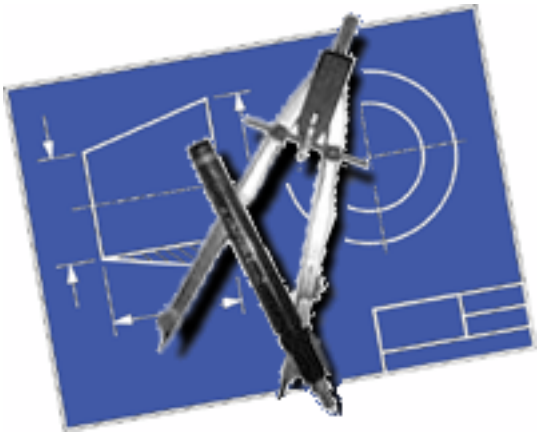


jDraft Manual

SpareTimeLabs

for version 1.0.0.9b

jdraft@sparetimelabs.com

February 9, 2007

Contents

List of Tables

List of Figures

Chapter 1

Introduction

1.1 jDraft Application

jDraft is a simple 2D drawing program for creating engineering drawings. On a superficial level it resembles simple drawing programs, such as old MacDraw or later day OpenOffice-Draw. But there is a difference. Anyone who tries to draw accurate drawings (that would conform to good engineering draftmanship guidelines) with these programs will soon find out that it simply is not possible.

The main design goal of jDraft was to make it possible to draw geometrically accurate/correct drawings in a simple and natural way, not unlike the time honored way of using a compass/divider and a straight edge. jDraft is by no means the only show in town, plenty of 2D CAD software around. Without badmouthing any particular software, I think it is fair to say that while those programs allow the creation of accurate drawings, many of them are not that easy to use. s jDraft attempts to be an animal of a different color, combining the ease of use of simple drawing programs with the accuracy of full blown CAD applications.

1.2 About This Manual

It is perfectly possible to use jDraft without any manual at all. The user interface conforms to the common idioms, concepts and practices of hundreds of other 'office' applications. This manual is not about describing every button and check box in every dialog and window in the software. Instead, this manual tries to give insight into the design philosophy and advice at a higher level on how to use the software, addressing the deeper, underlying concepts that are not obvious from the user interface.

Unavoidably, this manual contains a bit (no pun intended) of computer jargon, some of which is specific to the operating system the application is being used on. It is not necessary to understand this jargon, it is included for the benefit of those who feel they need to / want to know it. You can safely ignore it. In most cases, using the software is totally intuitive if you are the least bit of computer savvy. In case you experience some 'computer' woes you might want to lookup the jargon bits.

1.3 Mac OS X Notes

Mac OS users should substitute the COMMAND (aka Apple) -key for the CTRL -key.

In Mac OS, the CTRL -key is used together with a mouse click to effect the Right -click of other platforms.

1.4 Go on, Take Her for a Spin!

Reading about a thing is all very well, but there is nothing like the real thing. So why not, take her for a spin!

Users of this application are most likely computer savvy enough to unpack it and just do it.

Just double-click on the application icon and you open up a brand new but empty drawing.

Select a line tool from the drawing tools palette and click or drag on the drawing area to create some shapes. Click on the snap tools to experiment how the cursor snaps to shapes you've already created, as you draw.

Go on, draw circles within circles (not a biblical reference here).

Pick the selection tool. Click and drag a shape to move it. Drag a box around the circles to select them. Click the fill icon to create a hatched area.

1.5 Contacting SpareTimeLabs

To contact SpareTimeLabs email to address

jdraft@sparetimelabs.com.

All feedback and suggestions are welcome.

See, it's easy!

Chapter 2

Installation

2.1 Hardware/Software/User requirements

2.1.1 User requirements

This manual expects that the user is accustomed to typical office applications, such as word processing and photo manipulation applications, and understands the desktop metaphora / file system. Some notion of engineering drawings is also highly desirable to appreciate what this is all about.

2.1.2 Software requirements

jDraft requires the Java Runtime Environment.

- JRE 5.0 (1.5)

You can download the JRE from:
Sun website http://java.com.
jDraft is written in 100% Pure Java so it can run on a variety of operating systems. It has been tested on the following Operating Systems:

- Mac OS X 10.4.8
- Ubuntu 6 Linux
- SuSE 10 Linux
- Fedora 3 Linux
- Windows XP
- Windows 2000

2.1.3 Hardware requirements

- Screen Resolution 1024 x 768 pixels minimum
- 1 GHz CPU speed minimum
- 256 MB RAM minimum
- 10 MB disk space

Note that these are not absolute requirements, the software has been tested on a 333 MHz Pentium 3 with 128MB RAM and it runs, but the speed is probably not acceptable. Obviously, the more of everything the merrier it gets. The recommendation is a 2 GHz Intel CPU with at least 1 GB of RAM. On Mac OS X platforms, the Intel Dual Core CPU based Macs offer significant performance boost over the Power PC CPU Based Macs. This is due to the lack of Just In Time compiler support. The Java 6.0 runtime also has a definite advantage in graphics intensive operations, as it includes most.

2.2 Software installation

There is really next to nothing to install.

Just copy the application file to your hard disk and launch it by double-clicking it.

That's basically all you need to know, if the above works for you, you can skip to the next chapter.

The application typically comes in a compressed archive as listed in table 2.2.

You can download the text archives from

http://sparetimelabs.com/jdraft.

OS	Archieve	Executable File
Mac OS	jDraft-MacOSX.dmg	jDraft-MacOSX (.app)
Linux	jDraft-Linux.gz	jDraft-Linux
Windows	jDraft-Win.zip	jDraft-Win.exe

Table 2.1: jDraft Distribution

You can typically open and uncompress these archieves by simply double-clicking them. Uncompress and copy the application icon to wherever you want. Note that if you change the application file location after the file associations have been registered, you'll need to unregister and then re-register the associations, see below.

On the first run the application offers to register itself as the handler of documents with the file extenstion / type '.jdwg', which is the native format for jDraft drawings. You can decline the file association registration and the software will work just fine, only you cannot open drawings by double-clicking them. You can register/unregister the file associations at any time from the 'File/Associations/ -menu. (Not available/necessary on Mac OS X).

Note: If you launch the application using Java Web Start, i.e. directly from the jDraft homepage, the file associations will not be available.

Whenever the application is launched it checks that a small number of files it needs for storing settings and such, exist. If they do not exist, jDraft will silently create them. It might make sense to back up these files from time to time.

For details, see Appendix A

2.3 Launching the application

To launch the application, just double-click the application icon or one of your drawings.

That's basically all you need to know, if the above works for you, you can skip to the next chapter. The first time you use the application, you'll need to click the application icon, not one of the drawing document icons, as the file associations are not yet registered. On the first launch, the application offers to do the regisration. Once registered, file associations let you open drawings by double-clicking them. As a detail, launching the application by double-clicking the application icon causes the application to open either the last edited drawing. If

it is not available, like on the first run, it'll creates a new, empty drawing. If you then go on and open more files from the 'File/Open...' -menu without editing the first drawing, it will be automatically closed.

Note that in Linux the actual application file, 'jDraft-Linux', which is a shell script and an executable jar file, will not have the jDraft logo icon. Instead, the desktop file 'jDraft.desktop' has the 'correct' icon. You can double-click either one to launch the application. The application is also available as an executable jar file:

```
'Draft.jar
```

which can also be launched on most operating system by double-clicking it. But it is also possible to launch the application explicitly from the command line with a command as follows:

```
java -Xmx1000m -Xss10m -jar 'jDraft.jar'
```

Quite a mouthful, but in case the double-click launch fails, you may need to try that. In fact, both the 'jDraft-Win.exe' and 'jDraft-Linux' files are '.jar' files masquerading as something prettier, so you can use it in above as well. The one advantage of launching from the command line is that you get the 'console' output in the command line / terminal window. This is useful in case of troubleshooting as all the exceptions the application throws are printed there. Note that in Mac OS this is, cleverly enough, not necessary as the 'Console' application is always available, even 'after the fact', just go into the '/Applications/Utilities/Console'.

2.4 Product Registration

jDraft is Shareware use of which is subject to a licence, see appendix B. You can try it until a fixed date after which some of the features are disabled, unless you register tha product. Registration is free. Currently the only feature that becomes disable after the trial period is Saving of drawing documents. Registration is via email.

To register your copy, send a request with your real name and your country of location to jdraft@sparetimelabs.com.

and you will receive the registration key in a return email.

Copy/paste the registration key into the registration dialogue, which you can open from the 'Tools/Registration...' menu.

The registration key is stored in the 'jDraft.config' file alongside other application properties, settings and preferences. See Appendix A for details of the location of that file.

Chapter 3

Before You Draw

The application is pretty easy to use, so you may feel inclined to skip the rest of this manual, only using it as a reference.

That is just fine. However, before you get carried away and actually start producing your masterpieces, there are a few things you should consider.

The most important thing to understand is that almost everything related to the drawing is stored with each drawing. This is simple and conceptually clear. However, this means that there is no way to change something for every drawing in a single operation, sort of globally. As you work, you will notice that you always prefer to have some settings in a particular way, one that suits your style. In order to avoid adjusting the settings for each new drawing from scratch, you would be well advised to create a 'template' drawing that contains the settings just as you like them.

Of course, the application comes with built in templates that conform to ISO standard engineering drawing formats for sizes from A4 to A0 and, of course, the application tries to provide reasonable default values for everything both in the templates and for files created with the 'File/New...' command.

But there are bound to be settings that are not to your liking.

A simple way to manage this is just to create an empty drawing with your desired settings and then, each time you start a new drawing, open that template drawing and use the 'File/Save As...' command to give it a different name. It's important to remember to 'Save As' it first, as otherwise you'll be likely to modify your template!

However, a better alternative is to save your templates into a special 'templates' directory (see Appendix A for details on how to find this directory). Anything that is stored there will be visible in the 'File/Templates' menu. Selecting a drawing from that menu will create an 'Untitled' copy of the template, forcing you to give it a proper name before saving it, thus preventing you from messing up your templates.

Maybe better yet is to take one of the 'built in' standard templates and modify them. To do that just use the 'File/Open...' command and find your way to the 'template' directory.

Below is a list of things you might like to adjust to your liking. Note that, depending on your requirements, it might make sense to have a different set of templates depending on which sort of project you are working on. Drafting usually involves producing a set of drawings.

Note that the best time to create templates is probably after your first 'real' drawing, because only by doing a real drawing will you get to know what your needs are.

3.1 Paper/drawing size

Obviously, different sized drawings are needed for drawing parts of different sizes (and scales). Coordinate Systems A drawing can have any number of coordinate systems, each with their own origin and scale. The scale is the most important aspect of a coordinate system as the

scale of the current coordinate system determines the units used in drawing with numeric values and in dimensioning. Typically, a drawing will have at least two coordinate systems, one that corresponds to the physical paper and is used for working with e.g. the title block, and another one that is determined by the part you are drawing.

3.2 Grids

A snap grid is used to force dimensions to a multiple of some basic unit, say 1 mm or 0.1 inch. Even if your style of drawing is based on geometrical construction, a grid is often a handy aid. Printer setup Perhaps not the first thing that comes to mind, but printing has a lot of options, and naturally you'll want to print as soon as the drawing is ready and often before that. It is rather annoying if the printout then comes out partially clipped or in wrong scale. Equally annoying and wasteful is setting print parameters for each new drawing, especially as within an office the printing conditions tend to stay the same.

3.3 Line Styles

Line style defines the width, color and dashing of a line. For additional consideration on colors see below for 'use of colors'. Line styles a large de-facto defined by drafting standards. However, you may have your own preferences and variations. Worth noting is that any shape you draw refers to, but does not contain, a line style, thus changing the line style will change the line style of all shapes drawn with that line style within the document, but not across documents.

3.4 Layers

All shapes or drawing primitives, lines, circle etc., in a drawing reside on a layer. Layers define common attributes or properties for those shapes. For example you can turn a layer 'off' to temporarily hide shapes on that layer. There are various layering schemes, such as keeping sketching and dimensioning on their own layers. In architectural drawings it might makes sense to have separate layers for structural, electrical, air condition etc etc.

3.5 Colors

Unlike in artistic drawings or illustrations, it is typical in a CAD drawing to use colors to distinguish between shapes on different layers. Therefore, even though a line style contains a definition for color, it can be overridden, but the color is defined for each layer. Indeed, that is the norm. Further consider that the physical paper is white, whereas many people prefer to work on a black background on the screen. A common and handy way to use colors is to have all colors defined as you want them to appear on paper. To do that, set the colors for line styles as desired. Often this reduces to using black for every line style. Then, to use colors to distinguish between layers on screen, use layer colors to override the line style colors. To get a black background on screen, do not set the background to black but use the 'Invert Colors' option in the Preferences -dialogue instead. As you will be working with inverted colors, it is best to set and define the layer color scheme after you have turned on the inverted colors option.

Chapter 4

Working with Documents

The File menu (figure 4.1) contains the commands to manage your documents.

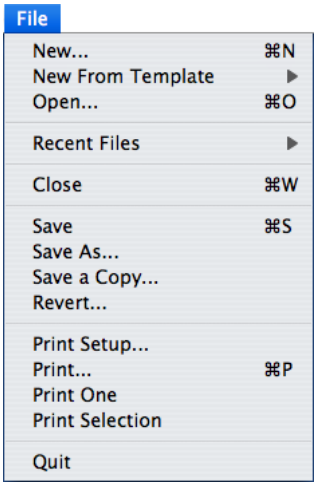


Figure 4.1: The File -menu

4.1 Opening an existing drawing

Documents can be opened by double-clicking their icons on the desktop, by using the 'File/Open...' command or by selecting from the 'File/Recent Files' -menu (figure 4.2) which remembers the last files/drawings opened.

It is also possible to open a drawing programmatically by giving the parameter on the command line.

```
-open filename
```

4.2 Creating a new drawing

New documents can be created by selecting the 'File/New' command or by selecting a template from the 'File/Templates' -menu, figure 4.3. The template menu displays a list of predefined drawings that contain presets and pre-drawn elements for such standard items as title blocks, frame and aligment marks etc.

If you do not create a drawing from a template the next thing you propably want to do is to set the drawing size with the **Settings/Document Size...** -dialog, figure 4.4.

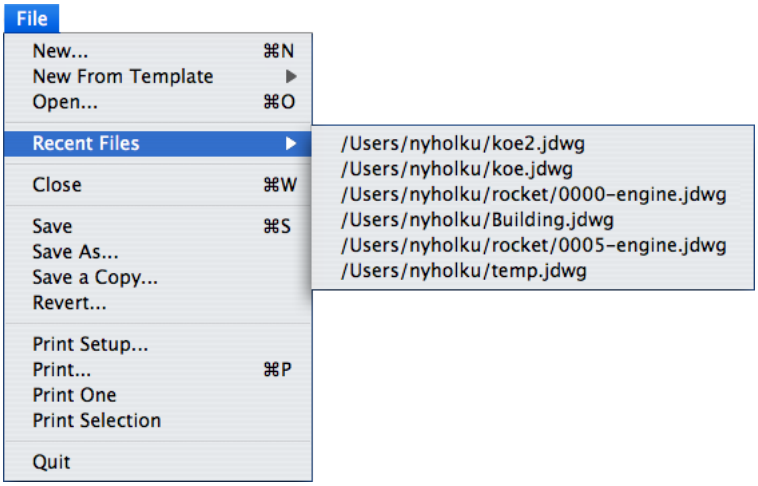


Figure 4.2: Recent Files -menu

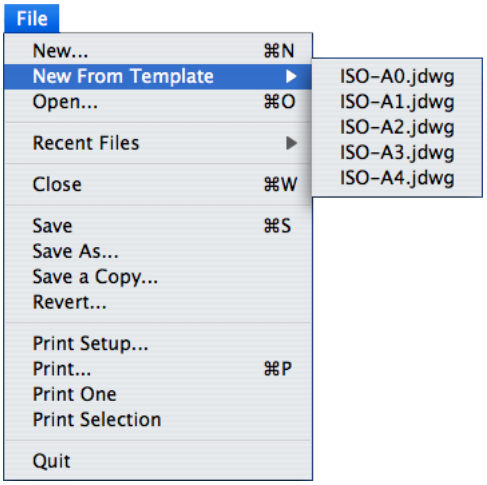


Figure 4.3: The Template -menu

4.3 Shuffling Windows

4.3.1 The Window -menu

The Window -menu (figure 4.5) has commands to to Maximize / Maximize All windows (you'll really want to use full screen for drawing) and shuffle through open windows in sequence. In addition to this, it lists all the open windows/drawing, allowing easy access to all open drawings. This is the preferred way to move between drawings.

The menu lists the open drawings in the order they have been opened, and this is also the order of cycling them. The current drawing, i.e. the one with the top most window, is marked with a check mark. An asterisk '*' in front of a file name indicates that the document contains unsaved changes.

4.4 Saving Documents

4.4.1 The File/Save -command

obviously stores the document to its file, writing out any changes made. If the document has not been previously saved, it will prompt you for a file name and locaton. The command is only

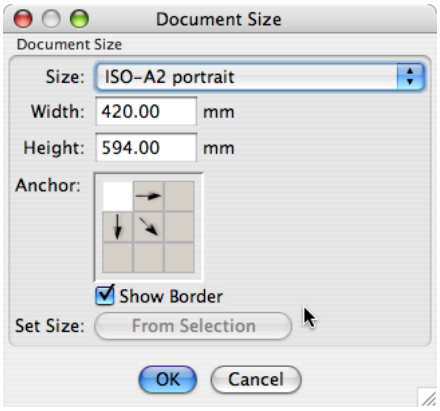


Figure 4.4: Document Size -dialog

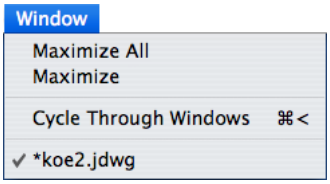


Figure 4.5: The Window -menu

enabled if the document contains changes and this is thus an indication of whether or not you have touched the document contents in any way.

4.4.2 The File/Save As -command

stores the document into a different file without touching the existing (if any) old disk file. It also changes the name of the open document so that any subsequent Saves go to the new file. You typically use this command to rename a document (however, if you need to get rid of the old file, you'll have delete it manually).

4.4.3 The File/Save a Copy command

saves a copy of the drawing as it is at the moment into a different file, without altering the name of the document. Any subsequent changes will go to the original file. You typically use this command to create a snap shot of a design for later reference, or maybe to have something to return to in case things turn nasty.

Chapter 5

User Interface Overview

Figure 5.1 is a screen shot of a typical jDraft drawing as it appears on the screen.

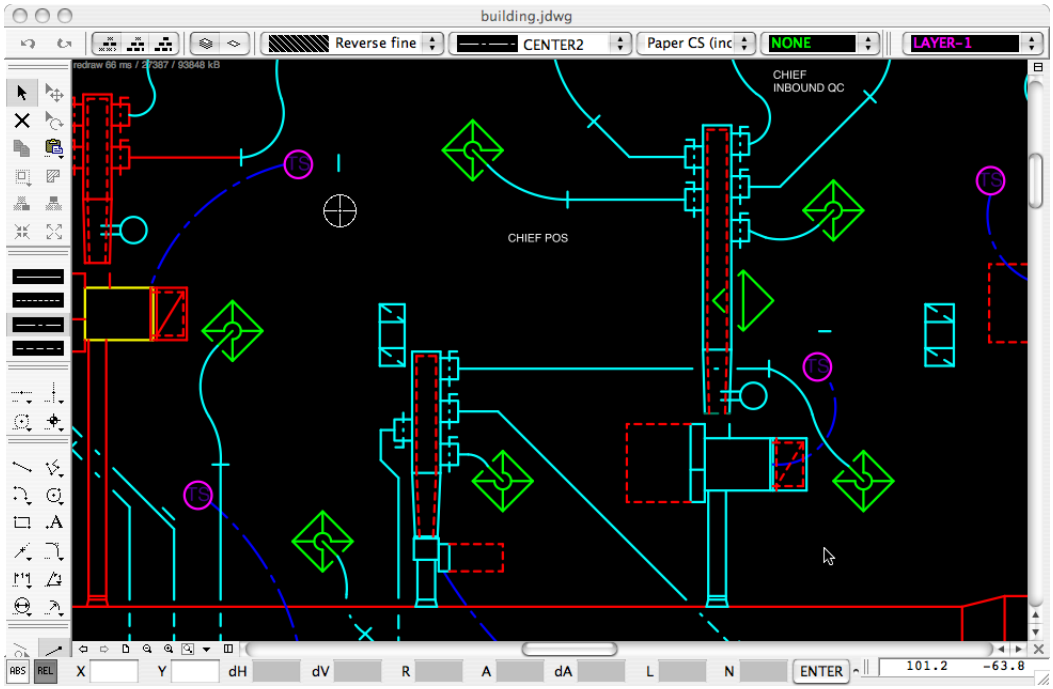


Figure 5.1: A jDraft Window

5.1 User Interface Organization

The user interface consists of four main areas.

On top of each window there are controls that are common to most commands, such as setting the current line style and layer and whether snapping is confined to the current layer or active group.

On the left side there are, counting from top, Edit, Lines, Guide, Draw, Dimension and Snap tools for drawing and editing. All these toolbars and the layers toolbar on the top right can be detached from the window and dragged anywhere on the screen as illustrated in figure 5.2.

At the bottom of the screen there are entry fields for numerically entering values whenever necessary.

The biggest part of the window is taken up by the drawing area in the center. The drawing area has scrollbars to scroll different parts of the document into view, and a number view controls to left of the horizontal scrollbar.

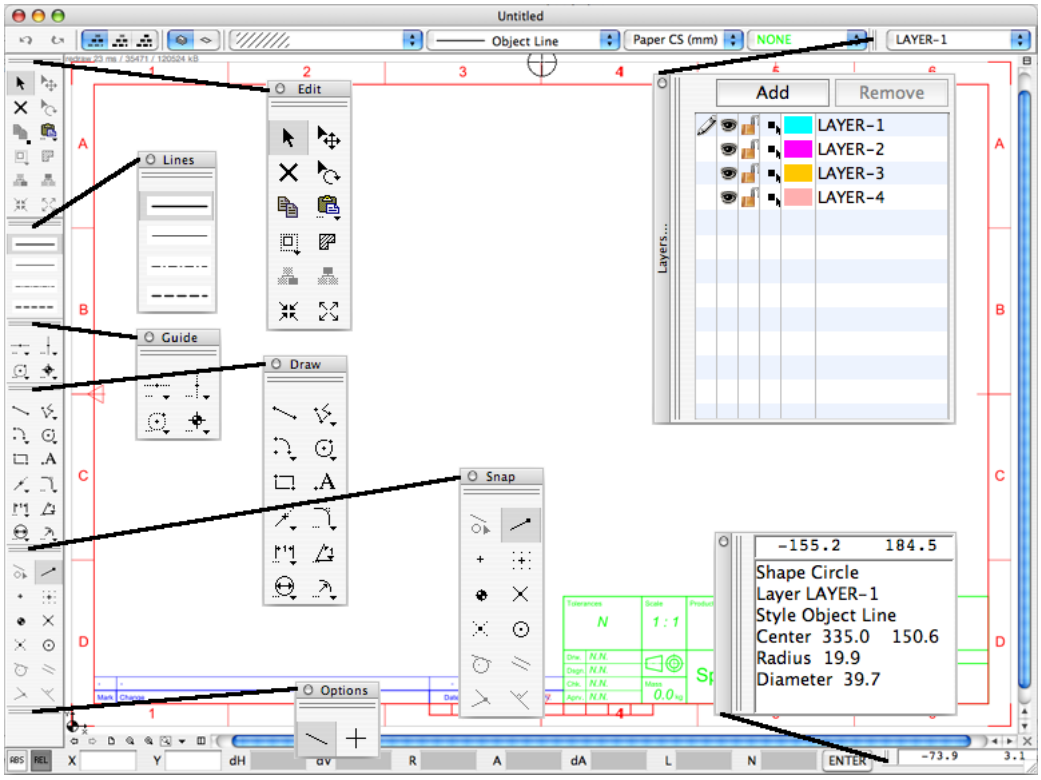


Figure 5.2: jDraft Toolbars

5.2 Palettes and Parameters

Note that some toolbar buttons display a small triangle and/or a triple dot on the bottom edge of the button, see figure 5.3.

The small triangle is an indication that there is actually a palette or popup menu attached to this button. By clicking the button with the mouse and holding the mouse button down, you can bring up the popup menu which typically contains more variations of the command that the button represents. By selecting one of the alternatives the button changes to that command.

The triple dot is an indication that there is a parameters dialogue attached to the button for entering parameters. This dialogue screen typically allows you to enter and change a number of parameters that affect all the commands under that button. To bring up the dialog, double-click on the button.

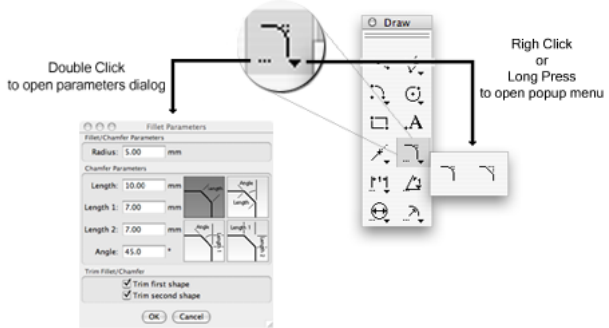


Figure 5.3: Pallets and Parameters

Figure 5.4 illustrates where to find the most important drawing tools parameters dialogs.

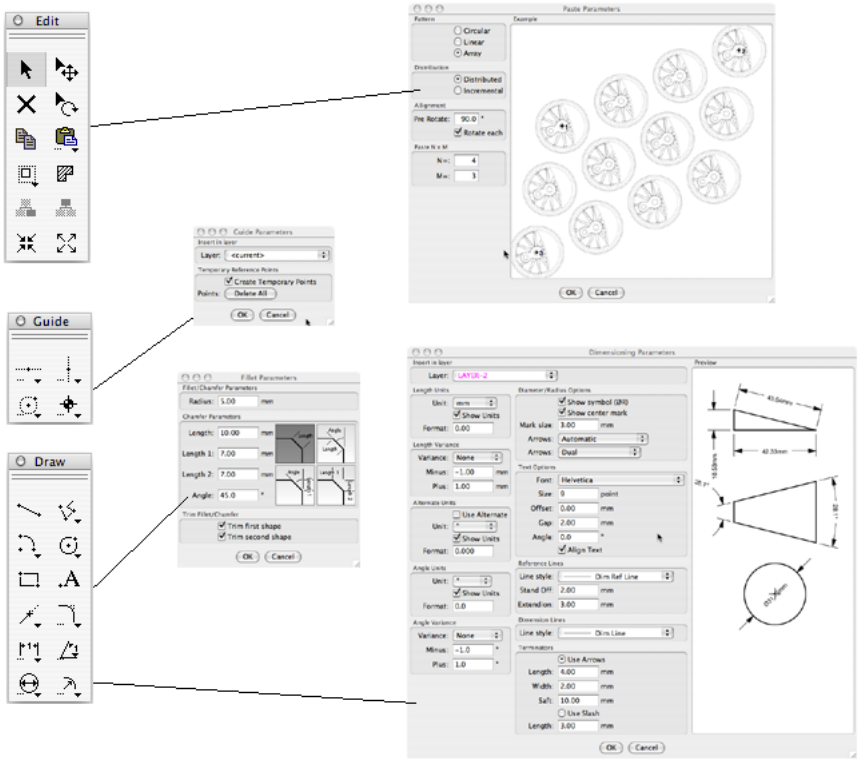


Figure 5.4: Finding the Parameters Dialogs

The right-click menu also contains commands that are relevant to the currently selected shapes.

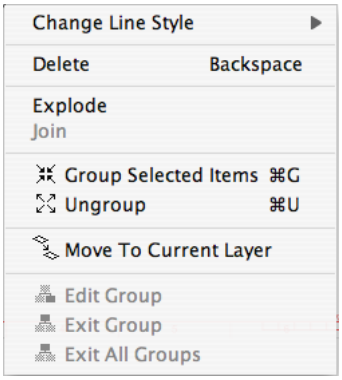


Figure 5.5: The Right Click -menu

5.3 eGuide

An interactive help facility can be invoked with the **Tools/eGuide...**command in the 'Help' menu, see figure 5.6.

eGuide tracks you as you draw and gives hints on what to do next. As at any given time there are a number of actions you can take, the eGuide cannot give you step by step instructions. The hints are given in a computer generated, ungrammatical English, with apologies to any language puritans.

To exactly describe how the eGuide works is difficult, but broadly speaking the eGuide works as follows. Based on the selected drawing tool, the various ways of how you can draw are described in the eGuide window. The underlined items indicate what input you have entered so far. Below them is text describing how you can enter more input.

No textual description can do justice to the interactive quality of the eGuide so it is suggested that you just try it. On the other hand, it is likely that you do not need guidance at all!

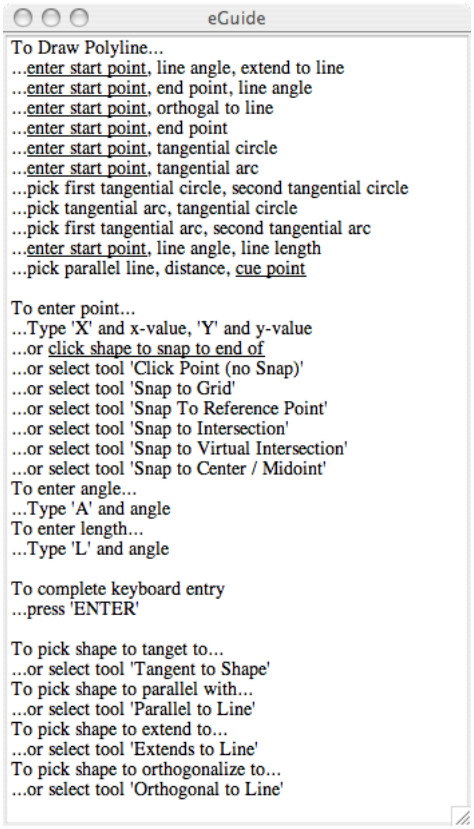


Figure 5.6: Hatching Combinations

Chapter 6

Moving Around

Moving around in the document. - such a deceptively simple, but essential subject that deserves a chapter of its own. At any given time, the drawing area shows some part of the drawing. If it were not so confusing, you could say it is a window to the drawing. Technically, it is called a 'pane' as in a window pane. By moving this pane and/or the document visible through the pane is how you bring various parts of the document into view, and therefore it is also customary to call it a 'view'.

As drawing and designing are mostly visual tasks, it is essential to be able move around in the drawing to see what you are doing. That is why jDraft provides so many ways to do that and why it is essential to master at least some of them. You don't need to use them all, but it's essential that what you do use becomes a second nature so that moving around does not distract you from drawing.

Most of the View controls relate to a specific view (see below on multiple views in section 6.8.2) so the view controls are attached to the lower left corner of each view, see figure 6.1.

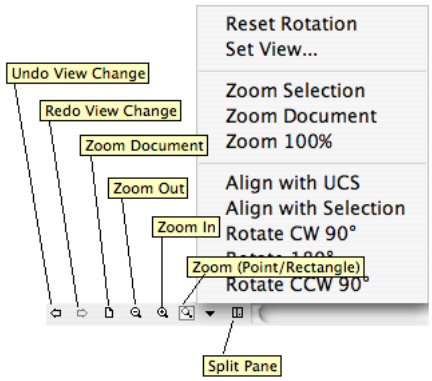


Figure 6.1: View Controls

You popup the View -menu by clicking on the small arrow.

6.1 Moving,Zooming and Grooving with the Mouse Wheel

One of the most useful view controls is the Mouse Wheel, especially in laptops that have a touch pad and support two-finger drag gestures, like in Mac OS X. Rolling the wheel causes the view to be centered at the current mouse location and be zoomed in/out with small amount for each wheel increment. This makes it very easy and fast to both move around and zoom in/out. Just move to cursor to the location in your drawing that you are interested and roll the wheel (or

gesture with two fingers). Small scrolls/gestures effectively just move your point of interest to the center of the screen while larger scroll wheel movements enables you to zoom in/out.

6.2 Scrollbars

The good old scrollbars on the right and bottom of the pane move the 'window' over the document. You scroll by dragging the knob (a.k.a thumb) around. You can also scroll by small increments by clicking at the small arrows. By clicking the 'track' on which the knobs slides, you can scroll half screen fulls at a time. The size of the knob relative to the size of the track gives an indication on how much of the document is visible at the moment. Think like pane size = knob size and track size = document size.

Should be familiar concept from myriads of other appications.

6.3 View Undo/Redo

Because there are so many ways to move around, sometimes a single mouse gesture moves your view to somewhere totally wrong, from which it can take a lot of navigation to find your way back. This can be really frustrating and may interrupt your thought/drafting process. For this reason jDraft remembers the last ten view positions for each pane so you can move back and forth between these view position with these buttons.

6.4 Zoom Document

This button resizes and repositions the pane (or document, depending on your view point, pun intended) so that the whole drawing is visible. This is handy if you get totally lost - it is a sort of 'reset' button.

6.5 Zoom In/Out

These buttons make the document (or pane depending on your view point, pun intended) larger or smaller. The icon with the plus sign makes the document larger, as if you are moving the document closer to you. This is known as Zoom In. The other one is, of course, called Zoom Out and makes the document appear smaller, showing more of it.

6.6 Zoom Command

This button activates the Zoom Command. Clicking this button once activates the command into a so called one-shot mode in which, after zooming once, the current drawing command is resumed. This makes it handy to quickly zoom in (or out for that matter) while drawing something, without interrupting your drawing command. Double clicking activates the Zoom Command so that it remains in effect until another command is selected or the Zoom Command button is clicked once more. You can also activate/deactivate this command by pressing the 'Z' key (without any modifier keys). Pressing 'Z' toggles between the Zoom Command and your current drawing command. When the Zoom Command is active the cursor takes one of the following shapes:

The Zoom In (plus sign) is the default and is active unless you press the ALT-key on the keyboard, in which case the Zoom Out (minus sign) mode is in effect as long as the alt key is held down. Clicking with the mouse zooms in/out by a factor of 1.41 effectively doubling or halving the visible area of the document and centering the view at the click location.

If you click and drag with the zoom command to specify a rectangle the view is resized and repositioned so that the area of the rectangle fills the view. Note that you can activate this same Zoom Command click and/or drag feature at any time with center mouse button.

If the SHIFT-key is held down, the cursors turns into a hand shape. In this mode you can grab and move the document by dragging it with the mouse. You can also at any time center the view at the mouse location without pressing any of the mouse keys - just press the key 'Q'.

6.7 View Controls -menu

This menu contains lots of less frequently used view control commands, most important of which is rotating the view. More on this later in Advanced view options.

6.8 Advanced view options

6.8.1 Rotated views

A feature often not seen in simpler drawing programs is the ability to rotate the document in relation to the view. In engineering drawing this is not a very often required feature but in architectual applications the need sometimes arises, as two wings of a building may be at odd angles to each other, making working on at least one of the wings less than optimal, as illustrated in figure **??**

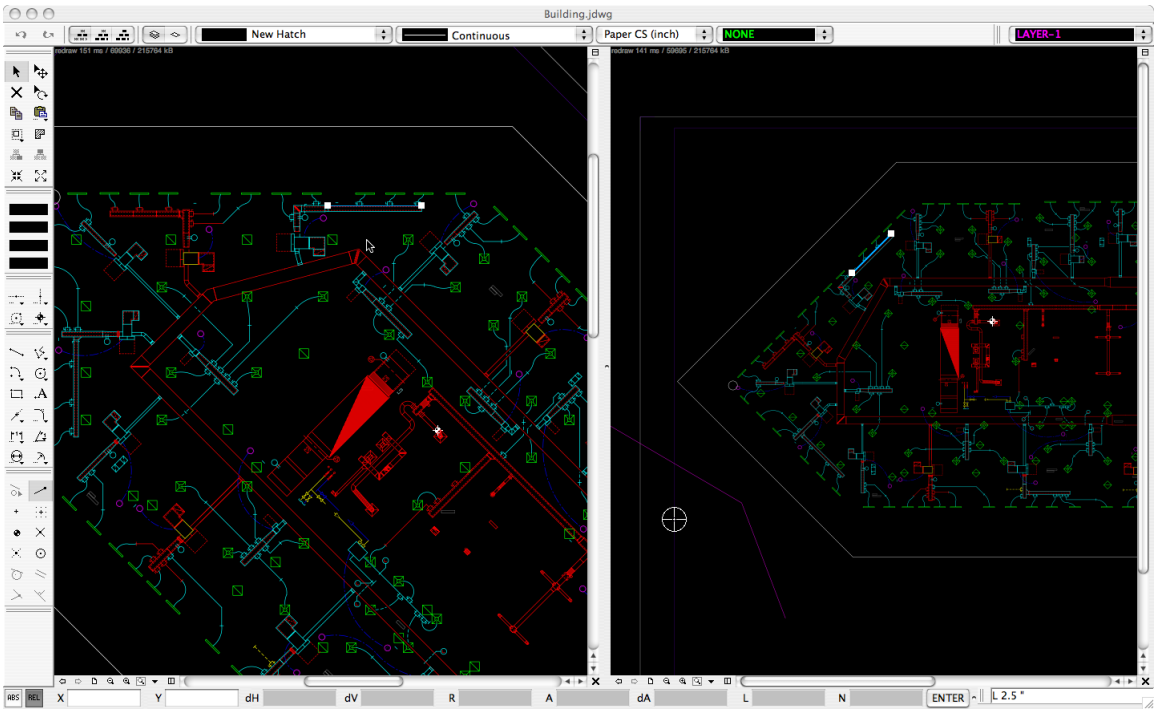


Figure 6.2: Rotated Views

Working with features that are not aligned with the document side becomes easy if you rotate the view to align it with the feature being drawn an create a coordinate system to match,

Rotation can be specified numerically with the view menu command 'Set View...' More often, though, the actual view angle may not be known precisely - instead it is the result of geometric construction or some such. In these case the easiest way to align the view is to select a line that you want to be horizontal or vertical in the view and use the 'Align With Selection'

command followed with 'Rotate 90' / 'Rotate 180' commands from the view menu, until the desired orientation is achieved.

It is also possible to align the view with the current User Coordinate System (UCS).

6.8.2 Multiple Views

Very often in large drawings it becomes necessary to draw lines or other features from one end to the other. To snap accurately you need to zoom in on both ends in turn, which can be a burden if many such lines are required. For this purpose any view can be split into two views, either horizontally or vertically, as illustrated in figure **??** Now both views can be independently zoomed in on different locations on the document, and drawing can be carried out by clicking on the view that provides the best visibility.

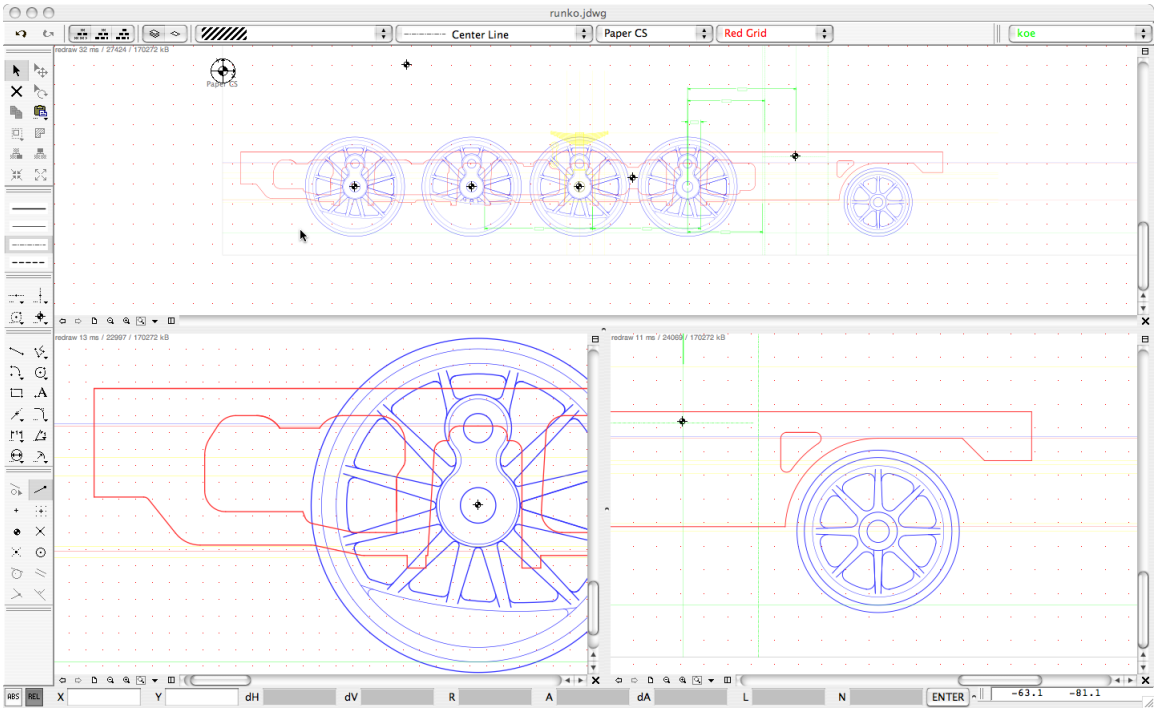


Figure 6.3: Multiple Views

Chapter 7

Anatomy of a Drawing

7.1 Shapes and Drawing Primitives

A drawing consists of the following types of shapes or drawing primitives, see also figure 7.1:

- Polylines
- Splines
- Arcs
- Circles
- Elliptical Arcs
- Elliptical Circles
- Filled Areas
- Text Blocks

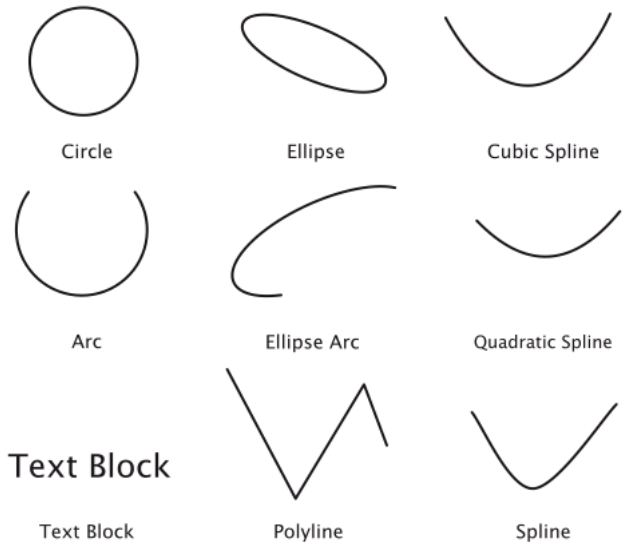


Figure 7.1: Drawing Primitives

In additions to these 'printable' shapes there are also

- Reference Points
- Guide Lines
- Guide Circles

which are visible on the screen but do not appear in the printout.

7.2 Line Styles

Except for Text Blocks and Filled Areas, for obvious reasons, each shape has a Line Style associated with it, which determines the width, color and dashing of the line that renders the shape.

Line Styles are shared between all shapes within a drawing so that changing/editing the line style affects the appearance of all shapes drawn with that Line Style. This is powerful and practical but is different from e.g. typical painting applications, where a line is drawn with one color and to change the color it is necessary to redraw with a different color.

Line Types are stored with the document and there is no explicit way to transfer line types from one drawing to another. However, if you copy/paste a shape from one document to another the Line Style is copied as well, of course. This does not create a link between the documents, so changing the Line Style in one does not change the other. Line Styles can be edited in the 'Settings/Line Styles...' -dialog.

7.3 Layers

All shapes reside on a layer. Layers are the main tool for keeping your drawings manageable. As drawings get more complicated, especially with assembly or general arrangement drawings showing multiple overlapping parts, they soon become incomprehensible and impossible to manage without the use of layers.

There are a number of layering schemes, and you need to come up with one that works for you. Most people seem to use layers to differentiate between parts. This often makes sense as it allows you to turn off (hide) parts selectively. Different engineering disciblins have different needs.

A layer is like a transparent drawing sheet. The drawing document is made of a stack of such sheets. The layers have a back to front order which determines which shapes take precedence when shapes overlap.

The current Layer is displayed and can be changed with the Select Layer combo box on the top toolbar. The Layer combo box can also be dragged out of the toolbar and used as a floating toolbar, giving instant access up to 30 layers and their properties with a single click.

Layers have the following properties

- Name
- Visible
- Locked
- Snapable
- Color
- Use Color

No two layers can have the same name. Names are case sensitive. If a layer is not visible

(is hidden) then none of the shapes that are on that layer are visible and cannot be picked, snapped to or in any way manipulated. It the layer is locked, the shapes on that layer cannot be manipulated or selected, but you can snap to them.

If the layer is snappable, you can snap to objects on that layer, otherwise they are ignored.

If the use color-attribute is set, shapes on that layer are displayed using the layer color, not the color dictated by the shape's Line Style.

7.4 Groups

Shapes can also be grouped together. A group behaves like a single entity. If you select one of the shapes in the group, the whole group becomes selected. If you move one shape, the whole group moves and so on. Groups are not in any layer, but rather the shapes that make up a group are each in their own layer.

A group can also contain groups, so it is possible to have hierarchical structures that may help in managing drawing in certain situations. To form a group, you select the objects to you want to include in the group and click the Group button.

If the group contains reference points they become snap points and handle locations for the group, which is a very powerful way of creating ready to use parts that can be easily snapped into the right positions.

(If there are no reference points, an artificial reference point is calculated as the mathematical center of the bounding box in the paper coordinate system for all shapes in the group.)

It is possible to work inside or within a group, modifying the group without first ungrouping it. To do that, select a group and click the Work In Group button or simply double-click the group. When you are working inside a group all shapes that are not a part of the group are displayed as gray. When working within a group, all shapes you draw will be added to the group.

7.5 Text Blocks

Text blocks are like mini word processing documents, in which you can use different fonts, sizes and styles (bold,italics). In order to be able to create precise layouts, the text blocks are layed out relative to a so called anchor point. The anchor point can be defined to be at key location relative to the text, for example in the beginning of the baseline of the first text line etc.

7.6 Filled Areas

Filled Areas are created by selecting one or more shapes. The outlines of those shapes are combined together to form the boundary of the Filled Area, and the inside of that area is filled with the current Fill Pattern. The insides are determined using so called odd/even ruler, which works by drawing an imaginary line from a point to infinity and counting how many times the line crosses the boundary of the shape. An odd count indicates that the point is inside. Each Filled Area has four handles which also serve as snap points. These handles are at the corners of the bounding box of the boundary in the internal document coordinate system. As the bounding box is not precise, you do not want to snap to these handles.

Filled areas cannot be stretched.

Filled areas are always on a layer, but within in that layer they are behind all other drawing shapes except guide lines.

7.7 Fill Patterns

Fill Patterns are used to fill the area covered by selected shapes by pressing the Fill button.

Unlike Line Styles, the Fill Patterns are not shared between shapes and the Fill Patterns you see in the Select Pattern -combo box are not stored with the document, but in the file 'jDraft.patterns'. For the location of that file see Appendix A.

When a filled area is created the corresponding pattern is copied from the pattern file to the drawing.

Each fill pattern has a name and no two fill patterns can have the same name. Names are case sensitive.

The current fill pattern grid is displayed and can be changed with the Select Fill Pattern combo box on the top toolbar.

Fill Patterns come in three different types:

- Hatches
- Solid Fills
- Raster Patterns.

To edit the Fill Patterns bring up the Fill Patterns -dialogue, figure 7.2 with the **Settings/Fill Patterns...** -menu command.

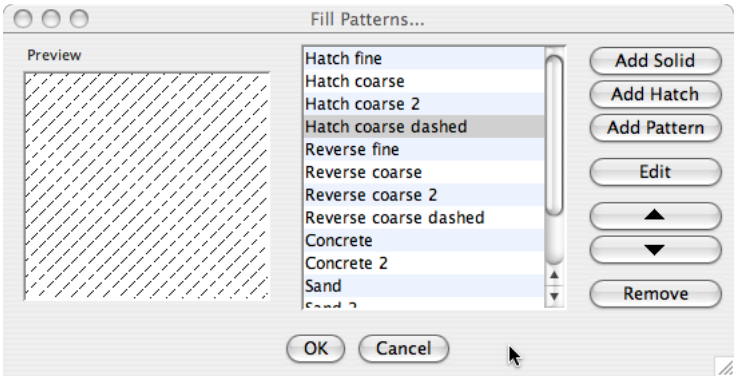


Figure 7.2: Fill Patterns -dialog

7.7.1 Hatches

Hatches are the traditional method of indicating cut away sections or surfaces on technical drawing. They are defined by:

- Origin
- Spacing
- Angle
- Line Style

You edit Hatch patterns by bringing up the Hath Pattern -dialogue, figure 7.3 selecting the pattern and clicking on the **Edit** -button on the Fill Patterns dialogue.

Typically, only the spacing and angle of the hatches are varied as the Line Style is dictated by drafting standards (usually a thin solid line). Sometimes, for example if an equally spaced hatch consisting of parallel lines needs to be created, it is necessary to use a different Origin for the two hatch styles, otherwise the lines will simply overlay each other.

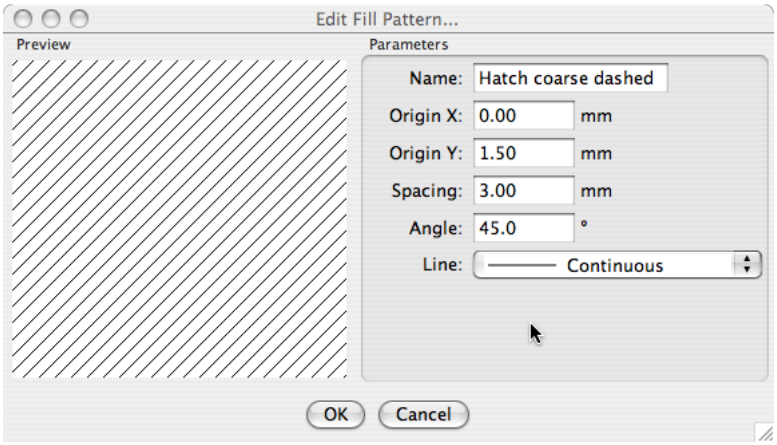
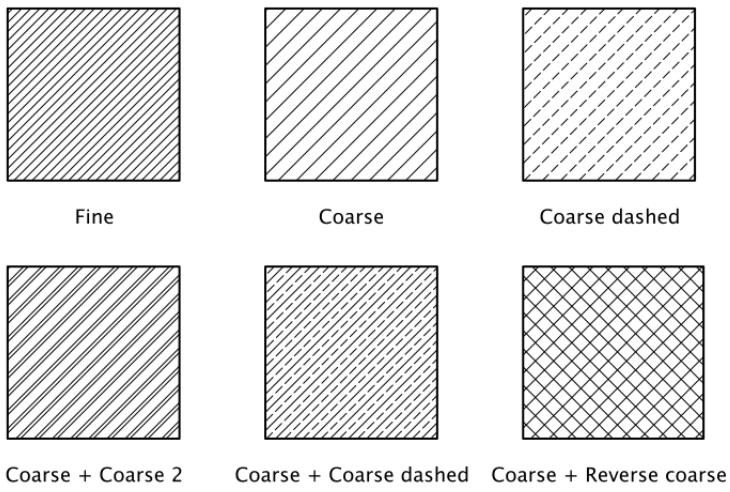


Figure 7.3: Hatch Pattern Edit -dialog

If cross-hatching or hatching with alternating line styles is needed it is necessary to hatch multiple times with different patterns.

Figure 7.4 shows some typical hatch pattern combinations used in engineering.



-

Figure 7.4: Hatching Combinations

When multiple filled areas with the same fill pattern overlap, the patterns 'blend' together, which is desirable as, if e.g. the hatching of an area needs to be done in parts it is important the hatches appear continuous.

7.7.2 Solid Fills

You edit Solid patterns by bringing up the Hath Pattern -dialogue, figure 7.5 selecting the pattern and clicking on the **Edit** -button in the Fill Patterns dialogue.

Solid fills are simply areas filled with a single, solid RGB color.

7.7.3 Raster Patterns

Raster Patterns are based on tiling a picture side by side to cover the Filled Area.

You edit Solid patterns by bringing up the Hath Pattern -dialogue, figure 7.6 electing the pattern and clicking on the **Edit** -button in the Fill Patterns dialogue.

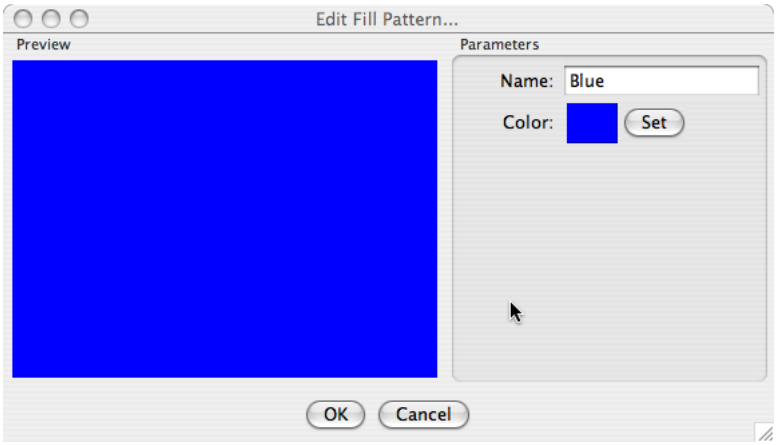


Figure 7.5: Solid Pattern Edit -dialog

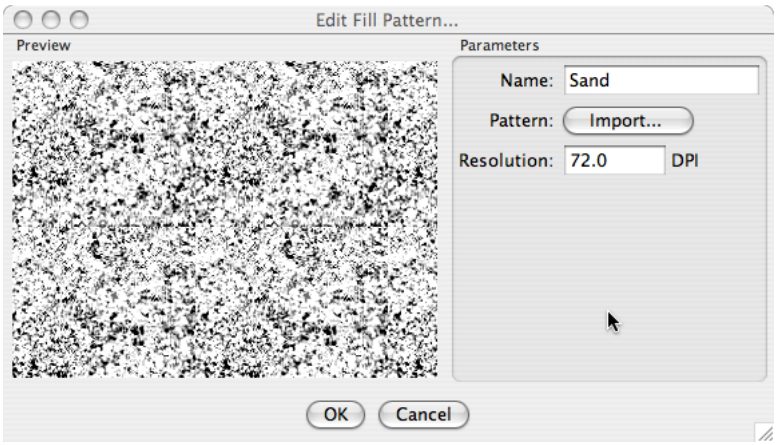


Figure 7.6: Raster Pattern Edit -dialog

Raster Patterns are created from image files (TIFF,GIF,JPEG and PNG formats are supported).

Raster Patterns are very powerful and can be used to created any kind of fill effects. However, the resulting output quality is defined by the resolution of the image used to create the pattern.

There is a tradeof between the accuracy (resolution) and file size. Obviously to create the perfect, for example 'concrete', pattern one would draw by hand a A4 sized sample, scan it at 300 DPI resolution and import it into fill pattern. Unfortunately, this would create a pattern of size 210x297x(300/25.4)2x4 bytes, a whopping 34 MBytes!

So the recommendation is to use patterns about 100 x 100 pixels at 72 DPI or thereabouts. This creates patterns of about 40kB in size and produces an acceptable output on a typical office printer.

Chapter 8

Drawing Aids

Drawing aids is, in a way, what jDraft and 2D CAD is all about, to be able to draw accurately and with ease.

Accurately here means with precision.

When you draw shapes, lines, arcs, anything, you are not limited to the accuracy of how well you can point with the mouse or see what you are drawing on the screen. Instead when you draw e.g. a line from point to point, you pick the point on something that is already defined in the drawing, say the end point of another line, the crossing of two lines or from a grid. Or you define it by constraints, saying that the line is to be a tangent to a circle and passing through a point. Precisely, perfectly.

In the end, the drawing is probably printed on a paper with a printer having a resolution of about 300 DPI (5 lp/mm) so why this craving for accuracy?

To understand this, consider that in a drawing made at 1 : 100 scale the above mentioned printer resolution results in an accuracy of about 0.1 mm which would mean that any Dimensioning would have a precision of about 10 mm! Clearly not acceptable. And things would get even worse as things are copied and pasted as the accuracy would deteriorate every time.

Hence the need to draw precisely.

Of course, nothing is perfect and for the technically inclined the accuracy is limited by IEEE double precision floating point math and is aproximately sixteen significant digits. Note that some geometrically almost singular cases can affect the accuracy of the math jDraft performs, such as intersection of tangential lines and circles or almost parallel lines. Also, the mathematics related to splines and ellipsoids are not always as precise because they rely on numerical rather than analytical models and thus things like intersections of splines and ellipsoids may not be as accurate as intersections of, say, lines and circles.

8.1 Snap Cursor

Whenever you are drawing, the cursor turns into a cross hair. In addition to this cross hair that moves as you move the mouse, there is a Snap Cursor, figure 8.1 that tracks the point that would/will be entered if you click with the mouse. This snap cursor gives clear visual indication of what the cross hair cursor is snapping to.

Figure 8.1: Snap -cursor

8.2 Shape Hilite

Sometimes seeing the snap cursor is not enough. Consider a situation where two lines start from almost, but not quite, the same point. In order to draw precisely it is important to see which one is snapping the cursor. To help visualize this, the shape(s) snapped to are Hilited with a hilite color (orange by default, but you can change it in the preferences dialogue).

8.3 Snapping

The above introduction covers the fundamentals of snapping to shapes.

In short, all you have to do is to select the snap mode and point and click at the shape you want to snap to. The snap cursor and the hilite indicate to you what you are doing. Figure 8.2 shows most of the shapes with their Handles which are also their snap-points. Note that sometimes the snap cursor and what you are pointing to with the cross hair cursor can be wide apart on the screen, for example when you are snapping to a center of a circle you point the circle circumference with the cross hair but the snap cursor will appear at the center of the circle.

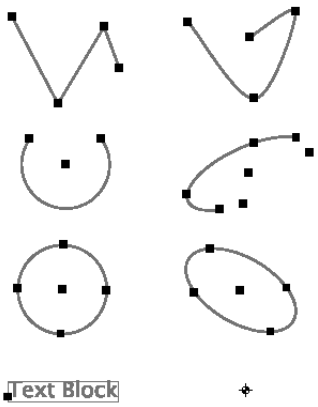


Figure 8.2: Shapes and Snap Point/Handles

Often there are two or more points into which the cursor could snap to, like two end points of a line. In situations like that, the software selects the closest one and thus you can affect what the software picks (in case it is not what you want) by moving the cursor to a different point.

You select the snap mode in effect using the Snap -toolbar in figure 8.3.

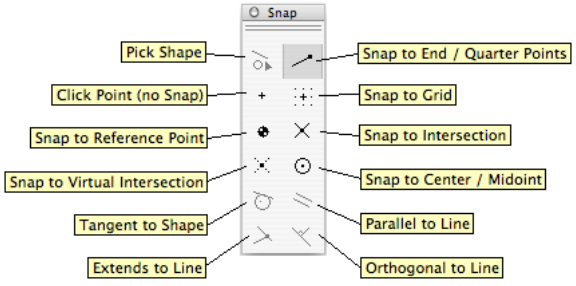


Figure 8.3: Snap Tools -toolbar

Snapping can be restricted to shapes on the current layer (as opposed to all visible layers) and to all visible shapes, shapes that are lower in the groups hierarchy (in other words shapes that are sub-groups of current group) or only to the current group. You control this with the Snap Controls -toolbar in figure 8.4.

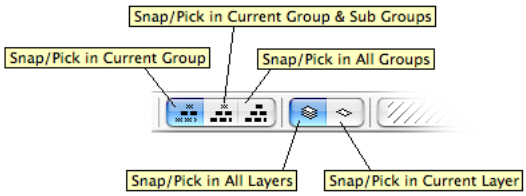


Figure 8.4: Snap Controls -toolbar

8.4 Grids

A Grid is a rectangular array of points that are spaced at equal distance from each other. When you snap to a Grid the nearest grid point is picked. This makes it easy to draw things to conform to some, well, grid. Any number of grids can be defined, but only one of them can be active at any time. Grids have names and colors to distinguish them on the screen and lists.

The Active grid is displayed, and can be changed with, the Select Grid -drop down menu on the top toolbar.

Figure 8.5 shows the grid setup dialogue which you can bring up from the **Settings/Grids...** -menu command.

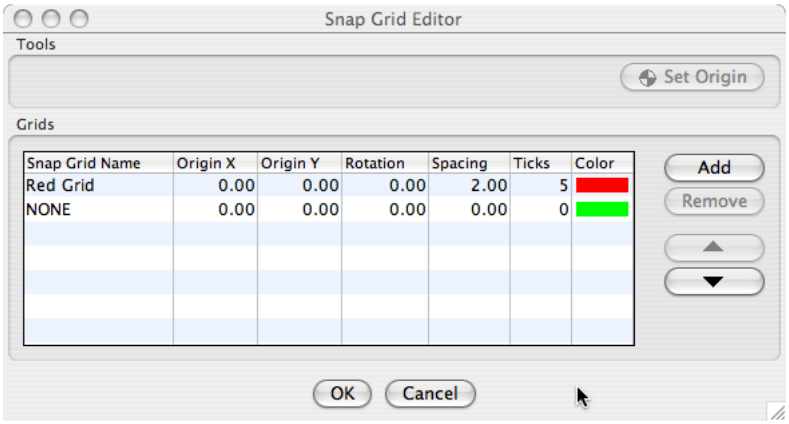


Figure 8.5: Grid Parameters -dialog

Each grid has the following properties

- Spacing
- Color
- Ticks
- Origin
- Rotation

Spacing determines the distance between grid points.

Color is the color used to display the grid on the screen. When a grid is active, it is displayed as a rectanglular array of tiny dots behing all layers.

Ticks specify how dense the displayed grid/dot array is. A value of one causes each grid point to be displayed, a value of five shows every fifth grid point only. Note that in order not to fill the screen with dots when the grid is dense or when the view is zoomed out, the sofware selectively displays even fewer points than specified by the Tick property.

Snapping however always takes place at the Spacing resolution, regardless of the display grid points.

8.5 Guide Lines

Guide lines come in two varieties, lines and circles. You create guide lines with the tools in the Guide -toolbar, see figure 8.6 and figure 8.7.

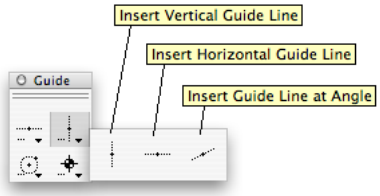


Figure 8.6: Line Guides -palette

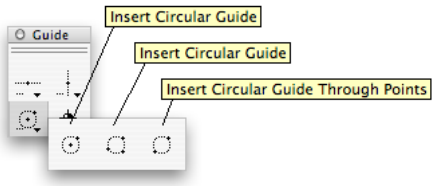


Figure 8.7: Circular Guides -palette

They behave mostly as normal lines and circles, you can move them, copy them etc. They are on a layer, obey the layer visibility and color and so on. But most importantly, you can snap to them. That is what they are for.

They differ from ordinary lines and circles in three respects.

- Guide Lines are not printable
- Guide Lines are behind all normal shapes
- Guide Lines have special line style 'Guide Line Style'

The Guide Lines Style has by default width of zero which makes a guide line always to appear as one pixel wide regardless of the zooming. You can edit the Guide Line Style as any regular line style by bringing up the Line Style -dialogue with the **'Settings/Line Styles...** -menu command.

8.6 Reference Points

Reference Points are small markers that you can make. Like guide lines, they are not printable. Reference Points have no size, so they appear the same regardless of zooming. This is mostly handy but can be annoying when zooming 'all out'.

Figure 8.8: Reference Point

A large number of reference points is usually a pain when drawing.Therefore Reference Points come in two varieties, permanent and temporary. Permanent Reference Points are like any other shapes, they exist until you explicitly delete them.

Temporary reference points, on the other hand, are consumed as you draw snapping in to them. After all, once you draw a line snapping to a Reference Point, the Reference Point is superfluous because now you can snap to the end of that line when necessary.

By default all reference points are borne temporary. Guide Lines and Reference Points both reside on some layer. By default they are created on the current layer. However, you can specify that they are created on a specific layer regardless of the current layer.

To change these settings, double-click on the Reference Point button in the Guide palette to bring up the Guide Parameters -dialogue, see figure 8.9.

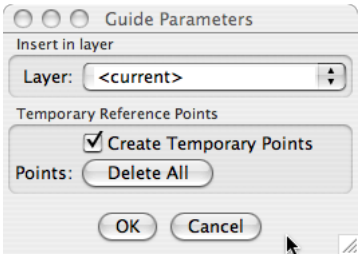


Figure 8.9: Circular Guides -palette

You create Reference Points with the tools in the Guide -toolbar, see figure 8.10.

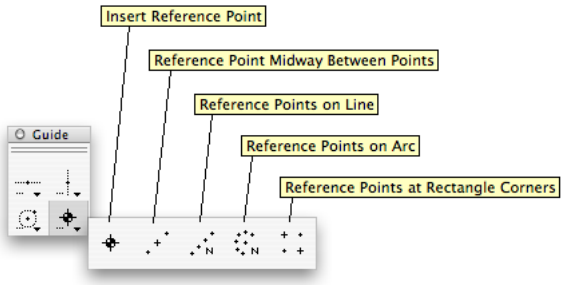


Figure 8.10: Reference Points -palette

8.7 Snap Points

All shapes have snap points to which you can snap. Most of them are intuitively placed and obvious, like end points and center points. Mostly these are in the same locations where the Handles appear on selected objects. However, there are some exceptions that you may want to know of.

8.7.1 Circles

Circles have four handles that are at 90 degrees apart on the circumference. These handles are wherever you drag them. In addition, these circles have four 'quarter points' that are also 90 degrees apart but are aligned with the current coordinate system, as illustrated in figure 8.11. You can snap to all of these.

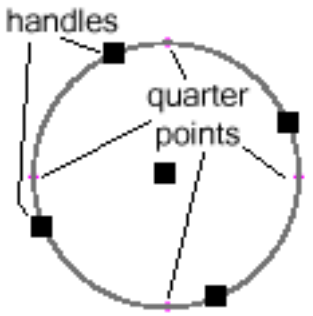


Figure 8.11: Circle Handles and Quarter Snap Points

8.7.2 Lines

Line ends and vertexes for polylines are snap and handle locations. Line centers and line segment centers for polylines are snap points, in snap to center mode, although there are no handles there.

8.7.3 Text Blocks

Every text block has an anchor point. The text layout is defined relative to this anchor point, which also serves as both the handle and the snap-to location

8.8 Picking Shapes

Sometimes, especially when you are snapping to the crossing of two shapes, there are more than two shapes so that it is impossible to point with the cursor so that exactly the two shapes that you want are picked. You can see from the Hilite that the wrong two shapes are being picked, but no matter how you move the cursor or zoom the display you just can't pick the right ones. This is surprisingly common with horizontal/vertical lines drawn on top of each other. The sofware has built in heuristics to reject parallel line cases, but sometimes that is not enough.

In situations like that you use the TAB -key to cycle through all possible combinations of shapes that could be picked up given the mouse location. Just keep pressing the TAB -key until the shape(s) you want are hilited.

8.9 Coordinate Systems

Many people seem to think that CAD drawing involves a lot of coordinate systems and arithmetic and find them a turn-off.

Actually, coordinate system are not that central in drawing precisely. There are a few things about coordinate systems you'll want to understand.

Coordinate systems have names for your convenience. No two coordinate system can have the same name. There can be any number of coordinate systems on a drawing but only one of them can be active or current at the same time.

The current coordinate system is the one used when entering or displaying numerical values to/from the drawing. It defines the scale of things when you draw, enter values, measure sizes or dimension parts. That is the most important thing to understand about coordinate systems. On the screen, the current coordinate system origin is visualized as in figure 8.12

Figure 8.12: Coordinate System Origin -symbol

Changing the coordinate system changes nothing in the drawing, it just changes the interpretation of what you enter or what the software displays. Internally, a 10 mm line is always a 10 mm line in a given location in the internal, fixed coordinate system of the document.

Note that the units used in entering numerical values or displaying coordinates do not come from the settings of the coordinate system but are set in the **Settings/Display...** -dialogue. The units used in dimensioning are determined by the settings in the Dimensioning parameters, see figure 12.1, dialogue which you can bring up by double-clicking any of the dimensioning buttons.

The coordinate systems are managed with the Coordinate Systems -dialogue illustrated in figure 8.13 which you bring up with the **Settings/Coordinate Systems...** -menu command.

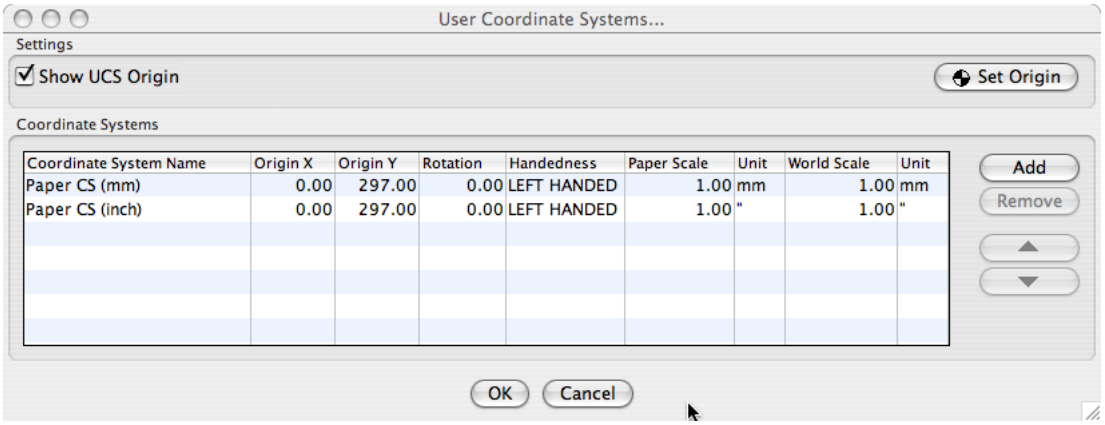


Figure 8.13: Coordinate Systems -dialog

8.9.1 Scale

The Scale defines how dimensions in a drawing are displayed when you are dimensioning. At a 1 inch to foot scale, a 10 mm line measures as 120 mm when you dimension it.

8.9.2 Rotation and Handedness

Some drawing operations, like drawing a rectangle by two opposing corners, need to know what is horizontal and vertical. Also, when you are giving a position by numbers, say 100 mm to the right of a previous point, you and the software need to know what 'to the right' means.

This is defined by the coordinate system handedness and rotation. A clever little icon indicates the origin and rotation/handedness of the current coordinate system.

8.9.3 Origin

When you need to specify points and locations in reference to some fixed point, that's when the Origin comes into play. By setting the origin at a suitable position you can enter a numeric

position in absolute measurement conveniently. To set the origin, click on the Set Origin button, which will close the Coordinate System dialogue and activate the set origin command. Click or numerically enter the new origin point and enter the rotation angle. Note that whatever you enter (numerically) is relative to the current coordinate system if the relative mode is in effect.

8.10 Last Point

Whenever you enter a point, either by clicking with the mouse or by entering its coordinates numerically, this point becomes what is called the Last Point, which is visualized on screen as in figure 8.14. The Last Point serves as a reference point when you are entering numerical values in relative mode. So when you enter numerically, say, X 100 Y 0, this is interpreted as 100 units to the right of the Last Point.

Figure 8.14: Last Point -symbol

The last point also serves as a reference if you use the Cut/Copy and Paste commands from the Edit -menu or use the equivalent keyboard shortcuts. When you cut/copy something the copied objects are translated so that the last point has the coordinates 0,0. When Pasting the objects, the objects are translated so that the coordinates 0,0 align with the (possible different) Last Point.

In practice this means that if you just copy/paste something, without changing the Last Point, the copy will be pasted on top of the orignal at the exact same location. However, you can use this to copy/paste with accuracy by setting the Last Point to a key reference location before copying, and then re-setting, before pasting, the Last Point to the target key location.

As the Last Point has such a key role in relative numeric entry and in using copy/paste as described above, there is an omnipresent shortcut for setting the Last Point without actually entering (drawing) any point.

To set the Last Point without drawing or entering anything, hold the CTRL (Command/Apple key for Mac OS) down while clicking. This is very powerful when combined with the relative numeric entry mode. You can CTLR-click at a location to set the Last Point and then specify a new point relative to that.

8.11 Numeric Entry

The Numeric entry toolbar at the bottom of the screen, figure 8.15 is often an alternative to specifying some or all of the parameters of what you are drawing. Most drawing and editing commands accept input from the numeric entry toolbar as well as from the keyboard. By seeing what entry fields are enabled you can see what can be entered.

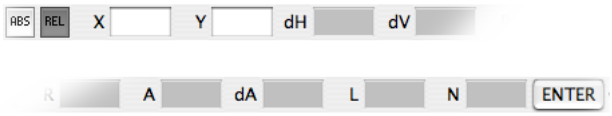


Figure 8.15: Numeric Entry -toolbar

To enter values just click on the entry fields and enter numbers. Use the mouse or TAB -key to move from field to field, but use the ENTER key only after you have entered all the values.

The units that are used to enter the values can be set in the 'Settings/Display...' -dialogue.

Each entry field has a shortcut that is displayed in front of the entry field with a CAPITAL letter. Pressing the shortcut key is equivalent to clicking on that entry field.

Coordinates (X and Y values) are either relative to the Last Point or absolute which means relative (!) to the current coordinate system origin. You can switch between the modes with the ABS and REL buttons on the toolbar.

Two typical examples to illustrate numerical entry.

To draw a circle with radius 5 at a mouse location do:

```
Click circle
Click/snap the center location
Type R 5 ENTER
```

To draw a vertical line 100 units long from a mouse location do:

```
Click line
Click/snap the starting point
Type X 0 Y 100 ENTER
```

8.12 Coordinate/Info Display

At the lower right corner of the application main window there is a small pane that displays the coordinates of the cursor. These coordinates are either relative to the Last Point if Relative -mode is in effect, or absolute which means relative to the Current Coordinate System origin. Note that the coordinates displayed are the mouse coordinates *before* the snaps are applied to, so they do not represent the precise point you will get when you click with the mouse.

This coordinate display can also be torn away to become the Info -toolbar, figure 8.16.

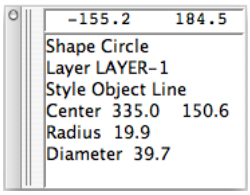


Figure 8.16: Info -toolbar

8.13 Background Images

Background Images can be linked to the drawing to serve as a reference. Combined with the use of a suitable grid, accurate reverse engineering can be done by digitizing an old drawing or photograph and drawing over it while picking sensible values from the grid, as illustrated in figure 8.17.

Backround Images are not imported into the document and thus do not make the file larger. The drawing only stores references to the original file. The references are stored relative to the location of the drawing in the file system. Therefore it is strongly recommended that the drawing is first saved at least once before background images are inserted.

Background images can be hidden so that they do not hinder drafting. Any number of Background Images can be used.

To manage background images, open the Background Images -dialogue, see figure 8.18, from the **Tools/ Background Images...** -menu command.

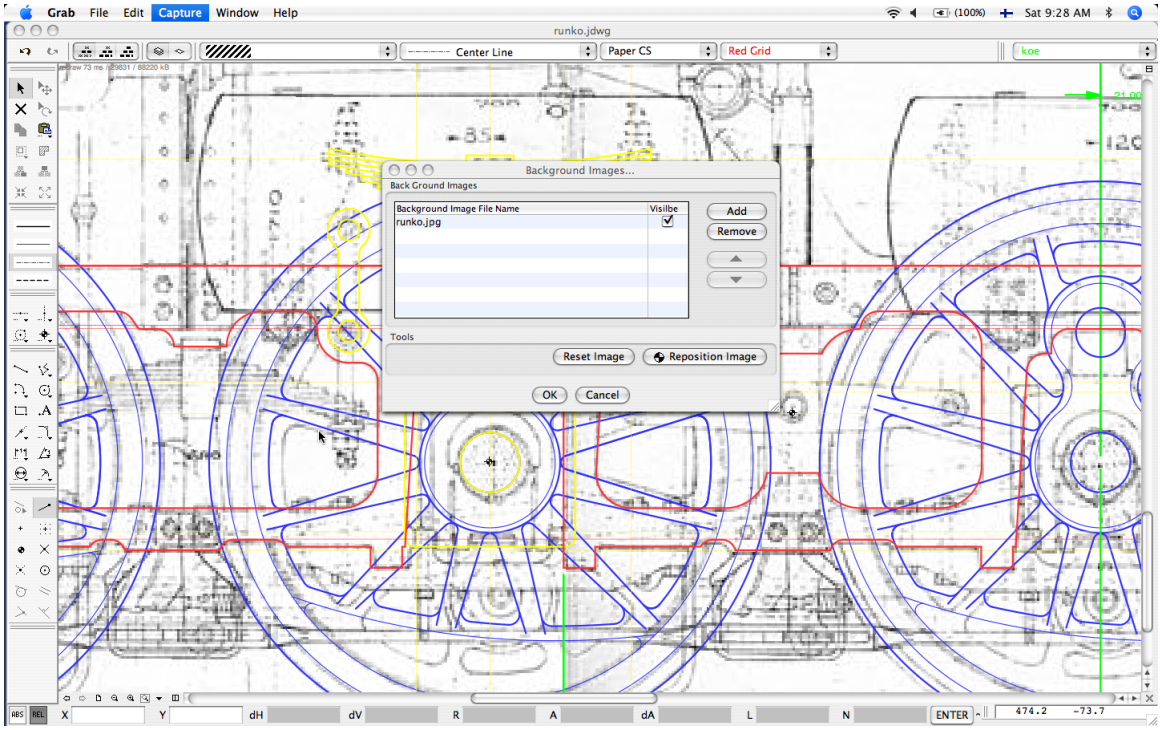


Figure 8.17: Example of Background Image Usage

The Background Images can be easily and precisely aligned with the drawing simply by specifying two points on the Background Image and two points on the drawing. The software rotates and scales the Background Image so that the two pairs of points align.

8.14 Options

In order to reduce the number of drawing commands and to smoothen the work flow some drawing commands offer options. These options are displayed in the form of buttons that appear and disappear as needed in the Options toolbar.

Typical options are Clockwise/Counter Clockwise when drawing arcs, figure 8.19 , Any Angle/Constrained Angle when drawing lines, figure 8.20 , Current Layer/Preserve Layers when pasting,figure 8.21 or Segment Type when drawing splines,figure 10.12.

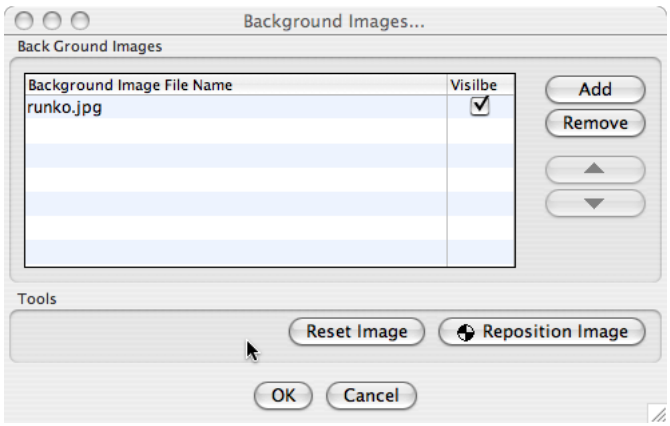


Figure 8.18: Background Images -dialog

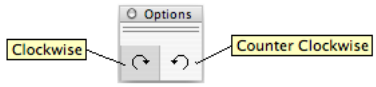


Figure 8.19: Arc Direction -options

Figure 8.20: Line Constrains -options

The option can be toggled by pressing the SPACE -key. For example when drawing an arc, if the arc is drawn the wrong way 'round just press the SPACE -key or click the option icon with the mouse.

8.15 Shift Click

When drawing lines it is often useful to constrain the line to vertical or horizontal. Holding the SHIFT -key down while entering a point forces the X or Y coordinate (depending on which is closer to its axis) to be the same as that of the Last Point. In effect, this forces for example lines to be vertical or horizontal and also offers some interesting snap features as the non-constrained coordinate will still be snapped according to the snap mode in effect.

Figure 8.21: Paste Laeyr -option

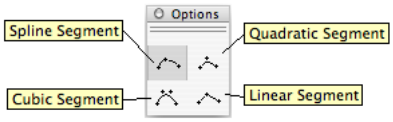


Figure 8.22: Spline Segment -option

Chapter 9

Editing

All the editing tools in the Edit -toolbar have one thing in common - that they work on or with the selected objects. So whatever you are doing with these tools you first have to select something.

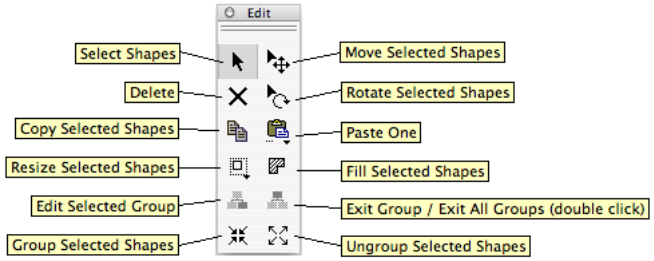


Figure 9.1: Edit Tools -toolbar

9.1 Selecting Shapes

Shapes are selected with the Select Command similarly to most applications. To activate the Select Command, click on the arrow shaped Select button on the Edit -toolbar.

Just point and click with the mouse.

If something is selected when you click an object the previous selection disappers, unless you hold the SHIFT -key in which case the new shape is either added to or removed from the selection.

If you click (on nothing) and drag a box then everything wholly within the box will be selected, or, if the SHIFT -key is used, added/removed to/from the selection.

If you click on a shape (as opposed to nothing) and drag the box the move command is activated. See next chapter. Regardless of what your are doing quickly double-hitting the ESC key toggles between the Select Command and your current drawing command. (A single ESC resets the current drawing command for example ending a polyline and starting a new).

9.2 Handles, Dragging and Stretching

When the Select command is active the selected shapes are hilited and display their handles, as illustrated in figure 9.2.

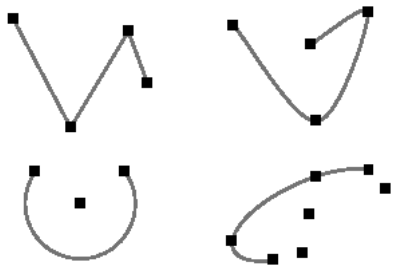


Figure 9.2: Selected Shapes with Handles Visible

9.2.1 Stretching

Clicking (dragging) a handle activates stretching, which changes the position of the handle and thus the 'shape of the shape', but usually not the location of the selected shape. If multiple shapes are selected, stretching takes place as if the same handle on each shape was dragged individually. At times this is very powerful, but it can cause surprises when 'the same handle' on each shape selected is not what you expect. Exactly what stretching does depends on the type of the shape and which handle is stretched. The behaviour is mostly intuitive and it is best to experiment.

9.2.2 CTRL -Dragging

If the CTRL is held down while clicking or dragging a handle the move (as opposed to the stretch) command is activated. This allows precise moves by taking advantage of the fact that all handles are snap locations and thus it is easy to align (move) shapes using the handles. If you click on a shape (as opposed to nothing) and drag, the move command is activated. The mouse location becomes the reference for the mouse, but no snap is applied. This makes the move inaccurate so this is not a good way to position shapes, but is handy when you are just moving things around.

9.2.3 ALT -Draging

If the ALT -key is held down when you initiate a drag then a copy of the selected objects is created and moved around. As in dragging above, this does not allow for precise positioning but it is nevertheless a very handy way to create copies of shapes that can then be precisely positioned. And copying is what computers are all about, see below on Copy / Paste.

9.3 Drag 'n Drop

When you are dragging, if you move your cursor outside the window you are drawing in, the operation becomes a drag and drop. This means that when you release the mouse button the shapes you were dragging around will be dropped on that mouse location. If that location happens to be another drawing they are either moved or copied there, depending on whether the ALT -key was held down (for copy) or not (move). Drag and Drop combined with Grouped shapes makes it possible to turn drawings into poormans parts libraries from which ready made parts can be dragged to your drawings.

You'll want to be careful not to accidentally Drop things and lose them, though.

9.4 Copy / Paste

Copying, in other words not repeating work, is what computers are all about. You should never ever recreate something if copying is an option. Well, almost never. You should consider copying even single shapes like lines, because every line you have drawn is a carefully crafted precision piece.

That is why there are so many ways to copy things in jDraft.

We have already mentioned the classic 'Edit/Copy-Paste' commands and the ALT-Dragging, which, while handy and familiar from typical desktop applications, are not really suitable for precision work.

Because jDraft is all about precision it provides more precise alternatives to these. The Copy / Paste buttons in the Edit -toolbar are almost equal to the menu bar Copy/Paste commands, but differ in that you specify a reference point for precise aligment.

To Copy shapes precisely you first use the Select command to select the objects, then click the Copy button and finally enter the reference point with the mouse using a snap, or numerically if you prefer. This copies the selected object to the clipboard.

This also automatically activates the Paste button.

When the Paste command is active, an outline of the shapes in the clipboard is attached to the cursor to indicate that you can point and snap with the mouse to place a copy of the clipboard contents into your drawing.

When copy-pasting like this, the reference position you specified when copying gets aligned with the point you pick when pasting. Precision work.

The paste command actually comes in four variations, see figure 9.3.

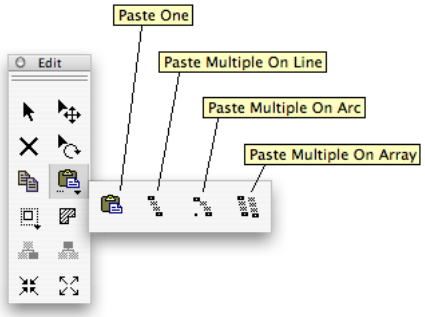


Figure 9.3: Paste -palette

In addition to the above mentioned 'Paste One' there are three more commands for pasting multiple copies at once in linear, circular and array formations. These commands takes a number of parameters that you can set in the Paste Settings -dialogue, figure 9.4, which you can bring up by double-clicking the Paste button.

In this dialogue, you can set the number of copies to be pasted and whether or not you want each copy to be rotated to match the orientation. A pre-paste rotation can be also specified.

The rotation concept seems to cause a lot of grief to people. In fact, it's rather simple.

When pasting, if rotation is enabled, each copy is rotated before pasting, first by the pre-rotation specified and then by the amount that the first and second paste location differ from horizontal. Rotation is always around the origin, which, in effect, means the reference location used when copying the shapes to the clipboard. When doing circular pastes it is best to visualize how much you need to rotate the shape you are copying to position it so that it lies on its side with the center of rotation to the left of it. This is your pre-rotation.

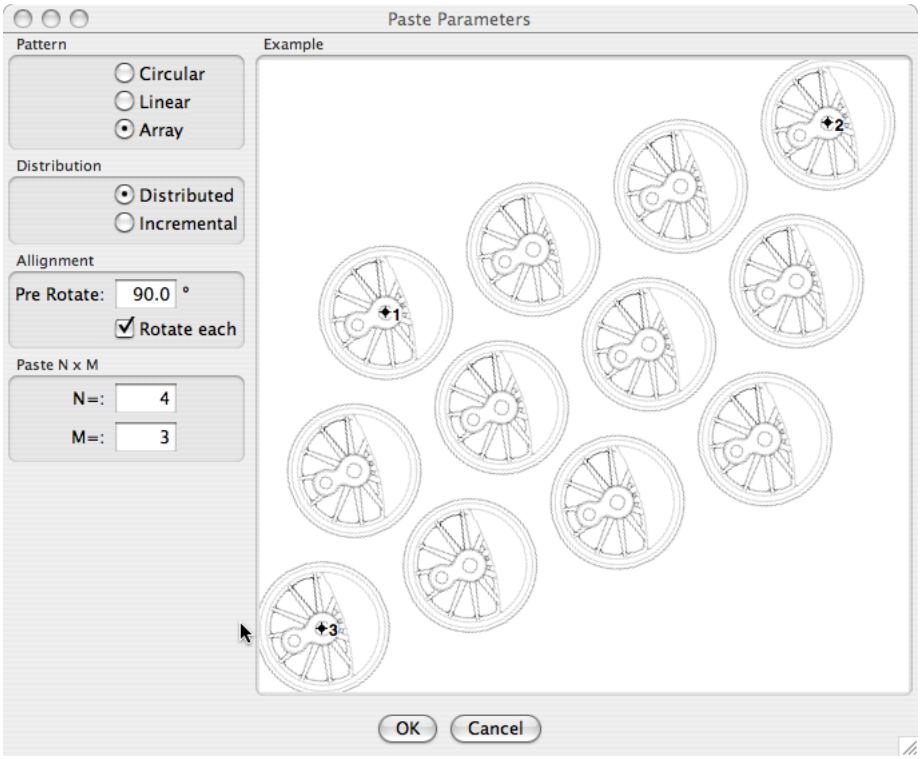


Figure 9.4: Paste Parameters -dialog

9.4.1 Paste Linear

With this command you enter two points. The first point specifies the location of the first copy. The second point specifies the position of the second copy (incremental mode) or last copy (distributed mode). The copies will be spaced at equal distances from each other.

9.4.2 Paste Circular

This is basically similar to Paste Linear except that the copies are pasted on a circular path.

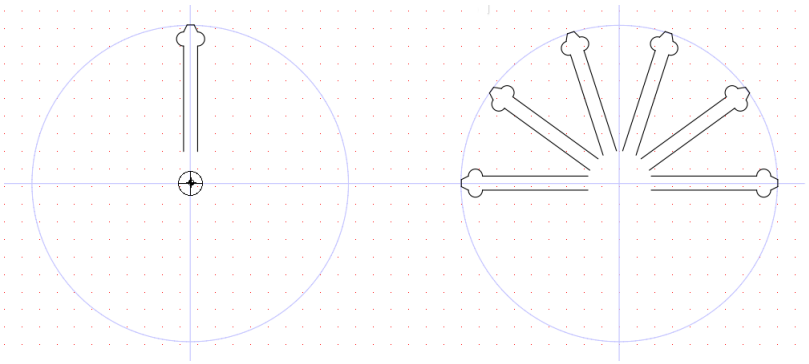


Figure 9.5: Circular Paste Example

Figure 9.5 shows how circular paste is used to draw a decorative half circle pattern. First, on the left, a single 'spoke' is drawn in upright position, hence (in below) the pre-rotate is -90 (clockwise) to align it correctly. Then this is Cut-copied using the tip of the spoke as the reference. Lastly, the semi-circular pattern is created by setting the Paste Paremeters as follows in figure 9.6:

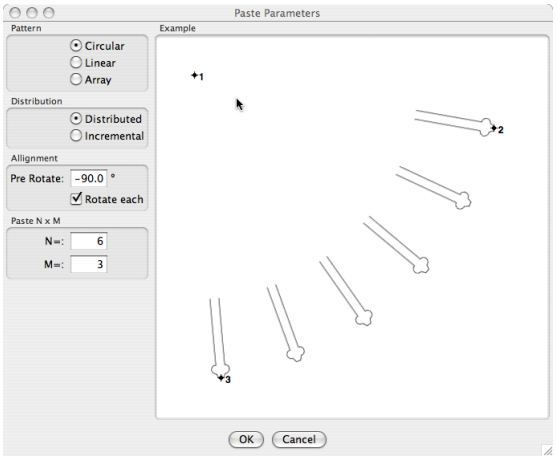


Figure 9.6: Circular Paste Parameters Example

entering the center and first copy positions by pointing and clicking with the mouse and entering the total angle numerically, figure 9.7.

Figure 9.7: Numeric Entry of Angle

But here again the best practice is to take it for a spin, the interactive 'Example' in the Paste Parameter dialogue is you best your best friend.

9.4.3 Paste Array

This pastes an array of copies on a grid that you specify by entring three points. The first point specifies the location of the first copy. The second point spefifies the position of the second copy on the first row (incremental mode) or last copy on the first raw (distributed mode). The third point specifies either the position of the second copy (incremental mode) on the first column or the last copy on the first column (distributed mode). Looks confusing on paper but is actually quite simple, go ahead and experiment.

9.5 Delete

Selected shapes can be deleted with the DEL -key or BACKSPACE -key or by using the Edit/Delete -menu command. There is also a Delete button on the Edit panel. Clicking the delete button deletes any selected objects and activates the delete Command, which allows you to point and delete objects by clicking on them.

9.6 Move

Moving is pretty straightforward, first you select with the Select Command the shapes you want to move, then click on the Move button and either click two points to indicate a distance and direction for the move or enter Horizontal and Vertical movement numerically.

In practice you'll most often move things by specifying a point in the selection and a new position for it. Intuitive. Pressing the 'M' -key gets you to Move Command at any time.

9.7 Rotate

Rotation works along the same lines as the Move command, except that you specify the center of rotation, and either the rotation angle numerically or two points as the ends of an imaginary arc for the rotation angle.

9.8 Grouping / Ungrouping

You can group or ungroup shapes with the buttons in the Edit tool bar or with the commands in the right click menu, figure 5.5.

9.9 Edit Logs

jDraft maintains a log of editing sessions for each document. The log is stored within the document and contains the starting and ending times and the username of each session during which the document was changed. You can view the log by bringing up the dialogue with the **Tools/Statistics...** -menu command. A summary of total hours put into that drawing is also shown.

If you do not want to have this information recorded you can clear it on a document by document basis or disable it altogether from the **Prefererences** -dialogue.

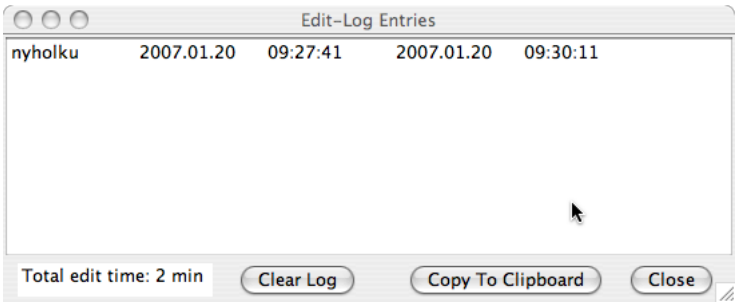


Figure 9.8: Edit Logs -dialog

Chapter 10

Drawing

10.1 Setup Coordinate System

Before you draw you probably want to set the coordinate system, or at the very least set the scale, so that you can enter and see dimensions in the real world units. Go to the Settings/Coordinate Systems... , add a new coordinate system (it is a good idea not to modify the standard Paper Coordinate system) and set the 'world' and 'paper' slices and units.

You can also set the current coordinate system using the top toolbar, figure 10.1 and setup the coordinate systems in the **Settings/Coordinate Systems...** dialogue.

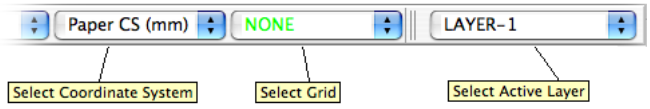


Figure 10.1: Coordinate System, Grid and Layer -controls

10.2 Select Layer

Any non-trivial engineering drawing uses layers to distinguish things like constructional aids, sketchings, dimensioning etc. by color. As you will be changing the layer frequently as you draw anyway, tear down the Layer toolbar, figure 10.2 and set up the layers and colors as necessary.

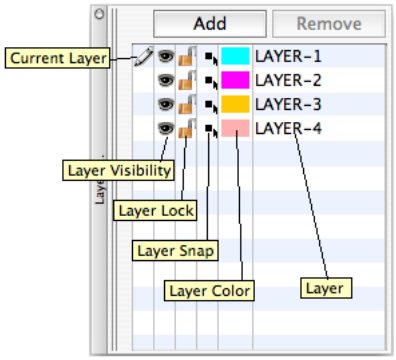


Figure 10.2: Layers -toolbar

You can also change the current layer with the top toolbar, figure 10.1 and change the layers in the **Settings/Layers...** dialogue, figure 10.3.

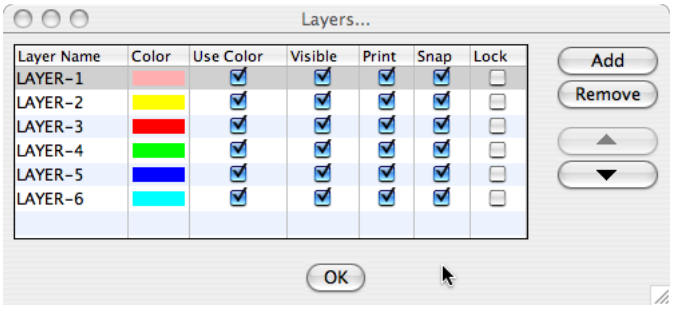


Figure 10.3: Layers -dialog

10.3 Select Grid

Most users seem to rely on a grid even if the actual drawing is done with geometric construction and dimensions, the grid seems to provide a sense of scale and comfort. You set up the grids **Settings/Grids...** dialogue and you select the grid in effect from the main toolbar, see figure 10.1.

10.4 Select Line Style

Select the line style for drawing from the top toolbar, figure 10.4, if there is a selection when you change current line style, the shapes will be changed to use that line style.

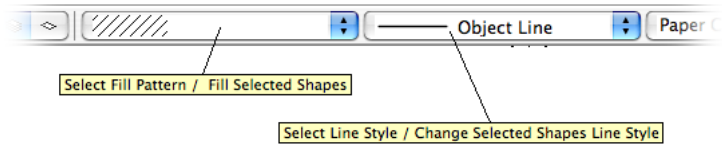


Figure 10.4: Fill and Line -controls

For quick access to four Line Styles, the line style can also be selected from the quick buttons on the 'Lines' toolbar on the left, figure 10.5 To configure these buttons, right-click the button or hold the mouse button down until the menu appears.

Figure 10.5: Lines -toolbar

To edit the Line Styles, bring up the line style editor dialogue with the **Settings/Line Styles...** -menu command.

Figure 10.6: Line Styles -dialog

10.5 Drawing Shapes

On last count there were over 150 drawing rules or commands, not counting their options, so obviously it would be as futile to list them as it would be to try to learn them. Fortunately, this is not necessary.

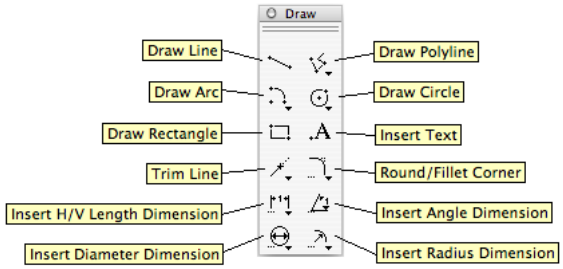


Figure 10.7: Draw -toolbar

Basically it is very simple, select the shape you want to draw and then point and click with the Snap tools. To draw a line, click on the Line tool and then click two points on the drawing area to create the line.

The real power of the user interface comes from the way it deducts what you are drawing.

Need to draw a circle with a given radius? Click the circle tool, then click on the radius entry field, type in the radius, and click the drawing to specify the center.

Need to give then center with numbers, just click and enter it in the X and Y entry fields.

Want to draw a tangent to a circle? Select the Line tool, then select the Tangent snap, click on two circles or click on a point and a circle.

The best way to get the hang of it is to try.

10.5.1 Circles -palette

10.5.2 Arcs -palette

10.5.3 Polyline / Spline -palette

Splines come in three variations, see figure 10.10. The main difference between the splines is how they pass through/near the control points. Catmull-Rom, called simply Spline, always passes through the control points, Quadratic splines pass through every other control point and Cubic splines pass through only every third control point.

To create a spline, select the Spline -tool and enter the control points. With the Options -toolbar, figure 10.12, you can select the type of spline you create. Different types of spline segments can be used in a single spline. Note that unless the number of control points 'match'

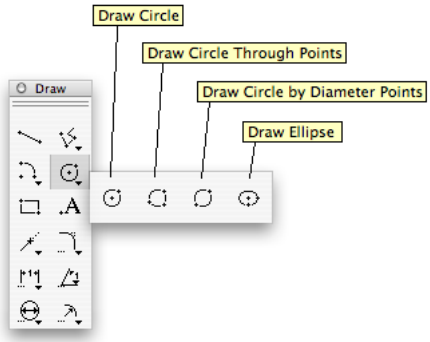


Figure 10.8: Circles -palette

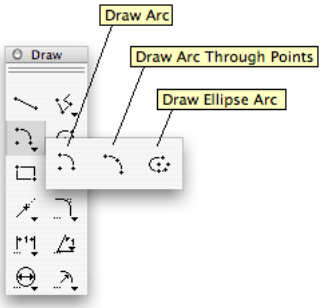


Figure 10.9: Arcs -palette

the segment type (i.e. quadratics need two points for each segment and cubic need three), the results do not look pretty.

To end a spline click on the spline toolbar button again, or press ESC key. You can also use the End Spline or Close Spline commands from the right-click menu, figure 10.13

10.6 Auto Snap

It is amazing how often drawing follows a pattern; you draw a line, snap to the line end point, snap to the circle center ad lib. You draw something else and when you come back to circle drawing, the same patterns repeats. The jDraft user interface takes advantage of this with a feature called Auto Snap. When you select a drawing tool and when you select a Snap tool, the software makes a note of that and the next time you do the Draw tool selection under similar circumstances the software clicks the Snap tool for you! If this default is wrong for your situation, just click the correct snap and the software learns that.

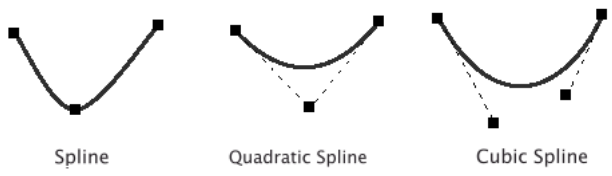


Figure 10.10: Catmull-Rom, Quadratic and Cubic Splines

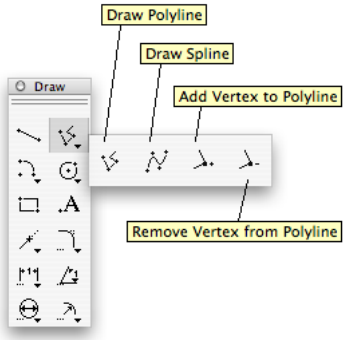


Figure 10.11: Polyline/Spline -palette

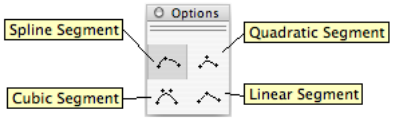


Figure 10.12: Spline Options -toolbar

10.7 Click or Drag

In the old days, before the modern mouse based user interfaces, the norm in CAD was to click twice to draw a line. Then came Apple Lisa and the public learned to point, press, drag and release to draw a line. Both systems have their advantages and disadvantages. Fortunately, jDraft users do not need to choose. You can use either way - the software automatically adjust to your gestures.

setup coordinates, scale, maybe grid, layers, select layer and select line style

10.8 Adding Text Blocks

When you select the text drawing tool and enter a point, a new text block is created and anchored on that point. A small Text Editor appears where you can edit the text, see figure 10.14. To close this dialogue, you either click on the Close symbol on the dialogue title bar, or press ENTER -key.

In engineering drawing most text is just one line of text, so the use of ENTER key to dismiss

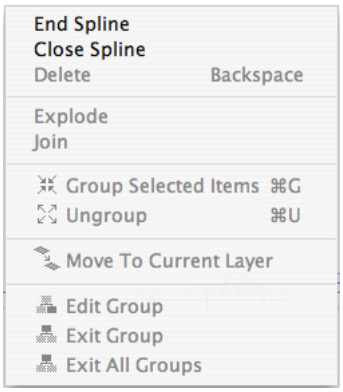


Figure 10.13: Spline Right Click -menu

the dialogue is handy. If you need to enter multiple lines in the same text block, use SHIFT-ENTER to get to the next line. If you find yourself doing multiple text line entries all the time, you can turn off the close-with-ENTER feature.

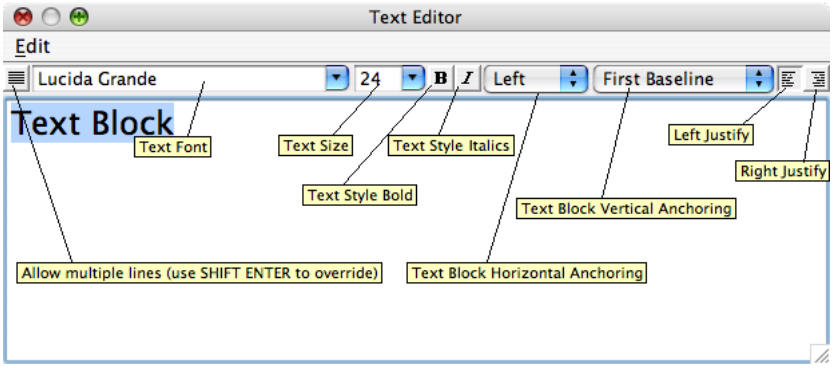


Figure 10.14: Text Editor -dialog

There are two ways to enter text, either before or after you place the text block. This can be set in the Preferences -dialogue. In the text-before-placement mode, whenever you click the Text -tool the application prompts you for text and then you can place one or more copies of that text with the mouse. In the placement-before-text mode you first select the text tool, then click to indicate the text location and the application prompts for the text.

The text is layed out relative to the anchor point, which you can set to be on the left/top, center or bottom/right in the horizontal/vertical direction. In the vertical direction, the aligment can also be on the ascender,descender or baseline of the first or last text line. For these lines, refer to figure 10.15. This makes easy to control precisely how the text block is positioned and how it will grow.

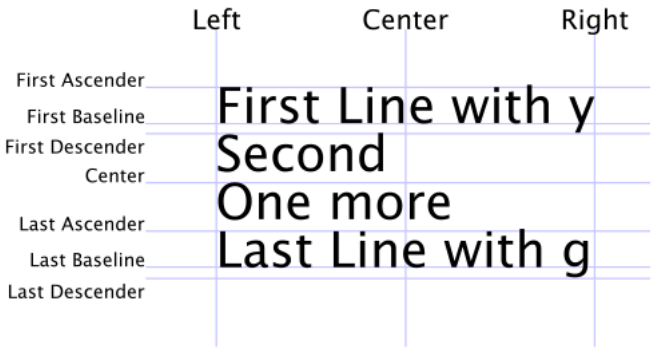


Figure 10.15: Text Block Alignment

10.9 Working With Groups

Shapes can be grouped so that they behave like a single entity. To do that, select the shapes and either click the Group Selected Shapes button or select it from the right click menu. To ungroup, use the Ungroup button/menu item. It is possible to work inside or within a group, modifying the group without first ungrouping it. To do that, select a group and click the Work In Group button or simply double-click the group.

When you are working inside a group, all shapes that are not part of the group are displayed as gray. When working within group all shapes you draw will be added to the group.

To exit the group, select Exit Group from the right click menu or double-click on 'nothing'.

Chapter 11

Advanced Editing

11.1 Explode

You find this command from the right click menu, figure 5.5.

Sometimes you need to do some drawing operation that jDraft does not support. In general, the support for all drawing operations is orthogonal so that everything works with/on anything. A notable exception is spline curves. Figure 11.4 shows an example of exploding a Spline.

Although you can snap to the intersection of splines you cannot cut or split the line at that intersection. Instead you need to turn the spline into a polyline with the Explode command from the right click menu.

All items, except Text Blocks and Filled Areas can be 'exploded'.

Note that there is no 'un-explode' command so you cannot turn a polyline into a spline. You can, though, 'Join' line segments to create a single polyline.

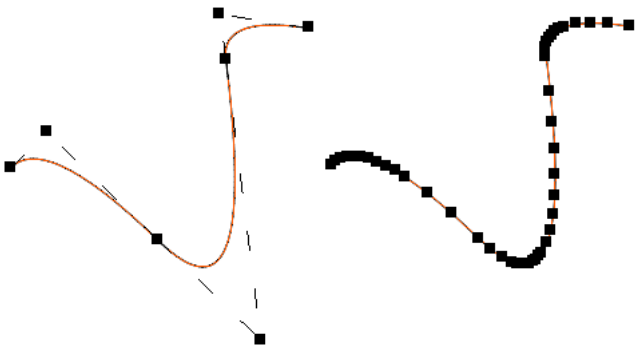


Figure 11.1: Exploding a Spline

11.2 Move To Current Layer

You find this command from the right click menu, figure 5.5.

This command moves all selected shapes to the current layer.

11.3 Polyline / Spline editing

You can add / remove points to/from polylines and splines with the Add Vertex / Remove Vertex tools. Just point and click on the polyline to add/remove vertexes. Figure 11.2 shows the spline tools palette.

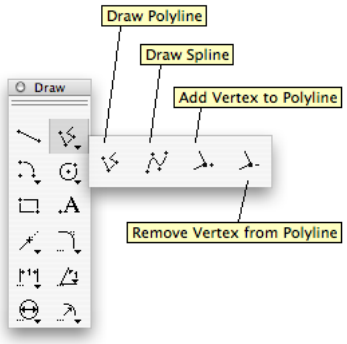


Figure 11.2: The Spline and Polyline -tools

11.4 Spliting/Trimming

Very often in techical drawings, which is not simply a drawing process but a design process as well, the need to trim away excess length of a line or split a line at the intersection of another line, arises. Figure 11.4 shows an example of trimming. To trim a line, select the Trim tool, first point at the line segment to be removed and then the intersecting shape. The line segment to be removed will be indicated by X-marks at the ends.

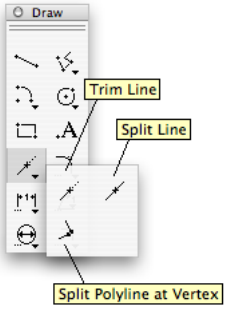


Figure 11.3: Trim and Split -palette

Splitting is analogous to trimming - if the excess is not removed, the shape is simply split at the intersection. Lines, arcs and circles can be trimmed/split. Polylines can also be split at a vertex with the Split Polyline at Vertex-tool, which is preferable to the split tool, which would in a situation like that generate a very short line segment.

11.5 Chamfering / Filleting

Typical turned or machined parts exhibit chamfering of edges as illustrated in figure **??**.

These are added at the end of design phase, i.e. the part is first drawn without these features and the chamfering added.

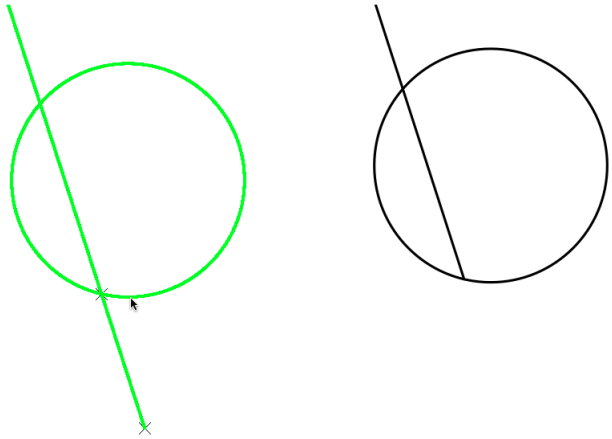


Figure 11.4: Trimming a Line

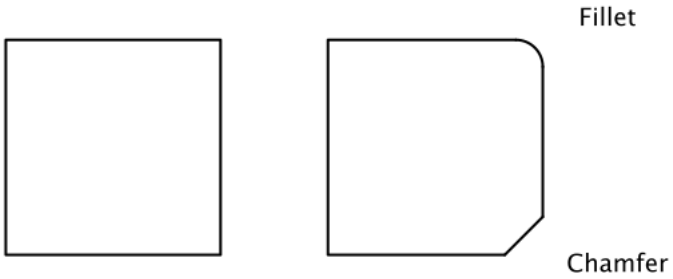


Figure 11.5: Fillets and Chamfers

Figure 11.7 shows the Filleting Parameters -dialogue, which contains also the chambering parameters. To chamfer, set the chamfer size and method in the chamfer dialogue and then pick two line at a corner to chamfer. Chamfering adds a line and trims the two lines. It is also possible to setup the tool to not trim the line, which can be handy at times.

Filleting is analogous to filleting, except that a semi circle / arc is used to 'round up' the corner.

11.6 Resizing and Mirroring

The Resize / Mirror -palette provides commands to resize and mirror selected shapes. The Resize command always transforms the selected shapes, whereas the Mirror commands create transformed copies.

To Resize shapes, first select the shapes to be resized, then click on the Resize tool, pick a line and numerically enter a new length for that line.

To Mirror shapes, first select the shapes to be mirrored, then click either the Point Mirror or Line Mirror tool and then enter a point or pick a line to mirror against.

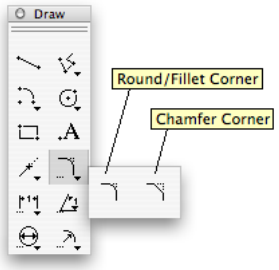


Figure 11.6: Fillet and Chamfer -palette

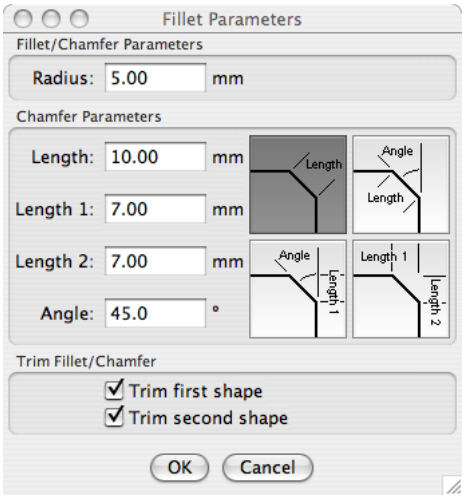


Figure 11.7: Fillet Parameters -dialog

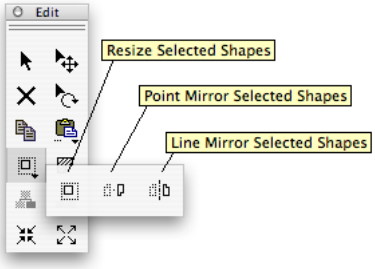


Figure 11.8: Resize / Mirror -palette

Chapter 12

Dimensioning

Dimensioning has a huge number of options to control how the dimensioning is positioned and to control the visual appearance, tolerancing and method of dimensioning. Figure 12.1 shows the Dimensioning Parameters -dialogue.

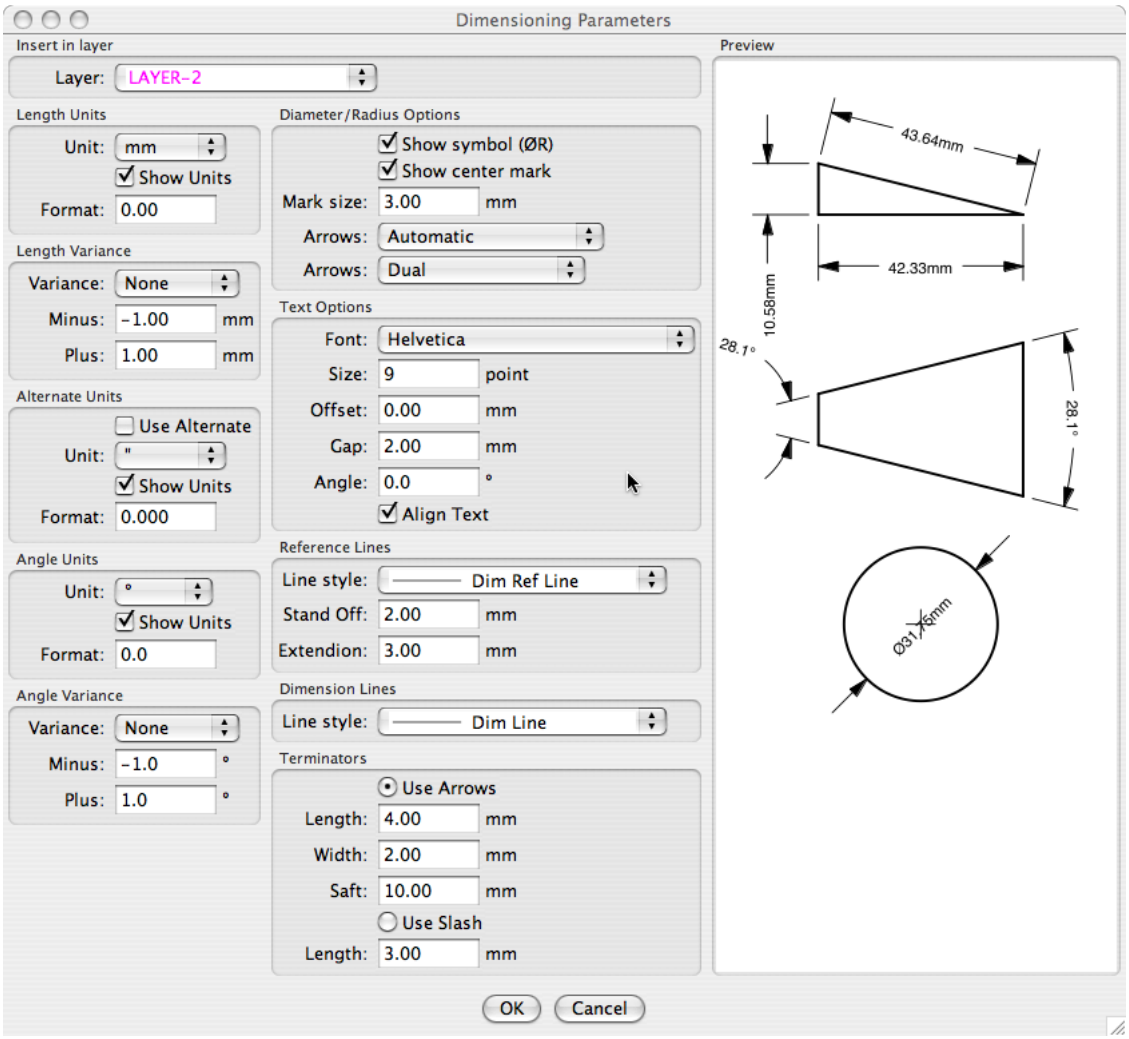


Figure 12.1: Dimensioning Parameters -dialog

Dimensioning is not 'associative', i.e. once the dimension is created it will not change. If the part you are drawing changes you need to re-dimension. Fortunately this is quick and easy.

Most dimensioning commands accept that you either pick a shape to dimension or indicate

two points from which the dimension is calculated. For example, you can point on a line to dimension it or click at the two end points.

With the Coordinate Dimension -tool you first enter two points to indicate an axis where the dimensions are created, and then one or more measurement points to create coordinates along that line/axis, for an example see figure 12.3.

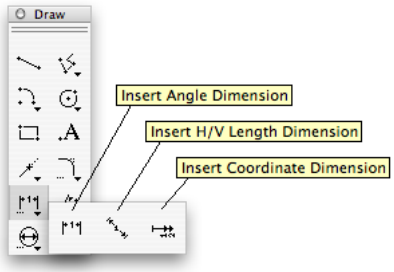


Figure 12.2: Orthogonal Dimensioning -palette

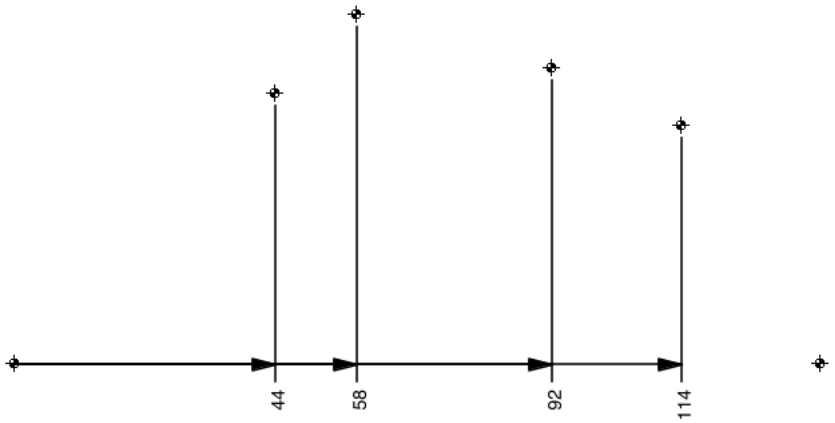


Figure 12.3: Coordinate Dimensioning Example

Diameter and radius dimensioning come in two varieties for axis on and side view projection dimensioning.

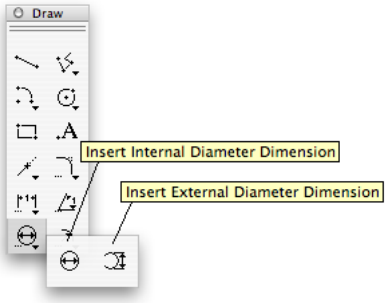


Figure 12.4: Diameter Dimensioning -palette

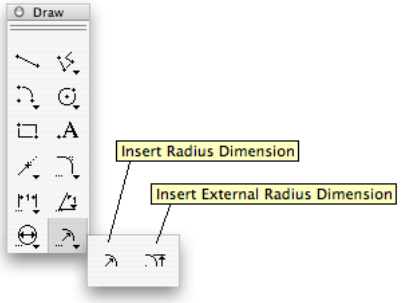


Figure 12.5: Radius Dimensioning -palette

Chapter 13

Printing

Considering that printing should be nothing but committing on paper what has been electronically drafted, it requires quite many options. You set most of these in the **File/Print Setup** -dialogue, see figure 13.1. Most of the options stem from the special needs of engineering, notably the from the way colors are used and the required large size of drawings.

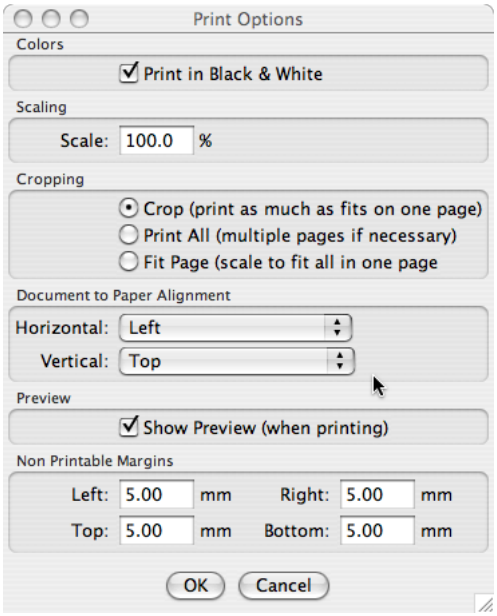


Figure 13.1: Orthogonal Dimensioning -palette

13.0.1 Black/White Printing

Most offices do not have color printers and if they do they are A3 in size at most, typically only A4. In engineering drawing, colors are usually used to aid the design/drafting process. The desired output from engineering is in any drawing essentially colorless as there is the additional requirement of being able to copy the drawings, a process which typically still is monochromatic in large sizes, although we have moved away from blueprints. Although most modern printers can print color images producing gray scale output, this is not satisfactory. That is why jDraft has the option to force the output to black/white, forcing everthing that is not white to black.

13.0.2 Cropping

In an ideal world, the physical medium a.k.a. paper matches the size of the electronic drawing and the ideal printer can print all up to the edges of paper. In reality this is rarely the case and

some adjustements are necessary. jDraft offers three basic options:

- Fit Page
- Crop
- Print All

The Fit Page option simply scales the drawing to fit the printable area (see below for the more on printable area). With this option the Scale setting is obviously ignored.

The Crop option prints as much as fits on a single page in the requested Scale. Print All prints everything inside the printable area of the drawing (this is not the printable area of the printer) at the requested scale.

13.0.3 Printable Area/Paper Margings /Non Printable Margins

There are two printable areas: the printable area of the printer and the printable area of the document.

The printable area of the printer is a physical (or driver) limitation of the printer and means the area which is the physical paper size minus the margins. Note that these margins come from, and are set in, the 'File/Print...' -dialog in the Page Set -tab.

(Most printers seem to set these at 1 = 25.4 mm by default, which is usually unnecessarily conservative. Most printers can print close to within 0.25 = 6 mm from the paper egde. The only way to find out is to experiment. Note that this is also a driver issue and, depending on the driver, it may not be possible squeeze out everything from the printer hardware.)

The printable area of the document is the drawing size as set in the Settings/Document Size... -dialogue minus the Non Printable Margins set in the File/Print Setup... -dialogue.

13.0.4 Document to Paper Alignment

Except when using Fit Page option, the question of how the drawing and the physical paper are aligned arises. The alignment determines what gets cropped or where the page breaks are placed.

Selecting left/top aligns the left/top edges of the physical paper and the drawing and the cropping and page breaks are worked starting from that.

13.0.5 Scaling

Scaling can be used to scale the drawing if the Fit Page option is not selected.

13.1 Paper Setup Revealed

The easiest way is to take advantage of the Preview option, figure 13.2 and experiment with different options.

However here are some guidelines.

If you print with Fit Page, your only worry is that the scale is not right. If you are lucky, the printable area of your printer is larger than the printable area of your drawing and everything gets printed and printed in the right scale. You only need to care about the aligment, that is, if you care about it.

For a document size that (closely) matches the printer's physical size, cropping is often an easy option, just try to minimize the paper margins. There will be some cropping on the edges but often this is of no importance. Your only worry is the alignment.

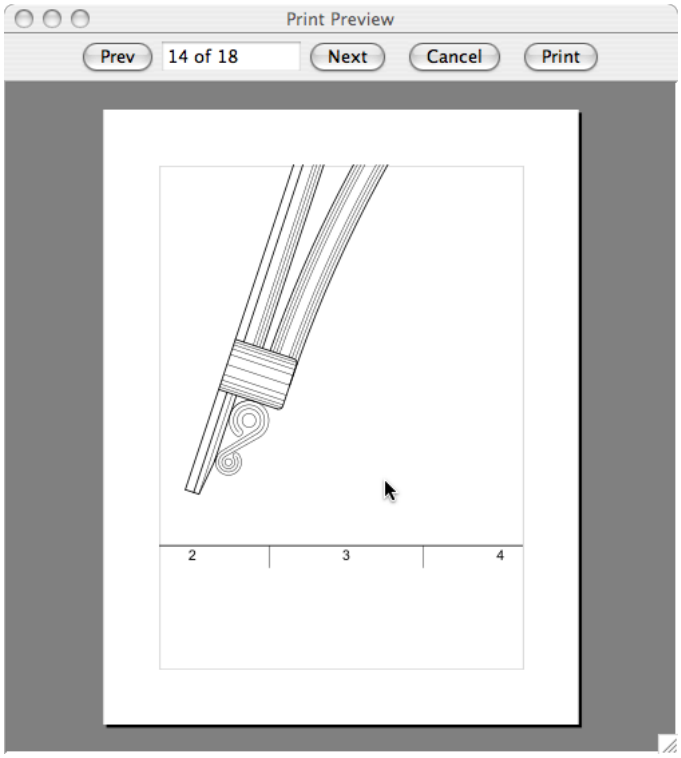


Figure 13.2: Priview -dialog

The most complex case is when you have to make-do with the printer that is way too small for your drawings and you need to print in correct scale. Figure 13.3 illustrates what happens then.

This is where the Print All and Non Printable Margins come into picture. Say your drawing is A2 (landscape) but you only have A4 printer. In principle A2 is four times A4 size. So you would like to print your drawing as four pages.

A4 is 297 mm x 210 mm (width x height, landscape) in size. Say you have found out (by experimenting) that you can print up to within 5 mm from the edges. So the printable area of your printer is 287 mm x 200 mm . The size of A2 is 594 mm x 420 mm. So you need to set the non printable margins as 594 - 2 * 287 = 20 mm, so you set the Non Printable Margins on left and right at 10 mm. On the vertical direction the math is 420 - 2 x 200 = 20 mm as well, so you set the top and bottom at 10mm . This, of course, leaves everything in the 10 mm wide border area of the drawing unprinted. If that is not acceptable, you need to set smaller Non Printable Margins and accept that over 9 pages are outout for this sample case, or get a bigger printer.

13.2 Print Selection

jDraft supports printing only the selected shapes, which can used for example to print out selected features of parts for design verification or workshop usage.

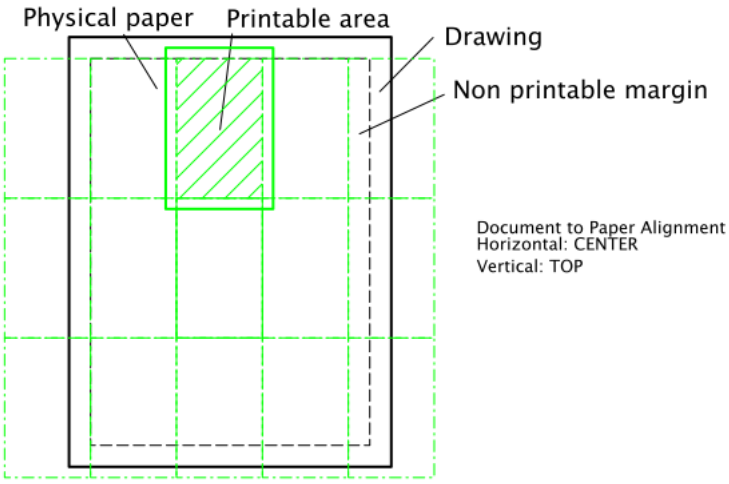


Figure 13.3: Print All On Multiple Papers

Chapter 14

Import / Export

jDraft supports importing and exporting drawings created with other CAD applications in DXF format.

The very nature of DXF format makes it less than perfect for transferring data between applications. Nevetherless it is the most popular 2D CAD format and industry standard.

Without going in to the details too deeply, here are the main issues with DXF as they far as they affect jDraft, especially the importing.

DXF is text based This slows down reading and writing DXF files, althoug at +2GHz machines this is rarely a problem. What may be a problem is that, being text based, numbers are typically represented with a limited number of digits, thus reducing the accuracy. This is controlled by the exporting application and is most likely adjustable, but going from the typical 6 digit accuracy to the jDraft 16 digit accuracy could more than double the already bloated file sizes. In practice this means that DXF files have less precision than the actual CAD model/file from which it is created.

An other key obstacle is that DXF files are basically unitless, in other words some of the features are very AutoCAD specific, meaning that there cannot be one to one transfers of all aspects of a drawing unless the receiving application uses exactly the same data model and rendering method. This rarely is the case. There are numerous smaller problems, but at the end of the day it's important to understand that DXF does not allow transfer of drawings with 100

It is also important to understand that the same issues plague export as well as import, but not symmetrically. Indeed the process of DXF import and export are notably unsymmertrical meaning that importing and exporting a drawing does not produce exactly the same DXF file nor will exporting and importing in DXF format produce exactly the same drawing.

DXF is scale/unit less There is no reliable way to find out the scale and units used in the DXF file. The DXF import function takes the scale and unit from the current coordinate system, so it is important to set it up properly before importing the file. Typically, DXF files are either mm based or inch based with 1 : 1 scale so typically it is enough to use one of the built-in default coordinate systems.

DFX has no concept of line widths Lines, arcs, circles etc. have a line style which defines the hatch pattern and and a color which in the old days was a reference to the pen plotter pen number, which in turn defined the line width, depending on which pen was loaded into the plotter.

So DXF import has little choice but to use a fixed width. By default, each line style has a width of 1/72 of an inch right after import. You can then edit them. The DXF format has no concept of fonts.

DXF has no concept of fonts Text in DXF files is in an ancient pen plotter font that has no correspondence in the modern font technology. jDraft circumvents this by scaling a 12 point Helvetica font as it best can. The result is not perfect, but it provides a visually reasonable result.

Having said the above, it is worth mentioning that jDraft does a reasonable job in importing DXF files. Exporting is slightly more limited.

14.1 DXF Import

DXF import is easy to use, just select 'Tools/Import DXF...' and pick a file to import. One important thing to do before that is to ensure that the Scale and Paper Unit settings of the current coordinate system match those used in creating the DXF file.

14.2 DXF Export

The DXF Export is an almost identical procedure, just select 'Tools/Export DXF...' and give the exported file a name. Here, again, it is necessary to ensure that the Scale and Paper Unit settings of the current coordinate system are correct so that they result in the desired scale and units for the outputted DXF values.

Chapter 15

Shortcuts

15.1 Configuring Shortcuts

jDraft has been designed from ground up to be used with a mouse. Most actions can be performed with a single mouse button and if/when the second mouse button is required (on Mac OS) it can be effected by holding the CTRL key down while clicking. The mouse should be regarded as the primary input device for jDraft.

However, a large number of keyboard shortcuts have been introduced to enable power users to enhance their productivity by taking advantage of the free hand.

Most, but not all, shortcuts can be configured in the Shortcuts -dialogue, 15.1, which you bring up with the **Settings/Shortcuts...** -menu command. Table 15.2.14 lists the shortcuts and shows their default key bindings.

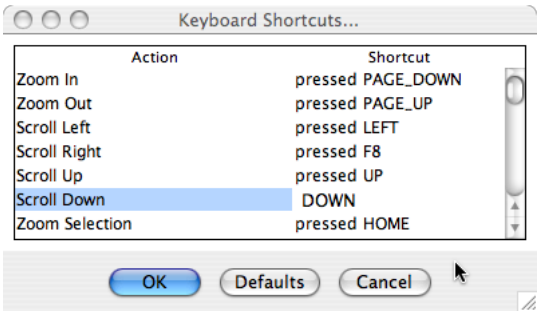


Figure 15.1: Shortcuts -dialog

To configure a shortcut, click on the shortcut key name on the Shortcuts -dialogue to bring up the shortcut capture dialogue, figure 15.2, and hit the key you want to use for that action.

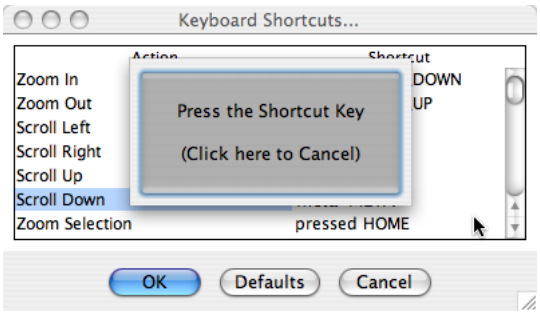


Figure 15.2: Change Shortcut -dialog

15.2 Shortcuts

15.2.1 Temporary Snap Modes

Shortcuts that activate one of the Snap -tools, work in two modes. A short press is equivalent to clicking the associated Snap -button. Holding down the key will temporarily activate the Snap mode, but only as long as the key is held down, after which the original Snap mode is resumed.

15.2.2 Double Clicking

Double clicking a toolbar button will bring up the associated parameters dialog, if any.

Double clicking a group will 'enter' that group making it the current group and enabling working inside the group so that all changes and additions affect that group.

Double clicking 'nothing' exits all groups.

Double clicking a Text Block brings up the text editor.

15.2.3 ESC -key

Hitting the ESC key once resets the current tool. This is most useful with the spline / polyline drawing tools as a way of terminating the the current polyline. Pressing ESC once is equivalent to clicking the tool button once.

Hitting the ESC key twice rapidly toggles between the Select -command and whatever drawing command is in effect.

15.2.4 TAB -key

Pressing the TAB -key repeatedly will cycle through all the possible pick combinations. Use this to sort out a situation where the application picks the wrong shape(s).

15.2.5 ALT -key

Holding the ALT -key down while starting a drag creates a copy of the selected shapes.

15.2.6 SHIFT -key

Holding down the SHIFT -key forces the point being entered to be on the same horizontal or vertical line as the Last Point.

15.2.7 CTRL -key

Clicking a handle will initiate a stretch operation. Holding the CTRL key down while clicking on the handle will initiate a move operation with that handle as the reference starting position.

15.2.8 Dragging in Grid

Dragging a Shape from its outline with the Grid -snap tool selected will move the selected shapes an integral number of grid units, thus maintaining their relative 'lock' position to the grid.

15.2.9 Cursor Keys

Pressing the cursor control keys will 'nudge' the selected shapes by one grid unit in the direction of the arrow. Up/down and left/right are interpreted as in a left handed coordinate system aligned with the active grid.

15.2.10 SPACE -key

Pressing the Space -key will toggle the first option in the Options -toolbar.

15.2.11 Activating a Numeric Entry Field

Pressing the key displayed in Capitals infront of a numeric entry field is equivalent to clicking in that entry field to move the keyboard focus to that window.

15.2.12 M -key

The M key activates the Move command.

15.2.13 R -key

The R key activates the Rotate command.

15.2.14 R -key

The Z toggles between the current drawing command and the zoom command.

Function	Key	Note
Zoom In	PAGE DOWN	
Zoom Out	PAGE UP	
Scroll Left	LEFT	
Scroll Right	RIGHT	
Scroll Up	UP	
Scroll Down	DOWN	
Nudge Left	LEFT	
Nudge Right	RIGHT	
Nudge Up	UP	
Nudge Down	DOWN	
Zoom Selection	HOME	
Zoom 100		
Move	M	
Rotate	R	
Undo View Change		
Redo View Change		
No Snap	S	
Snap End	V	
Snap Reference	W	
Snap Grid	G	
Snap Intersection	I	
Snap Virtual Intersection		
Snap Center	C	
Snap To Tanget	T	
Snap Parallel	U	
Snap Extends To	E	
Snap Orthogonal	O	
Pick Shape P		
Center View at Mouse	Q	
Undo	Z	CTRL
Redo	Y	CTRL
Move	M	CTRL
Rotate	R	CTRL
Open	O	CTRL
New	N	CTRL
Save	S	CTRL
Copy	C	CTRL
Paste	V	CTRL
Cut	X	CTRL
Delete	BACK SPACE, DELETE	
Print	P	CTRL
Cycle Windows	¡	CTRL

Table 15.1: Keyboard Shortcuts

Chapter 16

Appendix A

On each launch, jDraft ensures that a small number of files that require less than 1 MB disk space, exist. If they do not exist, jDraft will silently create them.

This appendix details the files.

All the files are created inside a single directory called '.jDraft' in the user home directory. Note that on Unix-like operating system (which is practically everything else but Windows) this file is invisible, because the name starts with a dot.

The user home directory varies from operating system to operating system and on real Unix/Linux machines it can even vary between installations. The home directory has the same name as your login username.

Common places for the home directory (using user login name 'johndoe') are:

```
MacOS /Users/johndoe
Linux /home/johndoe
Windows C:\\Documents and Settings\\johndoe
```

jDraft installs into directory:

```
/Users/johndoe
```

the following files:

```
jDraft-app.png
jDraft-doc-dft.ico
jDraft-doc-dft.png
jDraft-doc-jdwg.ico
jDraft-doc-jdwg.png
jDraft.config
jDraft.desktop
jDraft.patterns
jDraft.xml
```

Note that not all of the above are installed on all operating systems and not all of them during the launch, some are created during file association registration.
In addition, these two directories are created:

```
/plugins
/templates
```

Of most interest to the typical user are the following:
'jDraft.config' contains the user settings / application preferences
'jDraft.patterns' contains all the hatch/fill patterns.
'/plugins' contains all plugin components
'/templates' contains all the drawing template-drawings

Chapter 17

License Agreement Version 1.0 for the jDraft Shareware Application

17.1 License Agreement Version 1.0 for the jDraft Shareware Application

THIS JDRAFT SHAREWARE SOFTWARE LICENSE AGREEMENT VERSION 1.0 ("Agreement") is made by and between Kustaa Nyholm ("I"), a Finnish citizen , operating from Siuntio Finland and any person or legal entity using or accepting any software governed by this Agreement ("You/Your"). This Agreement shall be effective on the first day You use or accept software ("The Software") governed by this Agreement, whichever is earlier. THE PARTIES AGREE as follows:

1. Versions There may exist different version of both this Agreement and The Software. Different versions of The Software may be subject to (licensed under) different version of The Agreement. The Software includes a reference to the applicable version(s) of The Agreement. I may make an essentially similar version of The Software available under different agreement(s).

2.Registration The Software is distributed Un-Registered. To use the software after the evaluation period, the software needs to be registered. Registration is effected with a personal registration key that you may not redistribute or make available to third parties.

3 Grant I grant You a personal, nonexclusive, nontransferable, and perpetual license to use The Software subject to the terms and conditions of The Agreement: You can install and use for commercial and/or non-commercial purposes The Software on any number of computers provided that the use is personal and is NOT concurrent/simultaneous. You can make backup copies of The Registered/Un-Registered Software. You may distribute Un-Registered copies of The Software. You understand and accept that the Un-Registered copies may have limited or crippled functionality to urge You to register The Software and pay the registration fee / purchase price, including applicable taxes. You understand and accept that the Un-Registered copies of The Software may be time limited, in which case any data/information/work created with or by the software during the evaluation period with an Un-Registered copy of The Software and saved in a proprietary format may not be usable without a Registered copy of The Software, after the evaluation period has expired. You understand and accept that to discourage distribution of Registered copies of The Software registered copies of The Software will contain and display such personal information as You are willing to submit for that purpose and I am willing to accept, such as Your real name. You may not in any way modify The Software or registration information stored separately, including but not limited to modifications that make ineffective

or useless the afore mentioned measures to urge registration of The Software. You may not reverse engineer, disassemble, decompile or inspect the executable code of The Software, except to the extent allowed under applicable Copyright laws/agreements to ensure compatibility. You may not distribute or make available Registered copies of The Software You agree to exercise reasonable care to prevent third parties from copying / distributing versions of The Software Registered to You.

4 Termination The Agreement is automatically and immediately terminated if You fail to comply with terms of The Agreement. All Your rights to The Software are based on The Agreement and thus violation of The Agreement will result in losing Your rights, including but not limited to use of The Software.

5 Limitation of Liability I will have no liability for special, incidental or consequential damages even if advised of the possibility of such damages, including but not limited to patent, copyright and/or other intellectual property right issues. I will not be liable for any other damages or loss in any way connected with The Software.

6 Warranties, Refundabilety The Software is licenced as Shareware (try-before-you-buy), so I make no warranties at all. In general, as You can try-before-you-buy and can thus evaluate The Software, no refunds will be available. In any case, refunds will be limited to the purchase price. The use of The Software is granted to You on an asis basis. You use The Software at Your own peril. You assume all risk of loss for all claims or controversies, now existing or hereafter, arising out of use of The Software. I shall have no liability based on a claim that Your use or combination of The Software with products or data not supplied by me infringes any patent, copyright, or proprietary right. All other warranties, expressed or implied, including, without limitation, any warranty of merchantability or fitness for a particular purpose are hereby excluded.

7 Indemnity, Intellectual Property You undertake to indemnify Me against copyright and/or intellectual property claims that arise from the use of The Software. You agree to chease the use of The Software and destroy all copies of The Software if I advise you of a creditable third party copyright or patent claim.

8 Copyright, Intellectual Property I retain full copyright and any other intellectual property rights I may have. It is not the intention of this agreement to give away or license any copyright or intellectual property.

9 Taxes and Duties You shall pay or reimburse me for federal, state, provincial, local or other tariffs, duties and taxes not based on our net income, including all taxes, tariffs, duties, or amounts levied in lieu thereof, based on charges payable under this Agreement or based on The Software, its use or any services performed hereunder, whether such tariffs, duties or taxes are now or hereafter imposed under the authority of any federal, state, provincial, local or other jurisdiction.

10 Entire Agreement, Amendments This Agreement represents the complete and exclusive statement of The Agreements between the parties relating to the licensing of The Software and maintenance of The Software and supersedes all prior Agreements and representations between them relating to such licensing. Modifications to this Agreement shall not be effective unless in writing and signed by the party against whom enforcement is sought. The terms of this Agreement shall not be amended or changed by any purchase order or acknowledgment, even if I have signed such documents.

11 Finnish Law, Severability This Agreement will be governed by Finnish law. If any provision of this Agreement shall be unlawful, void, or for any reason unenforceable, it shall be deemed severable from and shall in no way affect the validity or enforceability of the remaining provisions of this Agreement.

12 Force Majeure It is herein agreed that neither party to this Agreement shall be liable for delays for failures in performance resulting from acts beyond the control of such party. Such acts include, without limitation, acts of God, strikes, lockouts, riots, acts of war, epidemics, governmental regulations superimposed after the fact, fire, power failures, earthquakes or other disasters.