backward. Searches backward in the text for the next occurrence of the specified text.
- **f** History forward. Goes to the next page in the history stack.
- **b** History backward. Goes to the previous page in the history stack.
- **Tab** Next link. Goes to the next hyperlink.
- **Control-Tab** Previous link. Goes to the previous hyperlink.

Chapter 10

Module Documentation

10.1 Fritzing Parts SVG Editor

Create and edit SVG files used as the images for the Fritzing Parts editor.

10.1.1 SYNOPSIS

FritzingPartsSVGEditor [X11 Resource Options] [options] [fileprefix]

10.1.2 DESCRIPTION

The Fritzing Parts SVG Editor creates and edits the SVG files used as the images for the Fritzing Parts editor. It is **NOT** drawing program (like inkscape or Adobe Illustrator). It is oriented towards placing graphical elements precisely, using exact numerical placement values. Be prepared to make extensive use of the oblong thing with the 100 or so buttons on it and expect to make little use of the other thing you move around! There is no dragging or dropping or click to place elements. The lack of such features is deliberate. Please read the whole manual for complete documentation on the use of this program.

10.1.3 OPTIONS

None at present.

10.1.4 PARAMETERS

An option filename prefix. The files the program uses are named using this prefix, with "_Breadboard.svg", "_Schematic.-svg", and "_PCB.svg" appended.

10.1.5 FILES

Preferences file (Tcl/Tk options format):

\$(HOME)/fritzingpartssvgeditor or \$(HOME)/fritzingpartssvgeditor.rc

10.1.6 AUTHOR

Robert Heller <heller@deepsoft.com>

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