
Knotter Manual

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Chapter 1

Knotter User Guide

1.1 Introduction

Knotter is a highly configurable interlace designer.

Interlace patterns are a kind of design historically used as a decorations in many places and by different cultures, some examples are Celtic knotworks and Islamic interlaces.

Knotter uses [graphs to represent knots](#).

A good description of the algorithm used to render them and design tips can be found at [Celtic Knotwork: the Ultimate Tutorial](#)

Knotter aims to allow its user to design such patterns in an intuitive way and to provide easy ways to integrate the result in external general-purpose graphic software.

For this purpose, designs created within Knotter can be save in a custom human-readable format and exported as Scalable Vector Graphics and in a wide number of raster image formats.



An illumination on the cover of the Quran with an interlaced frame.

1.2 Command-line interface

See the [Knotter man page](#)

1.3 Editing

A knot is produced from a graph where the edges define interactions between two knot lines.

1.3.1 Adding nodes

Double clicking on an empty spot on the drawing area will add a node. If you double click on an edge, the new node will split that edge in two.

1.3.2 Adding edges

To toggle edges between nodes, the **Ctrl-LNodesLink** and **NodesUnlink** commands.

1.3.3 Changing edge type

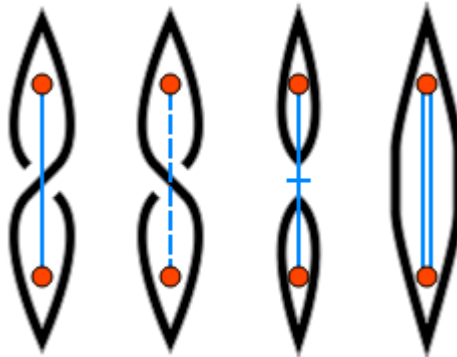
Knotter supports three types of edge:

Default The two lines cross at the edge midpoint, one on top of the other.

Inverted Like default but with the other line on top.

Hole The lines turn back without crossing.

Wall The lines follow the edge without crossing.



From left to right: Default, Inverted, Hole, Wall.

Tip

The type of an edge is changed with the mouse wheel or with the edge context menu.

1.3.4 Quick graph design

Adding nodes and edges one at the time can be very tedious, Knotter provides the **Alt-Shift-LToolsEdge list** tool to make this process easier.

When this is enabled, a single click will create a node and each new node is connected to the previous one by an edge.

To break the edge chain, click with the right button, you'll be able to start a new chain from the next node.

1.3.5 Selection and transformation

Only nodes can be selected and moved, the edges will follow their vertices.

A single node is selected by left clicking it, multiple nodes can be selected by holding Shift or Control.

Dragging the mouse from an empty spot will select the nodes within a rectangular area.

Dragging one of the selected nodes will move the selection, while moving nodes can be transformed using the mouse wheel (will scale the selection) or Shift + mouse wheel (will rotate the selection around the node under the cursor). These transformations are available when pasting nodes.

Selected nodes can be mirrored using **NodesHorizontal flip** and **NodesVertical flip**.

When several nodes are selected, they can be transformed (rotated and translated) by dragging the arrows that appear on the vertices of the bounding rectangle.

1.3.6 Snapping

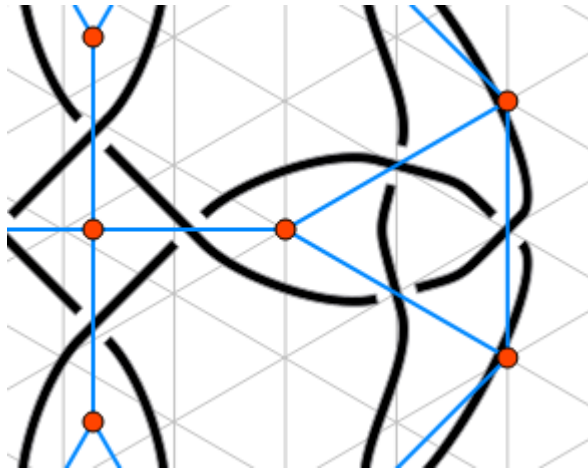
To allow precise designs Knotter offers a grid that, when enabled, will snap nodes to the closest point.

There are three types of grid:

Square A regular square grid.

Triangular1 A grid where the elements are equilateral triangles with a horizontal base.

Triangular2 A grid where the elements are equilateral triangles with a vertical side.



The grid allows precise editing

1.4 Style

The Knot Style docks allow the configuration of display and shape options.

Curve Control Point Distance How much the knot line follows its direction when exiting from an edge.

Crossing Gap Distance between the end points when a lines are crossing.

Minimum Cusp Angle Minimum angle between two edge to make the knot line display a cuspid rather than a smooth curve.

Cusp Distance Distance between the graph node and cusp tip.

Curve Style Various cuspid shapes.

Point Style How the sharp points are rendered.

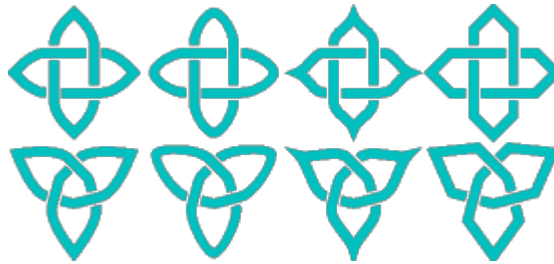
Bevel Flat.

Miter With a sharp point.

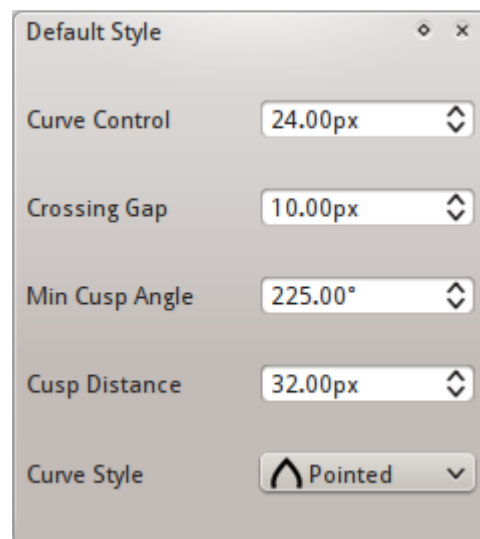
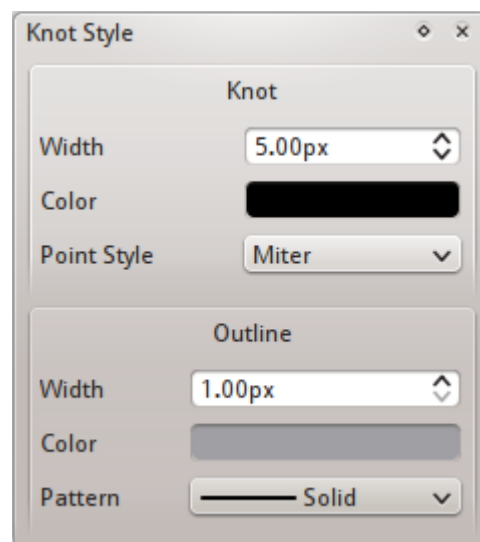
Round Smooth.

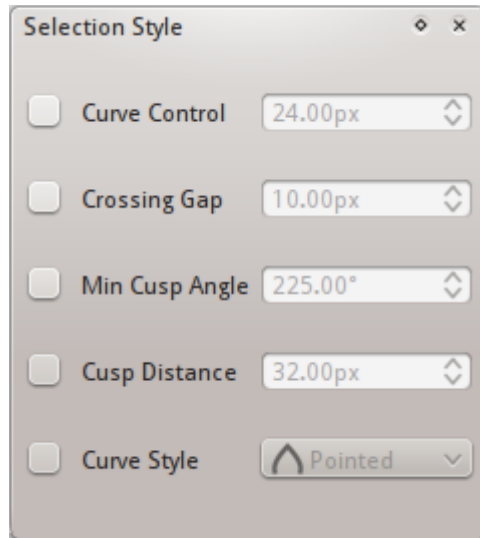
Tip

Some style settings can be configured on individual nodes, using the context menu (right click on a node) or with the "Selection Style" dialog



Solomon's knots and trefoils rendered using various styles.





Style settings docks.

1.5 Save and Load

Knotter can save and load knots in its own human-readable format.

1.5.1 Export

The Export dialog gives many options to export the knot as Image.

1.5.1.1 Mode

The export mode allows the selection of the rendering style used in the exported image

Normal Use the default rendering, all style options are applied to the final result.

Simplified Export the interlace as a stroke sequence.

For raster images the only noticeable difference with **Normal** is that the outline is not visible.

In vector exports, the result will be a cleaner, un-extruded path that can be customized more easily.

This is useful if you plan to edit the image with an external program as it will give more control on shape changes.

Loops Has a similar result as **Simplified** But all closed loops are colored differently.

1.5.1.2 Vector

Exports in the Scalable Vector Graphic format (SVG)

1.5.1.3 Raster

Antialias If checked, the output image will be supersampled.

Compression The compression level, the result depends on the exported format (0% will produce large, uncompressed files; 100% small files).

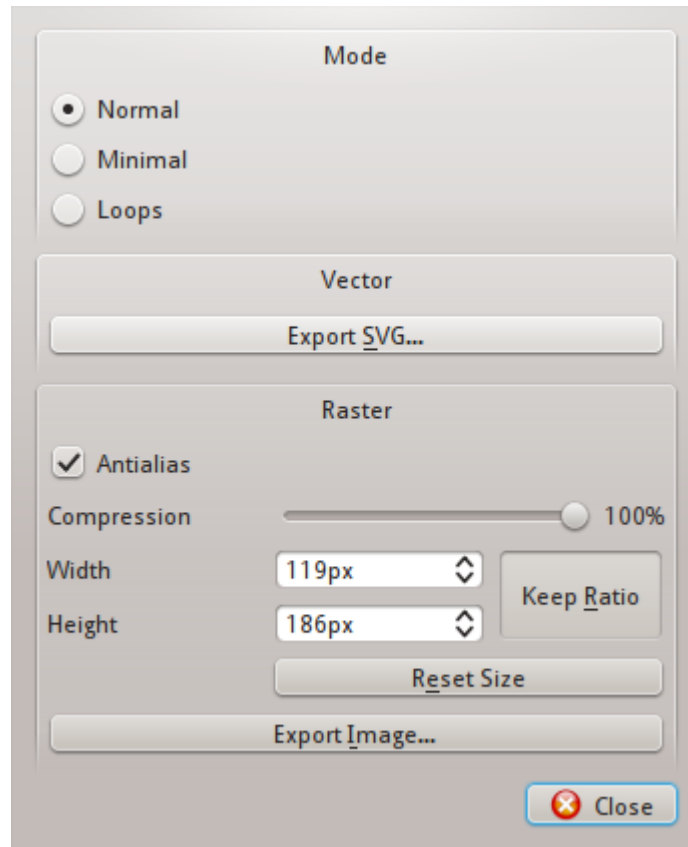
When exporting to a JPEG image, heavy compression will result in poor quality.

This option is only meaningful for export format that support compression.

Width/Height The resulting image size, if they are different from the actual knot it will be scaled to fit those.

Keep Ratio When enabled, editing Width/Height will preserve their ratio.

Reset Size Change Width and Height back to the default.



Export dialog.

Chapter 2

Man pages

Chapter 3

HowTo

This section shows how most common operations are performed in Knotter. Multiple items represent multiple ways to perform the same task.

Editing

1. *Insert a node.*

When in *Edges and nodes* mode, double click on the canvas.

When in *Edge list* mode, left click on the canvas.

2. *Insert edges.*

When in *Edges and nodes* mode, select some nodes and click **Ctrl-LNodesLink**.

When in **Alt-Shift-LToolsEdge list** mode, subsequent nodes are connected automatically with an edge.

3. *Remove nodes.*

Select some nodes and click **DelNodesErase**.

4. *Remove edges.*

Select the edges (or their vertices) and click **NodesUnlink**.

Bring the edge context menu and click Remove.

5. *Break an edge.*

Insert a node when the edge is highlighted.

Bring the edge context menu and click Break on intersections to add nodes where the edge intersects with others.

Bring the edge context menu and click Break... to break it in even-length pieces.

6. *Insert a regular polygon.*

Click on **ToolsInsert polygon...**

7. *Scale part of the graph.*

Select some nodes and use the handles when *Scale* mode is active. By default, dragging a handle will set the anchor point to the opposing handle, if you hold **Shift** the anchor point will be the bounding box center.

While dragging or pasting a part of the graph, use the mouse wheel.

8. *Rotate part of the graph.*

Select some nodes and use the handles when *Rotate* mode is active. Holding **Ctrl** will snap the rotation to steps of 15°

While dragging or pasting a part of the graph, use the mouse wheel.

9. *Flip part of the graph.*

Select some nodes and click on **NodesHorizontal flip** or **NodesVertical flip**.

10. *Merge nodes.*

Select some nodes and click **Ctrl-MNodesMerge**.

Style

1. *Change knot style globally.*

Use the *Knot style* settings to change overall knot appearance, *Default node style* settings to change style features that can be overridden node-wise

2. *Change the style for a specific node.*

Click on Context menu → Preferences... and the *Node style* dialog will be shown.

3. *Change the style for selected nodes.*

Use the *Selection style* dialog.

4. *Remove node specific settings*

Click on Context menu → Reset custom style.

On the *Node style* dialog, check Use default.

Configuration

1. *Configure the grid.*

To set up grid size and shape click on **ViewConfigure grid**

To move the grid origin, click on **ViewMove grid** and click on the canvas to select the new origin.

2. *View only the knot line.*

The grid can be toggled with **ViewEnable grid**, the graph with **ViewShow graph**. The knot can be still be edited when the graph is disabled as the node or edge under the cursor will be displayed.

3. *Improve performance*

Change settings on the preferences dialog.

Uncheck **ViewShow Knotline**.

Chapter 4

Menu actions

Note

Most keyboard shortcuts are loaded from the system settings and may differ from those listed here.

4.1 File Menu

File → New (Ctrl-N) Open a new tab.

File → Open (Ctrl-O) Select a file to open.

File → Open recent Lists recently used files.

File → Save (Ctrl-S) Save current file.

File → Save As.. (Ctrl-S) Save current file, always shows a dialog to select the file name.

File → Save All (Ctrl-Shift-S) Save all open files.

File → Export Show the export dialog, this allows SVG and raster export of the knot.

File → Print (Ctrl-P) Show the system print dialog.

File → Page Setup Show a dialog that can be used to configure the paper size for printing.

File → Print Preview Show a preview of the printing result with the current settings.

File → Quit (Ctrl-Q) Quits Knotter.

4.2 Edit Menu

Edit → Undo (Ctrl-Z) Undo last action.

Edit → Redo (Ctrl-Shift-Z) Redo next action.

Edit → Copy (Ctrl-C) Copy selected subgraph, this will copy data for Knotter internals and a SVG image

Edit → Cut (Ctrl-X) Move selected subgraph to clipboard, outgoing edges are removed.

Edit → Paste (Ctrl-V) Paste clipboard contents.

Edit → Select All (Ctrl-A) Select all nodes.

Edit → Preferences... Show configuration dialog.

4.3 View Menu

View → **Toolbars** Toggle visibility for the available toolbars.

View → **Docks** Toggle visibility for the available dockable dialogs.

View → **Zoom** → **Zoom in (Ctrl+)** Increase the zoom factor in the drawing area.

View → **Zoom** → **Zoom out (Ctrl-)** Decrease the zoom factor in the drawing area.

View → **Zoom** → **Reset Zoom (Ctrl-0)** Reset zoom to 100%.

View → **Reset view** Reset zoom to 100% and center on the origin.

View → **Show graph** Toggle visibility of the graph.

View → **Show Knotline** Toggle visibility of the interlace.

View → **Rendering** → **Normal** Use the default rendering, all style options are applied, may be slower than the other rendering modes.

View → **Rendering** → **Highlight Loops** Closed loops are detected and colored with different colors.

View → **Rendering** → **Simplified** Simple and fast rendering, some style options are discarded.

View → **Enable grid** Toggle grid visibility and snapping.

View → **Configure grid** Show the grid configuration dialog.

View → **Move grid** Enable reposition of the grid origin, once this is triggered, click on the canvas to set the new origin.

View → **Background** Show the background configuration dialog.

4.4 Nodes Menu

Nodes → **Link (Ctrl-L)** Connect selected nodes in a complete subgraph.

Nodes → **Unlink** Remove all edges connecting the selected nodes.

Nodes → **Erase (Del)** Erase selected nodes.

Nodes → **Merge (Ctrl-M)** Merge selected nodes in a single node.

Nodes → **Horizontal flip** Flip nodes horizontally.

Nodes → **Vertical flip** Flip nodes vertically.

Nodes → **Rotate** Dragging on the transformation handles will rotate the selection.

Nodes → **Scale** Dragging on the transformation handles will scale the selection.

Nodes → **Snap to grid** Snaps the selected nodes to the grid.

4.5 Tools Menu

Tools → **Edit graph (Alt-Shift-E)** Changes the editing mode, when this is enabled the user can interact with every aspect of the graph.

Tools → **Edge list (Alt-Shift-L)** Changes the editing mode, when this is enabled the user can insert nodes and edges quickly but other operations are somewhat limited

Tools → **Insert polygon...** Show a dialog to insert a regular polygon

Tools → **Refresh path (F5)** Forces Knotter to redraw the knot if it missed some edit. If you need to use this item, you may have encountered a bug. See [?title].

4.6 Help Menu

Help → **Manual (F1)** Shows a window with the displaying the HTML version of this manual.

Help → **About...** Shows a dialog with information on Knotter version and build environment.

Chapter 5

Dialogs

**To Do**

This section has not been written yet.

Chapter 6

Knotter file format

**To Do**

This section has not been written yet.

Chapter 7

Building and installing

This chapter describes how to build and install Knotter from source and the official packages, see Section 8.1 for links and instructions on how to get the packages.

7.1 Requirements and dependencies

Knotter is written in C++ using the Qt framework, installing the Qt SDK will satisfy most requirements.

- C++ build environment (Compiler, make etc.)
- Qt libraries and development tools
Knotter has been tested with Qt versions 4.7 and 4.8
[Qt Developer Network](#)
- Boost program-options (optional)
[Boost homepage](#)

7.2 Compiling from a bourne shell

This section describes the scripts that can be called to build Knotter from a bourne-compatible shell like **bash** or **dash**. This is the recommended way to build Knotter.

Building from a shell takes two steps, configuration and actual building.

The configuration is done via **configure.sh**, see **configure.sh --help** for a list of options.

configure.sh generates a Makefile that can be used to build the program.

Building with automatic configuration is done as follows:

```
./configure.sh  
make
```

If you want to install the Knotter, after the commands described above, run

```
make install
```

This will install the files in prefix, as set from **configure.sh**. You can move the entire install tree to a specific directory by setting the environment variable `INSTALL_ROOT`.

7.3 Compiling from Qt creator

**Warning**

It is strongly recommended that you compile from a shell if it is available on your system.

The project file is `knotter.pro`, you should be able to build it from Qt Creator.

7.4 Deb and packages

Binary deb and rpm packages can be used to install Knotter using the system installer on systems that support these package managers.

Chapter 8

Contacts and links

8.1 Obtaining Knotter

Source packages and some compiled binaries can be found at <http://sourceforge.net/projects/knotter/files/>, The latest sources can be obtained with git at `git://git.code.sf.net/p/knotter/code` ([Online repository browser](#)).

8.2 Reporting Bugs

To send bug reports, feature request and feedback you can use the [forum on SourceForge](#) or send me an email: Mattia Basaglia knotter@knotdraw.org

8.3 All contacts

Follows a list of places from which you can get more information or contact the maintainer

- [Knotter website \(knotdraw.org\)](#)
 - [SourceForce project summary](#)
 - [Forum](#)
 - Mattia Basaglia knotter@knotdraw.org (Project maintainer)
 - [Twitter account](#)
-

Chapter 9

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-

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Version 3, 29 June 2007

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