

+++ title = “The Embroidermodder 2.0.0-alpha Manual” author = “The Embroidermodder Team” abbrev = “docs” date = “2022-09-19” +++

<https://embroidermodder.org>

The current printer-friendly version of the manual.

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## The Embroidermodder Team

The Embroidermodder Team is the collection of people who’ve submitted patches, artwork and documentation to our three projects. The team was established by Jonathan Greig and Josh Varga. The full list is actively maintained below.

Credits for Embroidermodder 2, libembroidery and all other related code

Please note that this file is not in alphabetical order. If you have contributed and wish to be added to this list, create a new credit section and increment the number. Fill it in with your information and submit it to us.

Here is a summary of the values used:

Label	Description
Name	The full name of the contributor starting with first name.
GitHub	The GitHub account name of the contributor.
CoreDeveloper	This is reserved for long term contributors.
Documentation	If you have contributed changes to README files or help files, set this to true.
Artwork	If you have contributed artwork or related changes, set this to true.
BugFixes	If you have contributed bug fixes or added new features, set this to true.
Translation	If you have provided language translations, set this to true.

Label	Description
Designs	If you have contributed an embroidery design sample, set this to true.
Bindings	If you have contributed programming language bindings for libembroidery, set this to true.
Commands	If you have contributed a command for Embroidermodder 2, set this to true.

- Jonathan Greig **redteam316** (Core Developer, Artwork, Documentation, Designs, Commands)
- Josh Varga **JoshVarga** (Core Developer)
- Jens Diemer **jedie** (Documentation)
- Kim Howard **turbokim** (Bug Fixes)
- Martin Schneider **craftoid** (Documentation)
- Edward Greig **Metallicow** (Artwork, Bug Fixes, Commands) *“It is a sin to wear the band’s shirt on concert night, Unless you buy it @t the show.”*
- Sonia Entzinger (Translation)
- SushiTee **SushiTee** (Bug Fixes)
- Vathonie Lufh **x2nie** (BugFixes, Bindings)
- Nina Paley (Designs)
- Theodore Gray (Designs)
- Jens-Wolfhard Schicke-Uffmann **Drahflow** (Bug Fixes)
- Emmett Lauren Garlitz - Some Little Sandy Rd, Elkview, West by GOD Virginia 011 **Em** “I have a nice cherry chess-top(Glass). But remember, I NEVER played on it.”\_
- Robin Swift **robin-swift** (Core Developer, Documentation)

## Introduction

The *Embroidermodder 2* project is a collection of small software utilities for manipulating, converting and creating embroidery files in all major embroidery machine formats. The program *Embroidermodder 2* itself is a larger graphical user interface (GUI) which is at the heart of the project.

This manual, the website ([embroidermodder.org](http://embroidermodder.org)), mobile embroidery format viewers and tools (**iMobileViewer**, **MobileViewer**), the core library of functions (**libembroidery**) and CLI (**embroider**) are all tools to make the standard user experience of working with an embroidery machine better without expensive software which is locked to specific manufacturers and formats. But ultimately we hope that the core *Embroidermodder 2* is a practical, ever-present tool in larger workshops, small cottage industry workshops and personal hobbyist’s bedrooms.

Embroidermodder 2 is licensed under the zlib license and we aim to keep all of

our tools open source and free of charge. If you would like to support the project check out our Open Collective group. If you would like to help, please join us on GitHub. This document is written as developer training as well helping new users (see the last sections) so this is the place to learn how to start changing the code.

## **The Graphical User Interface: Embroidermodder 2.0.0-alpha**

### **Abstract**

### **Overview**

### **Features**

Embroidermodder 2 has many advanced features that enable you to create awesome designs quicker, tweak existing designs to perfection, and can be fully customized to fit your workflow.

A summary of these features:

- Cross Platform
- Realistic rendering
- Various grid types and auto-adjusting rulers
- Many measurement tools
- Add text to any design
- Supports many formats
- Batch Conversion
- Scripting API

### **Cross Platform**

If you use multiple operating systems, it's important to choose software that works on all of them.

Embroidermodder 2 runs on Windows, Linux and Mac OS X. Let's not forget the Raspberry Pi (<http://www.raspberrypi.org>).

### **Realistic Rendering**

It is important to be able to visualize what a design will look like when stitched and our pseudo "3D" realistic rendering helps achieve this.

Realistic rendering sample #1:

Realistic rendering sample #2:

Realistic rendering sample #3:

Various grid types and auto-adjusting rulers

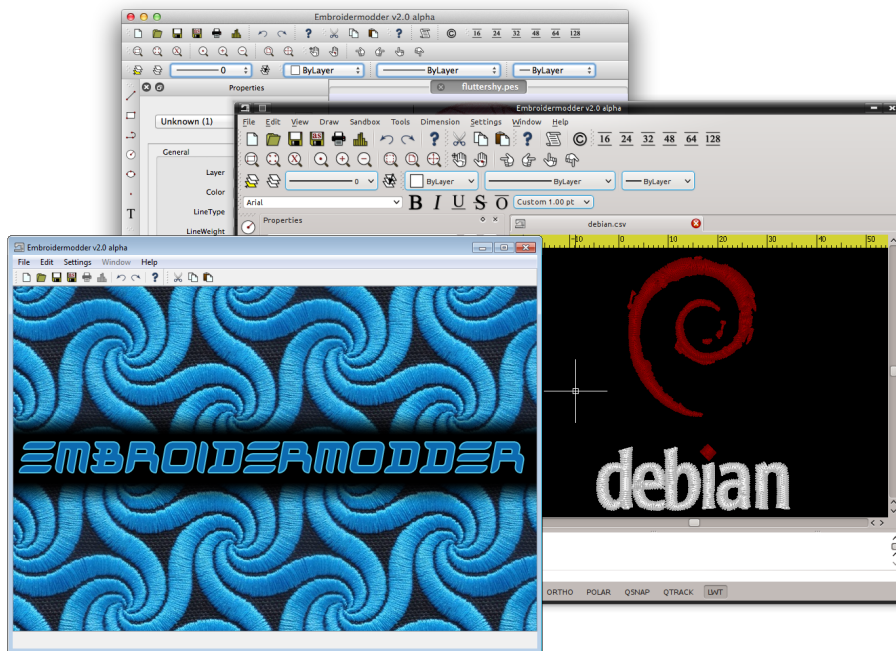


Figure 1: features platforms

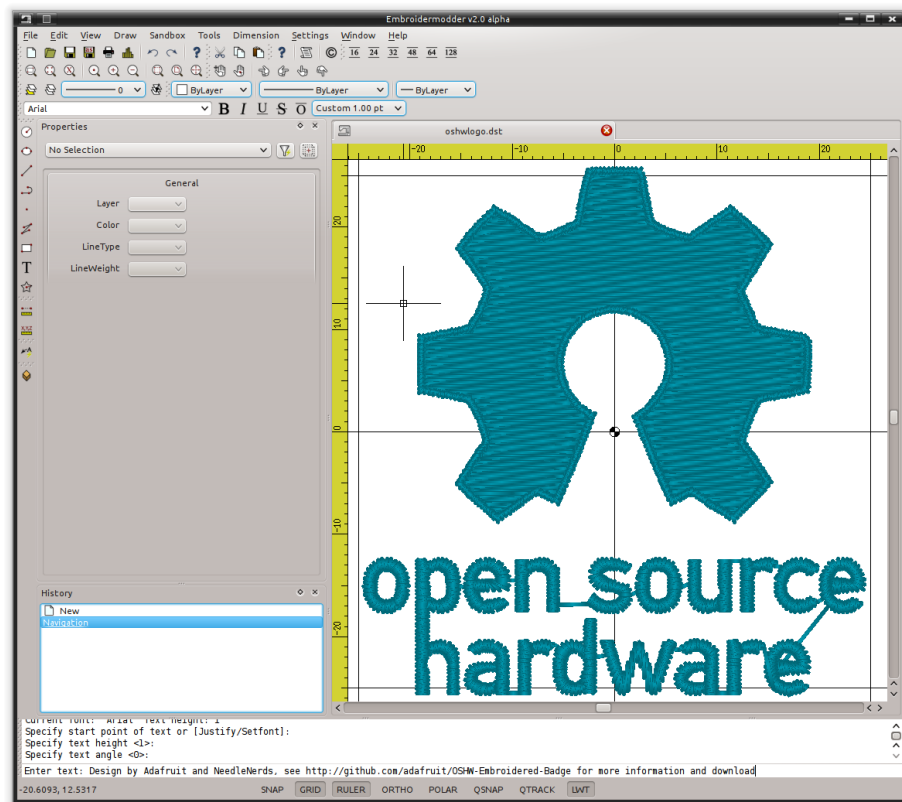


Figure 2: features real render 1

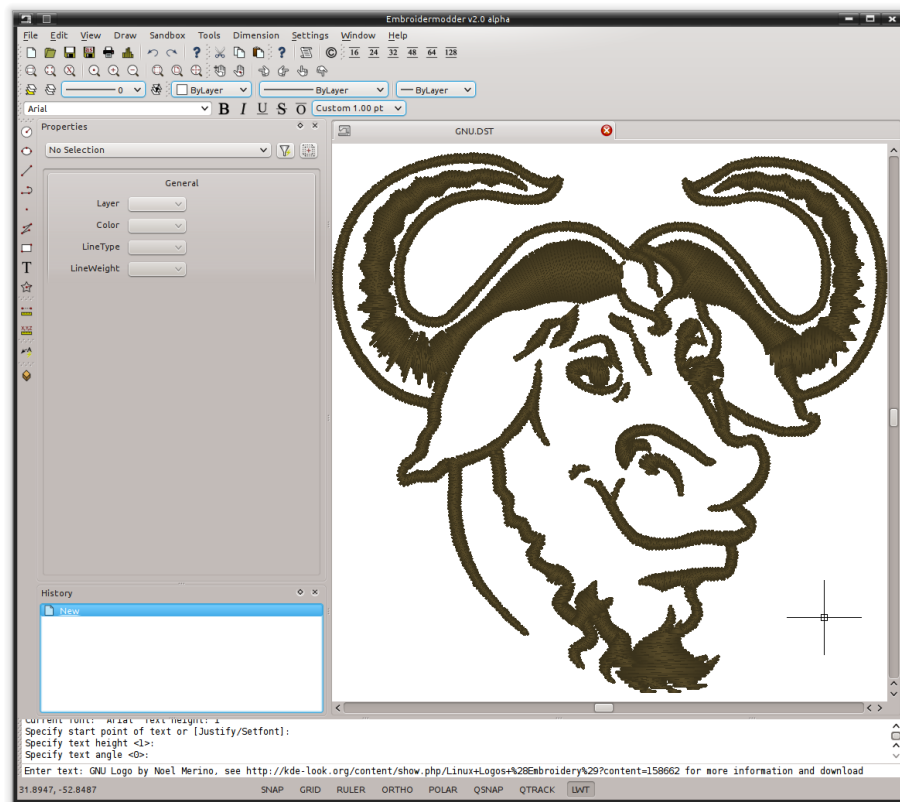


Figure 3: features real render 2

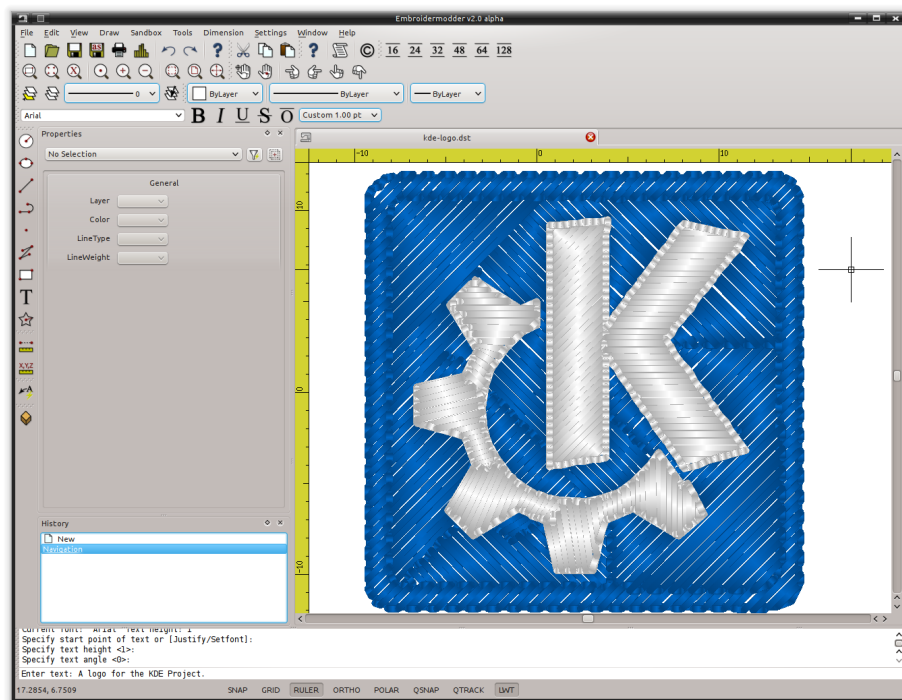


Figure 4: features real render 3

Making use of the automatically adjusting ruler in conjunction with the grid will ensure your design is properly sized and fits within your embroidery hoop area.

Use rectangular, circular or isometric grids to construct your masterpiece!

Multiple grids and rulers in action:

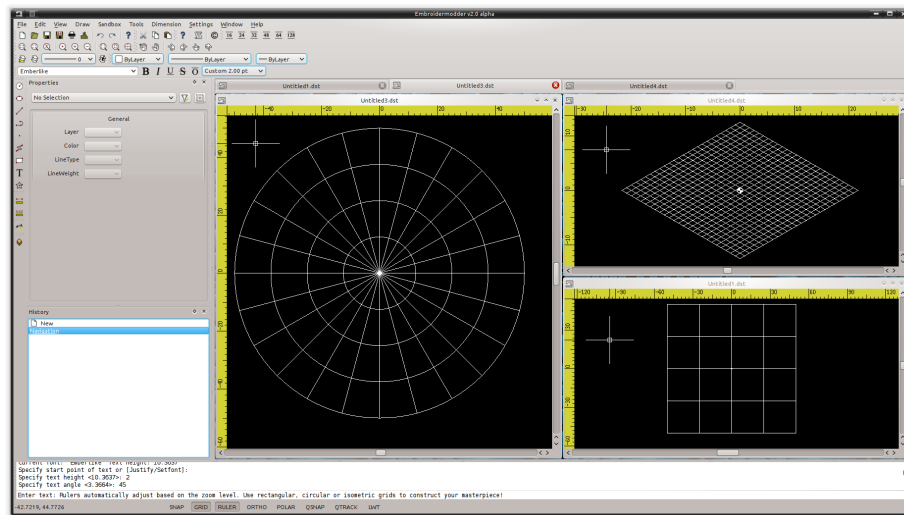


Figure 5: features grid ruler

## Many measurement tools

Taking measurements is a critical part of creating great designs. Whether you are designing mission critical embroidered space suits for NASA or some other far out design for your next meet-up, you will have precise measurement tools at your command to make it happen. You can locate individual points or find distances between any 2 points anywhere in the design!

Take quick and accurate measurements:

## Add text to any design

Need to make company apparel for all of your employees with individual names on them? No sweat. Just simply add text to your existing design or create one from scratch, quickly and easily. Didn't get it the right size or made a typo? No problem. Just select the text and update it with the property editor.

Add text and adjust its properties quickly:



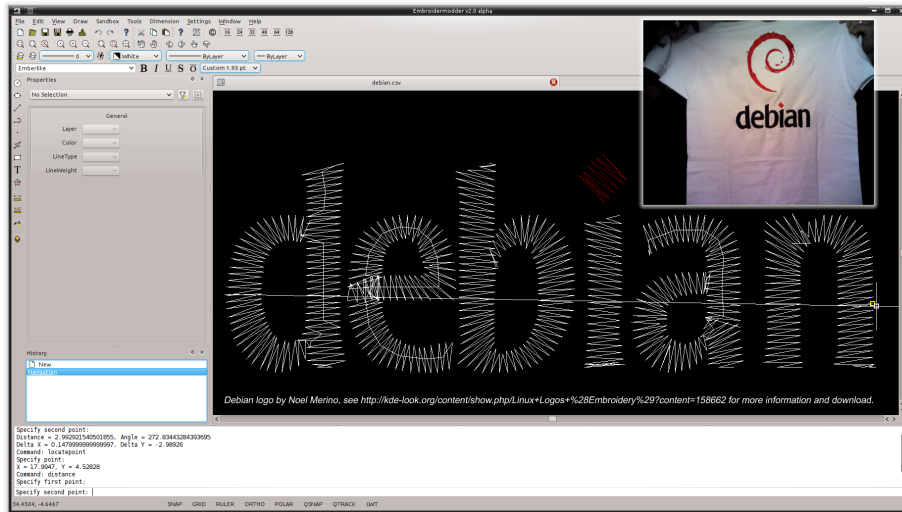


Figure 6: features measure 1

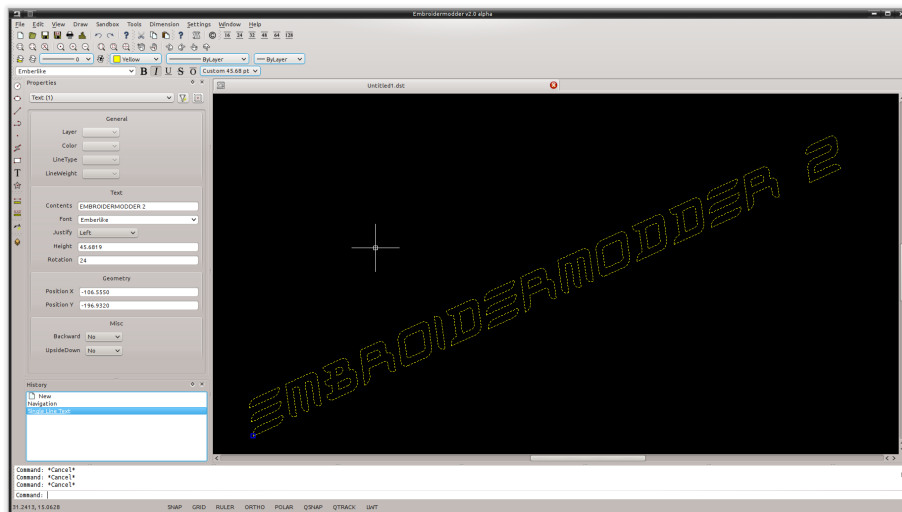


Figure 7: text embroidery

## Supports many formats

Embroidery machines all accept different formats. There are so many formats available that it can sometimes be confusing whether a design will work with your machine.

Embroidermodder 2 supports a wide variety of embroidery formats as well as several vector formats, such as SVG and DXF. This allows you to worry less about which designs you can use.

## Batch Conversion

Need to send a client several different formats? Just use libembroidery-convert, our command line utility which supports batch file conversion.

There are a multitude of formats to choose from:

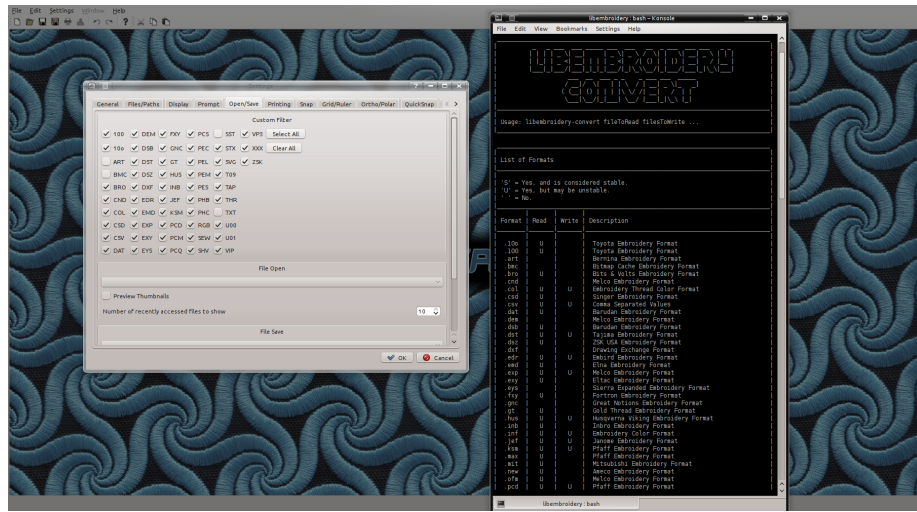


Figure 8: formats

## Scripting API

If you've got programming skills and there is a feature that isn't currently available that you absolutely cannot live without, you have the capability to create your own custom commands for Embroidermodder 2. We provide an QtScript API which exposes various application functionality so that it is possible to extend the application without requiring a new release. If you have created a command that you think is worth including in the next release, just contact us and we will review it for functionality, bugs, and finally inclusion.

An Embroidermodder 2 command excerpt:

```

var strList = str.split(",");
if(isNaN(strList[0]) || isNaN(strList[1]))
{
    setPromptPrefix("Point or option keyword required.");
    appendPromptHistory();
    setPromptPrefix("Specify second axis end point or [Rotation]: ");
}
else
{
    global.x3 = Number(strList[0]);
    global.y3 = Number(strList[1]);
    global.height = perpendicularDistance(global.x3, global.y3, global.x1, global.y1, global.x2, global.y2)*2.0;
    setRubberPoint("ELLIPSE_AXIS2_POINT2", global.x3, global.y3);
    vulcanize();
    endCommand();
}

```

Figure 9: lisp scripting

## Contributing

### Version Control

Being an open source project, developers can grab the latest code at any time and attempt to build it themselves. We try our best to ensure that it will build smoothly at any time, although occasionally we do break the build. In these instances, please provide a patch, pull request which fixes the issue or open an issue and notify us of the problem, as we may not be aware of it and we can build fine.

Try to group commits based on what they are related to: features/bugs/comments/graphics/commands/etc...

See the coding style here

## Introduction

### Basic Features

#### Move a single stitch in an existing pattern

1. In the **File'** menu, **clickOpen...**. When the open dialog appears find and select your file by double clicking the name of the file. Alternatively, left click the file once then click the **Open** button.
- 2.
3. In the **'File'** menu

TIP: For users who prefer

#### Convert one pattern to another format

1. In the **File** menu, click **Open...**
2. The
3. In the dropdown menu within the save dialog select the

## Advanced Features

### Other Projects

#### Planning

To see what's planned open the Projects tab which sorts all of the GitHub Issues into columns.

#### Format Support

FORMAT	READ	WRITE	NOTES
10o	YES		read (need to fix external color loading) (maybe find out what ctrl  code flags of 0x10, 0x08, 0x04, and 0x02 mean)
100			none (4 byte codes) 61 00 10 09 (type, type2, x, y ?) x
art bro	YES		none read (complete)(maybe figure out detail of header)
cnd col			none (color file no design) read(final) write(final)
csd dat dem	YES		read (complete) read () none (looks like just encrypted cnd)
dsb	YES		read (unknown how well) (stitch data looks same as 10o)
dst	YES		read (complete) / write(unknown)
dsz dxfr	YES		read (unknown) read (Port to C. needs refactored)

FORMAT	READ	WRITE	NOTES
edr			read (C version is broken) / write (complete)
emd			read (unknown)
exp	YES		read (unknown) / write(unknown)
exy	YES		read (need to fix external color loading)
fxv	YES		read (need to fix external color loading)
gnc			none
gt			read (need to fix external color loading)
hus	YES		read (unknown) / write (C version is broken)
inb	YES		read (buggy?)
jef	YES		write (need to fix the offsets when it is moving to another spot)
ksm	YES		read (unknown) / write (unknown)
pcd			
pcm			
pcq			read (Port to C)
pcs	BUGGY		read (buggy / colors are not correct / after reading, writing any other format is messed up)
pec			read / write (without embedded images, sometimes overlooks some stitches leaving a gap)
pel			none
pem			none

FORMAT	READ	WRITE	NOTES
pes	YES		
phb			
phc			
rgb			
sew	YES		
shv			read (C version is broken)
sst			none
svg		YES	
tap	YES		read (unknown)
u01			
vip	YES		
vp3	YES		
xxx	YES		
zsk			read (complete)

\end{longtable}

Support for Singer FHE, CHE (Compucon) formats?

## Embroidermodder Project Coding Standards

A basic set of guidelines to use when submitting code.

### Naming Conventions

Name variables and functions intelligently to minimize the need for comments. It should be immediately obvious what information it represents. Short names such as **x** and **y** are fine when referring to coordinates. Short names such as **i** and **j** are fine when doing loops.

Variable names should be **camelCase**, starting with a lowercase word followed by uppercase word(s). C Functions that attempt to simulate namespacing, should be **nameSpace\_camelCase**.

All files and directories shall be lowercase and contain no spaces.

### Code Style

Tabs should not be used when indenting. Setup your IDE or text editor to use 4 spaces.

### Braces

For functions: please put each brace on a new line.

```
void function_definition(int argument)
{
    /* code block */
}
```

For control statements: please put the first brace on the same line.

```
if (condition) {
    /* code block */
}
```

Use exceptions sparingly.

Do not use ternary operator (?:) in place of if/else.

Do not repeat a variable name that already occurs in an outer scope.

## Version Control

Being an open source project, developers can grab the latest code at any time and attempt to build it themselves. We try our best to ensure that it will build smoothly at any time, although occasionally we do break the build. In these instances, please provide a patch, pull request which fixes the issue or open an issue and notify us of the problem, as we may not be aware of it and we can build fine.

Try to group commits based on what they are related to: features/bugs/comments/graphics/commands/etc...

## Comments

When writing code, sometimes there are items that we know can be improved, incomplete or need special clarification. In these cases, use the types of comments shown below. They are pretty standard and are highlighted by many editors to make reviewing code easier. We also use shell scripts to parse the code to find all of these occurrences so someone wanting to go on a bug hunt will be able to easily see which areas of the code need more love. Use the same convention as libembroidery.

libembroidery is written in C and adheres to C89 standards. This means that any C99 or C++ comments will show up as errors when compiling with gcc. In any C code, you must use:

```
/* C Style Comments */

/* TODO: This code clearly needs more work or further review. */

/* BUG: This code is definitely wrong. It needs fixed. */

/* HACK: This code shouldn't be written this way or I don't feel
 * right about it. There may a better solution */
```

```

/* WARNING: Think twice (or more times) before changing this code.
 * I put this here for a good reason. */

/* NOTE: This comment is much more important than lesser comments. */

```

## Donations

Creating software that interfaces with hardware is costly. A summary of some of the costs involved:

1. Developer time for 2 core developers
2. Computer equipment and parts
3. Embroidery machinery
4. Various electronics for kitbashing Embroiderbot
5. Consumable materials (thread, fabric, stabilizer, etc...)

If you have found our software useful, please consider funding further development by donating to the project on Open Collective.

## Introduction

*(UNDER MAJOR RESTRUCTURING, PLEASE WAIT FOR VERSION 2)*

Embroidermodder is a free machine embroidery application. The newest version, Embroidermodder 2 can:

- edit and create embroidery designs
- estimate the amount of thread and machine time needed to stitch a design
- convert embroidery files to a variety of formats
- upscale or downscale designs
- run on Windows, Mac and Linux

For more information, see our website [?].

Embroidermodder 2 is very much a work in progress since we're doing a ground up rewrite to an interface in Python using the GUI toolkit Tk. The reasoning for this is detailed in the issues tab.

For a more in-depth look at what we are developing read the developer notes<sup>1</sup>. This discusses recent changes in a less formal way than a changelog (since this software is in development) and covers what we are about to try.

To see what we're focussing on at the moment check this table.

<i>Date</i>	<i>Event</i>
April-June 2022	Finish the conversion to C/SDL2

---

<sup>1</sup>link to dev notes section



<i>Date</i>	<i>Event</i>
July-August 2022	Finish all the targets in the Design, or assign them to 2.1.
September 2022	Bugfixing, Testing, QA. libembroidery 1.0 will be released, then updates will slow down and the Embroidermodder 2 development version will be fixed to the API of this version.
October 2022	Embroidermodder 2 is officially released.

## Build and Install

### Desktop

First you must install the dependencies which aren't compiled into the source:

- `git`
- `cmake`
- A C compiler (we recommend `gcc` or `clang`)

on Debian Linux/GNU use:

```
$ sudo apt install git clang build-essential libsdl2-dev \
    libsdl2-images-dev libsdl2-ttf-dev
```

If you can't find a good fit for your system (on Windows use the section below), try compiling the included submodules with:

```
$ bash build_deps.sh
```

From here, on most systems the command:

```
$ bash build.sh
```

will build the software. Currently this is the 2.0-alpha, which will have a build code of some kind.

## Dependencies and Build

### Plans

**Windows Specific Advice** This is one of many possible ways to build the software on Windows, this section is to help people who've not got a build environment to start with.

1. Download and install MSYS2 (follow their instructions): <https://www.msys2.org/>
2. Boot "Mintty" from the Start menu.
3. Use the commands:

```
pacman -S gcc cmake git bash mingw-w64-SDL2 \
    mingw-w64-SDL2_image mingw-w64-SDL2_ttf
git clone https://github.com/Embroidermodder/Embroidermodder
cd Embroidermodder
bash build.sh
```

**Mobile** These are currently unsupported (see iMobileViewer and Mobileviewer for iOS and Android respectively), but after the Desktop version is released we'll work on them.

The Mobile version will share some of the UI and all of the backend, so development of the Desktop version will help us make both.

## Documentation

The documentation is in the form of the website (included in the `docs/` directory) and the printed docs in this file.

## Development

If you wish to develop with us you can chat via the contact email on the website or in the issues tab on the github page. People have been polite and friendly in these conversations and I (Robin) have really enjoyed them. If we do have any arguments please note we have a Code of Conduct so there is a consistent policy to enforce when dealing with these arguments.

The first thing you should try is building from source using the build advice above. Then read some of the development notes to get the general layout of the source code and what we are currently planning.

**Testing** To find unfixed errors run the tests by launching from the command line with:

```
$ embroidermodder --test
```

then dig through the output. It's currently not worth reporting the errors, since there are so many but if you can fix anything reported here you can submit a PR.

## Overall Structure

### Code Optimisations and Simplifications

**Current** What Robin is currently doing.

Getting the code to pass PyLint, that involves getting all source files under 1000 lines, renaming all variables to be in snake case.

Changing the separation of code between EM and libembroidery.

Translating the Qt widget framework to Tk.

**Geometry** The geometry is stored, processed and altered via libembroidery. See the Python specific part of the documentation for libembroidery for this. What the code in Embroidermodder does is make the GUI widgets to change and view this information graphically.

For example if we create a circle with radius 10mm and center at (20mm, 30mm) then fill it with stitches the commands would be

```
from libembroidery import Pattern, Circle, Vector, satin
circle = Circle(Vector(20, 30), 10)
pattern = Pattern()
pattern.add_circle(circle, fill=satin)
pattern.to_stitches()
```

but the user would do this through a series of GUI actions:

1. Create new file
2. Click add circle
3. Use the Settings dialog to alter the radius and center
4. Use the fill tool on circle
5. Select satin from the drop down menu

So EM2 does the job of bridging that gap.

**Settings Dialog** There are many codeblocks for changing out the colors in one go, for example:

```
self.mw.update_all_view_select_box_colors(
    self.accept["display_selectbox_left_color"],
    self.accept["display_selectbox_left_fill"],
    self.accept["display_selectbox_right_color"],
    self.accept["display_selectbox_right_fill"],
    self.preview["display_selectbox_alpha"])
```

This could be replaced with a simpler call

```
self.mw.update_all_view_select_box_colors(
    self.accept["display_selectbox_colors"],
    self.preview["display_selectbox_alpha"])
```

where we require that

```
self.accept["display_selectbox_colors"] == {
    "left_color": "#color",
    "left_fill": "#color",
    "right_color": "#color",
    "right_fill": "#color"
}
```

with `\#color` being some valid hex code.

**Kivy** Once the tkinter interface is up and running we can experiment with different frontends to improve the look of the application. For example, the MIT licensed KIVY would allow us to replace the mobile development in Swift and Java with all Python development:

<https://kivy.org/#home>

**Data/Code Seperation** All the “data” is in code files that are within the `config/` submodule. So this way we don’t have to deal with awkward data packaging, it’s just available as a single JSON style object called `settings` available with this import line:

```
from embroidermodder.config import settings
```

In order to pass PyLint style guides this will be split up and formatted into Python code but no processing beyond inlining the data into a single dict should be carried out here.

**The Settings Dictionary** No more than 4 levels of indentation

Only strings, arrays, dicts and integers so matching the JSON standard. Ideally you should be able to copy/paste the data in and out and it would parse as JSON. Currently this fails because we have multi-line strings in Python syntax and inlining.

We may be able to extend the lisp support, which would deal with this. Or we can change multiline strings out for arrays of strings.

**Lisp Expression Support** In order to safely support user contributed/shared data that can define, for example, double to double functions we need a consistent processor for these descriptions.

Embroidermodder uses a list processor (a subset of the language Lisp which is short for LIST Processor) to accomplish this.

For example the string:

```
(+ (* t 2) 5)
```

is equivalent to the expression:

```
2*t + 5
```

The benefit of not allowing this to simply be a Python expression is that it is safe against malicious use, or accidental misuse. The program can identify whether the output is of the appropriate form and give finitely many calculations before declaring the function to have run too long (stopping equations that hang).

To see examples of this see `parser.py` and `config/design\_primitives.py`.

It's also worth noting that we don't use the simpler reverse Polish notation (RPN) approach because:

- It's more compact to use Lisp because `a b c + +` for example needs a new `+` sign for each new term as opposed to `(+ a b c)`.
- It's easier to support expressions that are themselves function calls defined by the user (by adding support for `defun` or `lambda`).

**SVG Icons** To make the images easier to alter and restyle we could switch to svg icons. There's some code in the git history to help with this.

**The Actions System** In order to simplify the development of a GUI that is flexible and easy to understand to new developers we have a custom action system that all user actions will go via an **actuator** that takes a string argument. By using a string argument the undo history is just an array of strings.

The `C action\_hash\_data` struct will contain: the icon used, the labels for the menus and tooltips and the function pointer for that action. There will be an accompanying argument for this function call, currently being drafted as `action\_call`. So when the user makes a function call it should contain information like the mouse position, whether special key is pressed etc.

**Accessibility** Software can be more or less friendly to people with dyslexia, partial sightedness, reduced mobility and those who don't speak English. Embroidermodder 2 has, in its design, the following features to help:

- icons for everything to reduce the amount of reading required
- the system font is configurable: if you have a dyslexia-friendly font you can load it
- the interface rescales to help with partial-sightedness
- the system language is configurable, unfortunately the docs will only be in English but we can try to supply lots of images of the interface to make it easier to understand as a second language
- buttons are remappable: XBox controllers are known for being good for people with reduced mobility so remapping the buttons to whatever setup you have should help

Note that most of these features will be released with version 2.1, which is planned for around early 2023.

## Current Work

- Converting C++ to Python throughout.
- OpenGL Rendering
  - Real rendering to see what the embroidery looks like.
  - Icons and toolbars.
  - Menu bar

- Libembroidery interfacing:
  - Get all classes to use the proper libembroidery types within them. So **Ellipse** has **EmbEllipse** as public data within it.
- Move calculations of rotation and scaling into **EmbVector** calls.
- Get undo history widget back (BUG).
- Switch website to a CMake build.
- GUI frontend for embroider features that aren't supported by embroidermodder: flag selector from a table
- Update all formats without color to check for edr or rgb files.
- EmbroideryFLOSS - Color picker that displays catalog numbers and names
- Setting for reverse scrolling direction (for zoom, vertical pan)
- Stitching simulation
- User designed custom fill
- Keyboard zooming, panning
- Advanced printing
- Libembroidery 1.0
- Better integrated help: I don't think the help should backend to a html file somewhere on the user's system. A better system would be a custom widget within the program that's searchable.
- New embroidermodder2.ico 16x16 logo that looks good at that scale.
- saving dst, pes, jef
- Settings dialog: notify when the user is switching tabs that the setting has been changed, adding apply button is what would make sense for this to happen.
- Update language translations
- Replace KDE4 thumbnailer.
- Import raster image
- Statistics from 1.0, needs histogram.
- SNAP/ORTHO/POLAR
- Cut/copy allow post-selection
- Layout into config
- Notify user of data loss if not saving to an object format.
- Add which formats to work with to preferences.
- Cannot open file with # in the name when opening multiple files but works with opening a single file.
- Closing settings dialog with the X in the window saves settings rather than discarding them.
- Otto theme icons: units, render, selectors, what's this icon doesn't scale
- Layer manager and Layer switcher dock widget
- test that all formats read data in correct scale (format details should match other programs).
- Custom filter bug – doesn't save changes in some cases.
- Get flake8, pylint and tests to pass.
- Sphinx documentation from docstrings or similar.

For more details read on into the Design section.

**Sample Files** Various sample embroidery design files can be found in the `embroidermodder2/samples` folder.

## Design

These are key bits of reasoning behind why the software is built the way it is.

## CAD command review

<i>ID</i>	<i>name</i>	<i>arguments</i>	<i>description</i>
0	newfile	none	Create a new EmbPattern with a new tab in the GUI.
1	openfile	filename string	Open an EmbPattern with the supplied filename <b>fname</b> .
2	savefile	filename string	Save the current loaded EmbPattern to the supplied filename <b>fname</b> .
3	scale	selected objects, 1 float	Scale all selected objects by the number supplied, without selection scales the entire design
4	circle	mouse co-ords	Adds a circle to the design based on the supplied numbers, converts to stitches on save for stitch only formats.
5	offset	mouse co-ords	Shifts the selected objects by the amount given by the mouse co-ordinates.
6	extend		
7	trim		
8	break_at_point		
9	break_2_points		

<i>ID</i>	<i>name</i>	<i>arguments</i>	<i>description</i>
10	fillet		
11	star		
12	singlelinetext		
13	chamfer		
14	split		
15	area		
16	time		
17	pickadd		
16	zoomfactor		
17	product		
18	program		
19	zoomwindow		
20	divide		
21	find		
22	record		
23	playback		
24	rotate		
25	rgb		
26	move		
27	grid		
28	griphot		
29	gripcolor		
30	gripcool		
31	gripsize		
32	highlight		
33	units		
34	locatepoint		
35	distance		
36	arc		
37	ellipse		
38	array		
39	point		
40	polyline		
41	polygon		
42	rectangle		
43	line		
44	arc (rt)		
45	dolphin		
46	heart		

**Removed Elements** So I've had a few pieces of web infrastructure fail me recently and I think it's worth noting. An issue that affects us is an issue that can effect people who use our software.



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**OpenGL** OpenGL rendering within the application. This will allow for Realistic Visualization - Bump Mapping/OpenGL/Gradients?

This should backend to a C renderer or something.

**Configuration Data Ideas** embroidermodder should boot from the command line regardless of whether it is or is not installed (this helps with testing and running on machines without root). Therefore, it can create an initiation file but it won't rely on its existence to boot: `~/.embroidermodder/config.json`.

- Switch colors to be stored as 6 digit hexcodes with a #.
- We've got close to a hand implemented ini read/write setup in `settings.py`.

**Distribution** When we release the new pip wheel we should also package:

- `.tar.gz` and `.zip` source archive.
- Debian package
- RPM package

Only do this once per minor version number.

**Scripting Overhaul** Originally Embroidermodder had a terminal widget, this is why we removed it.

ROBIN: I think supporting scripting within Embroidermodder doesn't make sense.

All features that use scripting can be part of libembroidery instead. Users who are capable of using scripting won't need it, they can alter their embroidery files in CSV format, or import pyembroidery to get access. It makes maintaining the code a lot more complicated, especially if we move away from Qt. Users who don't want the scripting feature will likely be confused by it, since we say that's what libembroidery, embroider and pyembroidery are for.

How about a simpler `call user shell` feature? Similar to texmaker we just call system on a batch or shell script supplied by the user and it processes the file directly then the software reloads the file. Then we aren't parsing it directly.

I don't want to change this without Josh's support because it's a fairly major change.

JOSH: I totally agree.

I like the idea of scripting just so people that know how to code could write their own designs without needing to fully build the app. Scripting would be a very advanced feature that most users would be confused by. Libembroidery would be a good fit for advanced features.

Now we are using Python (again, sort of) this would be a lot more natural, perhaps we could boot the software without blocking the shell so they can interact? TODO: Screenshot a working draft to demonstrate.

## Perennial Jobs

- Check for memory leaks
- Write new tests for new code.
- Get Embroidermodder onto the current version of libembroidery.
- PEP7 compliance.
- Better documentation with more photos/screencaps.

**Developing for Android** <https://developer.android.com/studio/projects/android-native-code>

```
$ apt install google-android-ndk-installer cmake lldb gradle
```

## The Command Line Interface: `embroider`

### Usage

For basic use, we recommend you build as above, then run without arguments:

```
$ embroider
```

which will print out this advice on how to use these tools without digging straight into the rest of this manual.

#### EMBROIDER

```
A command line program for machine embroidery.
Copyright 2013-2021 The Embroidermodder Team
Licensed under the terms of the zlib license.
```

```
https://github.com/Embroidermodder/libembroidery
https://embroidermodder.org
```

Usage: `embroider [OPTIONS] fileToRead...`

#### Conversion:

```
-t, -to          Convert all files given to the format specified
                  by the arguments to the flag, for example:
                  $ embroider -t dst input.pes
                  would convert ``input.pes`` to ``input.dst``
                  in the same directory the program runs in.
```

```
The accepted input formats are (TO BE DETERMINED).
The accepted output formats are (TO BE DETERMINED).
```

#### Output:

```
-h, -help        Print this message.
-f, -format       Print help on the formats that
                  embroider can deal with.
-q, -quiet        Only print fatal errors.
-V, -verbose      Print everything that has reporting.
-v, -version      Print the version.
```

#### Graphics:

```
-c, -circle       Add a circle defined by the arguments
                  given to the current pattern.
-e, -ellipse      Add a circle defined by the arguments
                  given to the current pattern.
-l, -line          Add a line defined by the arguments
                  given to the current pattern.
-P, -polyline      Add a polyline.
-p, -polygon       Add a polygon.
```

`-s, -satin` Fill the current geometry with satin stitches according to the defined algorithm.  
`-S, -stitch` Add a stitch defined by the arguments given to the current pattern.

**Quality Assurance:**

`-test` Run the test suite.

For each of the flags described here we will go into greater detail in this manual.

**To Flag**

**Circle Flag**

**Ellipse Flag**

**Line Flag**

**Polyline Flag**

**Polygon Flag**

**Satin Flag**

**Stitch Flag**

**Basic Test Suite** The flag `--test` runs the tests that take the least time and have the most utility. If you're submitting a patch for review, please run:

```
$ embroider --test | tail -n 1
```

You'll be presented with an overall PASS or FAIL for your build, if your build fails you can try and trace the error with:

```
$ valgrind embroider --verbose --test
```

or

```
$ gdb --args embroider --verbose --test
```

depending on your preferred debugging approach. Passing this test will be required for us to accept your patch.

**Full Test Suite** The flag `--full-test-suite` runs all the tests that have been written. Since this results in a lot of output the details are both to stdout and to a text file called `test_matrix.txt`.

Patches that strictly improve the results in the `test_matrix.txt` over the current version will likely be accepted and it'll be a good place to go digging for contributions. (Note: strictly improve means that the testing result for each test is as good a result, if not better. Sacrificing one criteria for another would require some design work before we would consider it.)

## Ideas

**Rendering system** There are two forms of render that will be produced.

1. A raster format as ppm so we can have a pixel for pixel output (for example extracting the embedded images in some formats).
2. The SVG format that will be fairly similar to InkStitch's format.

We have an `EmbImage` struct to store the raster format.

```
$ embroider test01.csv --render
```

currently creates a blank image. Previously the Hilbert curve test managed to create a correctly rendered version.

**Tactile art and braille support** One application I'd like to leave a reminder here for is automating embroidery for blind and partially sighted people.

There are many limitations to making braille (cost, poor support, lack of widespread adoption in the sighted world) and as such there is a strong DIY culture around it.

There are blind internet users who can also run terminal applications using a refreshable braille display, so in theory we could support an application like this for them:

```
$ embroider --braille ``Hello, world!`` hello.dst
```

which would produce braille that would read `Hello, world!` as an embroidery design.

Another option is tactile fills that use the same fill algorithms but are designed better to facilitate tactile art.

I think the way forward on this is to call up the RNIB business advice line and ask for assistance once we have a working model. That way they can get us in contact with experts to review how legible the output is and usable the software is for the intended audience.

This is less important than getting better machine support but given the high social impact I think it should be a priority.

# The Low Level API: Libembroidery 1.0.0-alpha

## API Reference

convert

## Mobile Support: MobileViewer and iMobile-Viewer

## Embroidermodder 2.0.0-alpha User Manual

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#### Move a single stitch in an existing pattern

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- 2.
3. In the **File** menu

TIP: For users who prefer

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3. Parse JSON using `cJSON` (we have the new `parseJSON` function).
4. Better structure for settings data so parse and load JSON is easier and there's less junk in global variables. A structure similar to a
5. Python dict that uses constants like the sketch below.



## Why JSON over ini?

1. We need to hand-write *a* system because the current system is Qt dependent anyway.
2. This way we can store more complex data structures in the same system including the layout of the widgets which may be user configured (see Blender and GIMP).
3. Also it's easier to share information formatted this way between systems because most systems use JSON or XML data: there's better support for converting complex data this way.

## Sketch of a settings system

```
#define SETTING_interface_scale    16

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char int_settings_labels[] = {
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}
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This would all be in C, and wouldn't rely on Qt at all. We already use a system like this in libembroidery so hopefully devs on both would get the pattern.

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These are key bits of reasoning behind why the software is built the way it is.

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## Perennial Jobs

1. Check for memory leaks
2. Clear compiler warnings on `-Wall\ -ansi\ -pedantic` for C.

**Developing for Android** <https://developer.android.com/studio/projects/add-native-code>

```
apt install google-android-ndk-installer cmake lldb gradle
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- In the dropdown menu within the save dialog select the

## Advanced Features

### Other Projects

### References

### Planning

To see what's planned open the Projects tab which sorts all of the GitHub Issues into columns.

### Format Support

Support for Singer FHE, CHE (Compucon) formats?

## Embroidermodder Project Coding Standards

A basic set of guidelines to use when submitting code.

### Naming Conventions

Name variables and functions intelligently to minimize the need for comments. It should be immediately obvious what information it represents. Short names such as *x* and *y* are fine when referring to coordinates. Short names such as *i* and *j* are fine when doing loops.

Variable names should be “camelCase”, starting with a lowercase word followed by uppercase word(s). C++ Class Names should be “CamelCase”, using all uppercase word(s). C Functions that attempt to simulate namespacing, should be “nameSpace\_camelCase”.

All files and directories shall be lowercase and contain no spaces.

### Code Style

Tabs should not be used when indenting. Setup your IDE or text editor to use 4 spaces.

**Braces** For functions: please put each brace on a new line.

```
void function_definition(int argument)
{
}

```

For control statements: please put the first brace on the same line.

```
if (condition) {  
  
}
```

Use exceptions sparingly.

Do not use ternary operator (?:) in place of if/else.

Do not repeat a variable name that already occurs in an outer scope.

## Version Control

Being an open source project, developers can grab the latest code at any time and attempt to build it themselves. We try our best to ensure that it will build smoothly at any time, although occasionally we do break the build. In these instances, please provide a patch, pull request which fixes the issue or open an issue and notify us of the problem, as we may not be aware of it and we can build fine.

Try to group commits based on what they are related to: features/bugs/comments/graphics/commands/etc. . .

## Comments

When writing code, sometimes there are items that we know can be improved, incomplete or need special clarification. In these cases, use the types of comments shown below. They are pretty standard and are highlighted by many editors to make reviewing code easier. We also use shell scripts to parse the code to find all of these occurrences so someone wanting to go on a bug hunt will be able to easily see which areas of the code need more love.

libembroidery is written in C and adheres to C89 standards. This means that any C99 or C++ comments will show up as errors when compiling with gcc. In any C code, you must use:

```
/* C Style Comments */  
/* TODO: This code clearly needs more work or further review. */  
/* BUG: This code is definitely wrong. It needs fixed. */  
/* HACK: This code shouldn't be written this way or I don't feel right about it. There may a  
/* WARNING: Think twice (or more times) before changing this code. I put this here for a good  
/* NOTE: This comment is much more important than lesser comments. */
```

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## Conclusions

## Bibliography

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## Color Charts

### Built-ins

### SVG Colors

### Threads

### DXF color table

### HUS color table

### JEF color table

### PCM color table

### PEC color table

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Version 1.3, 3 November 2008

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