

FX Draw 3 Advanced

The Mathematics Teacher's Drawing Program

FX Draw 3 Advanced

User's Guide

by Efofex Software

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FX Draw 3 Advanced

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1 Rotating & Reflecting

FX Draw 3 allows you to rotate and reflect images.

You can rotate using the keyboard or toolbars. You can reflect using the reflection toolbar.



To use these tools, select the figures you wish to rotate or reflect and then choose the appropriate action.

The reflection buttons are self-evident. The rotation buttons allow you to rotate images in 1 or 15 degree increments.

You can also rotate figures using the keyboard.

15 degrees	Clockwise	Ctrl + PageDown
1 degree	Clockwise	Ctrl + Shift + PageDown
15 degrees	Counter-Clockwise	Ctrl + PageUp
1 degree	Counter-Clockwise	Ctrl + Shift + PageDown

Most figures rotate or reflect as you would expect. Some complex figures (eg graphs) do NOT reflect or rotate. If you rotate a selection of figures that include a graph, the figures will rotate and the graph will move to maintain its RELATIVE position in the group but the image will NOT rotate.

Text boxes CAN be rotated but often this is not what you really want to happen. You can turn text rotation on or off in the Text Properties screen. If rotation is OFF, the text will move to maintain its relative position in the group but will not be rotated.

Equations cannot be rotated.

2 A GAD Trick

You may have wondered how FX Draw chooses which geometrically interesting point to jump to. The actual process is quite complex but in essence, each point is given a “mass” based on “importance” (for example, the middle of a line is considered more “important” than the point one third along the line). FX Draw then calculates an “attraction” in much the same way as gravity –attraction is based on mass divided by the square of the distance. The most “attractive” point wins.

Sometimes this system can cause a few problems when there are a lot of geometrically interesting points around. A very important point may not win the attractiveness competition because you are so near another, less important point.

The practical impact of this is that sometimes you can find the important point

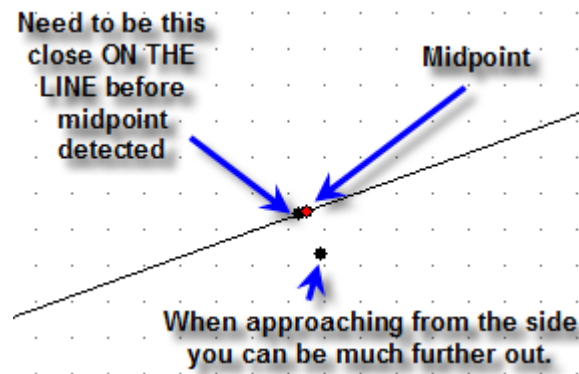
you want BY MOVING SLIGHTLY AWAY FROM IT.

As a simple example, draw a line.

First, try to get the midpoint of the line by moving the mouse as accurately as you can ALONG the line. In other words keep the mouse cursor ON the line while you are trying to find the midpoint.

You should find that there is a relatively small range where FX Draw will find the mid point. Most of the time it will report that it has found a Point on the Figure. Points on Figures are much less “important” than midpoints BUT because you are very close to the figure, they become very attractive.

Now approach the midpoint of the line from the side (perpendicularly). You should find that FX Draw finds the midpoint a LOT further out.



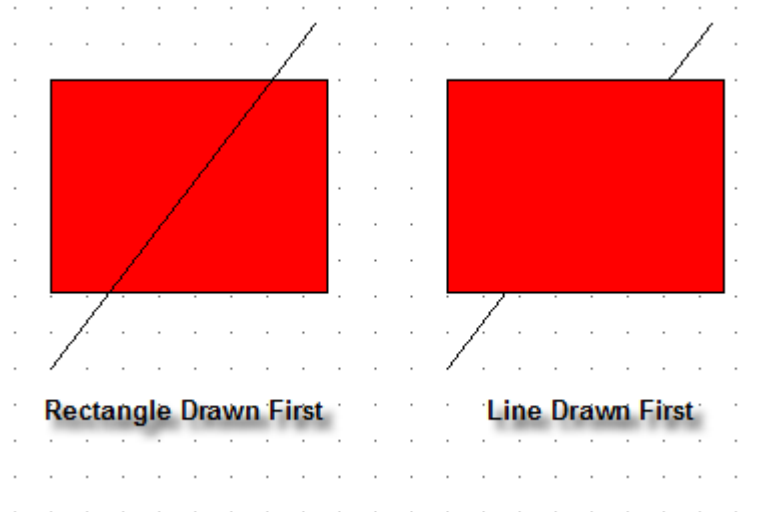
3 Drawing Order

As you create a diagram, FX Draw remembers the order that you drew the figures in. When it draws your diagram, it will draw each individual figure in the same order as you created it in.

Most of the time the order does not matter. It DOES matter when a figure has been filled.

Try drawing a line and then a filled rectangle that covers part of the line. The line should “disappear” under the rectangle.

Now draw a filled rectangle and then a line that crosses over the rectangle. The line will be visible on top of the rectangle.



Different drawing orders can dramatically change how your diagram looks. FX Draw allows you to change the drawing order of your figures.

The Drawing Order toolbar lets you change the drawing order of figures in your diagram.



The first button moves the currently selected figure to the front of your image. It makes the selected figure the LAST thing drawn.

The second button moves the currently selected figure to the back of your image. It makes the selected figure the FIRST thing drawn (and hence the most likely thing to be covered up later).

The third button moves the selected figure one level towards the front of the image.

The fourth button moves the selected figure one level towards the back of your image.

Using these four buttons you can exert a large amount of control over how your diagram is drawn.

4 Maintaining The Aspect Ratio of a Gallery Image

Whenever you select a gallery image to draw, FX Draw will place the image into the rectangle you sketch out. Sometimes this is not appropriate.

Some diagrams rely on a particular aspect ratio (height compared to width) so that they appear correctly – an example is the pulley diagrams in Dr Mark Dabb's gallery available on our website.

Holding down the SHIFT key while drawing your gallery image forces FX Draw to use the same aspect ratio as the original creator of the image. You can force FX

Draw to draw it as the diagram's creator intended.

5 Exporting Images

The most common way of getting images out of FX Draw 3 is to use the Word integration. The advantage of this method is that you can double-click on your image and edit it at a later date.

BUT...

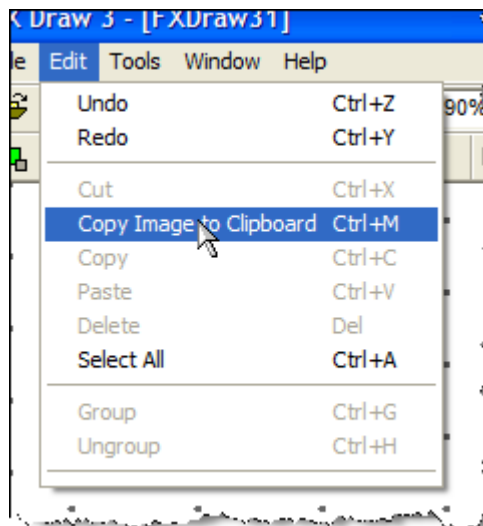
Word Integration uses some outdated technology that Microsoft has abandoned and is being progressively abandoned by graphical software companies. Problems with the technology are discussed in a later lesson.

So what are your other options?

Copy and Paste

FX Draw 3 supports a way to copy and paste into external programs but it is not normal copy and paste. A normal copy operation in FX Draw places a copy of your figures onto the clipboard but it uses a special internal format that only FX Draw 3 understands. If you try to paste this into an external program you will get nothing.

FX Draw 3 CAN add your figures to the clipboard in a format useful to external programs. Draw your image and either press Ctrl+M or choose Copy Image to Clipboard from the Edit menu.



Now switch to the external program and choose Paste.

IMPORTANT NOTE

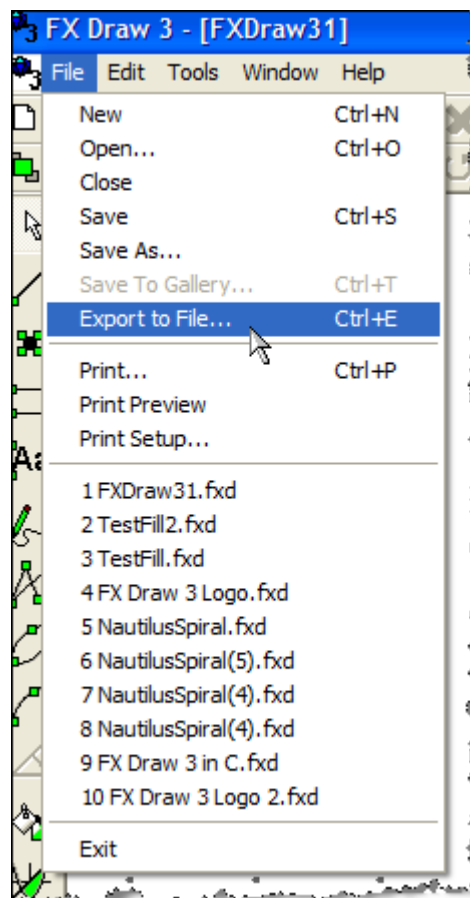
Copying and Pasting is a **ONE WAY STREET**. Once the image has been placed into the external program, it cannot be edited by FX Draw.

Technical Note (most users can ignore this section)

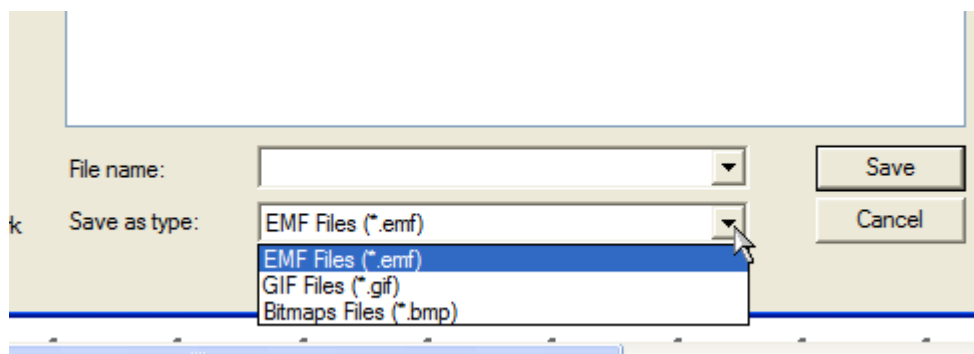
The image is placed on the clipboard as an enhanced metafile. This maintains the high quality images you expect from FX Draw. The decision to not include an EMF rendering on the clipboard during a normal copy operation was deliberate. Producing the EMF can be computationally intensive and produces some unwelcome visual artifacts when zoom is not 100%. These reasons have prompted us to remove EMF production from normal copy operations.

Export a File

FX Draw can also export images to files in a variety of formats. Draw your image and then either type Ctrl + E or choose Export to File from the File menu.



FX Draw can export to 3 file types, Enhanced Metafile (EMF), Graphics Interchange Format (GIF) and Bitmap (BMP).



EMF	High quality vector format useful for publishing purposes.
GIF	Compressed bitmap format useful for web images.
BMP	Uncompressed bitmap format that should only be used as a last resort.

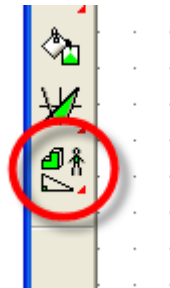
Why No JPG?

JPG is a great way to compress bitmaps but it uses a method that is designed for photographs and is unsuitable for the type of graphics FX Draw produces. Lines in FX Draw graphics saved as a JPG file would have a little "halo" of miscoloured dots around the line. Because it is not appropriate, we do not provide it.

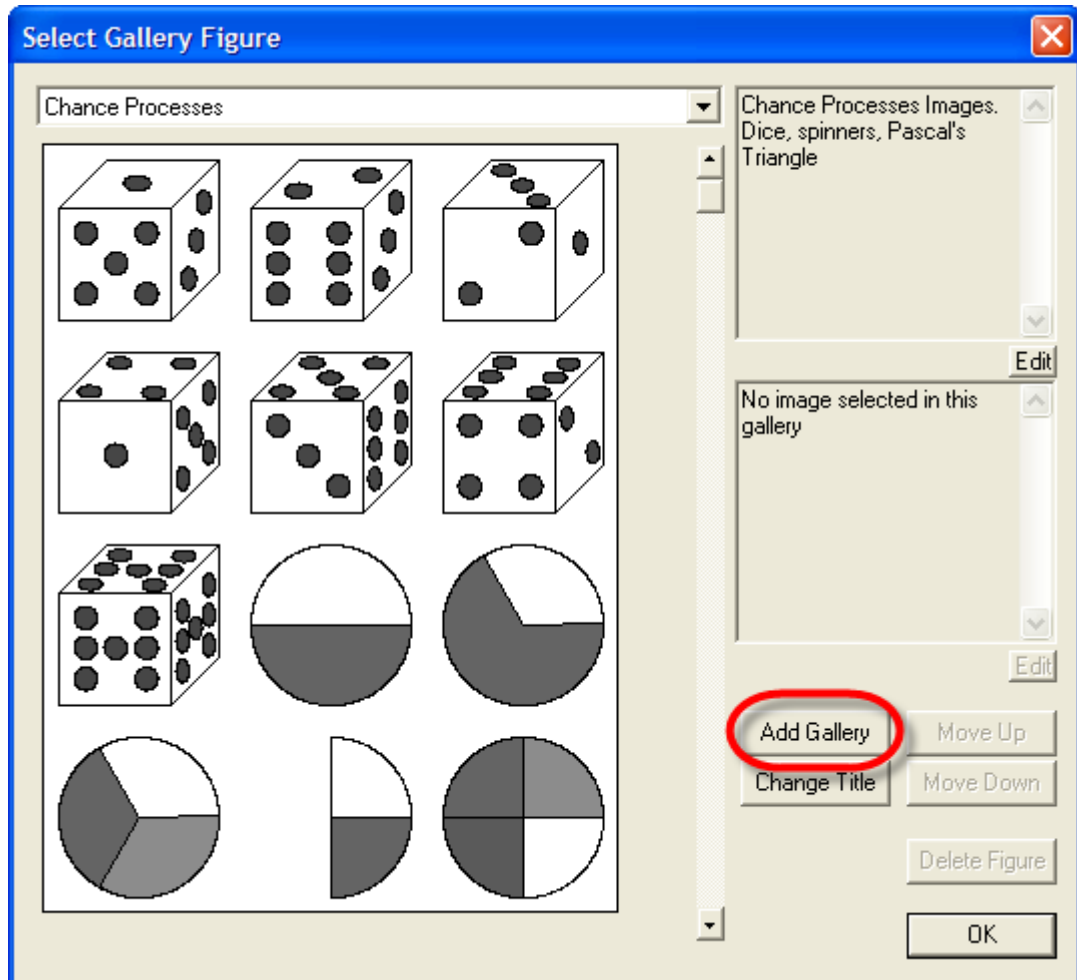
6 Creating Your Own Gallery (or Modifying Ours)

Galleries are easy to create and we are always looking for new galleries from people just like you.

First, create an empty gallery to hold your images. Push the gallery library button



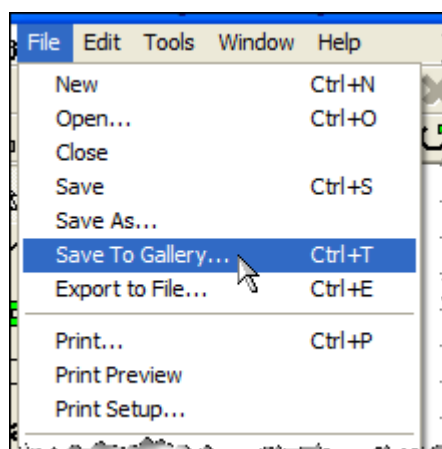
and then the Add Gallery button. Give the gallery a title and push OK.



Now start drawing your masterpieces.

Once you have drawn an image that you want to save, **SELECT** it. If the whole image is required, the easiest way is to push Ctrl+A.

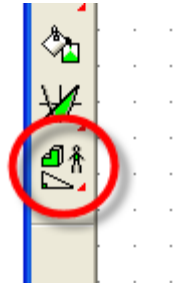
Go to the File menu and choose Save To Gallery (or type Ctrl+T).



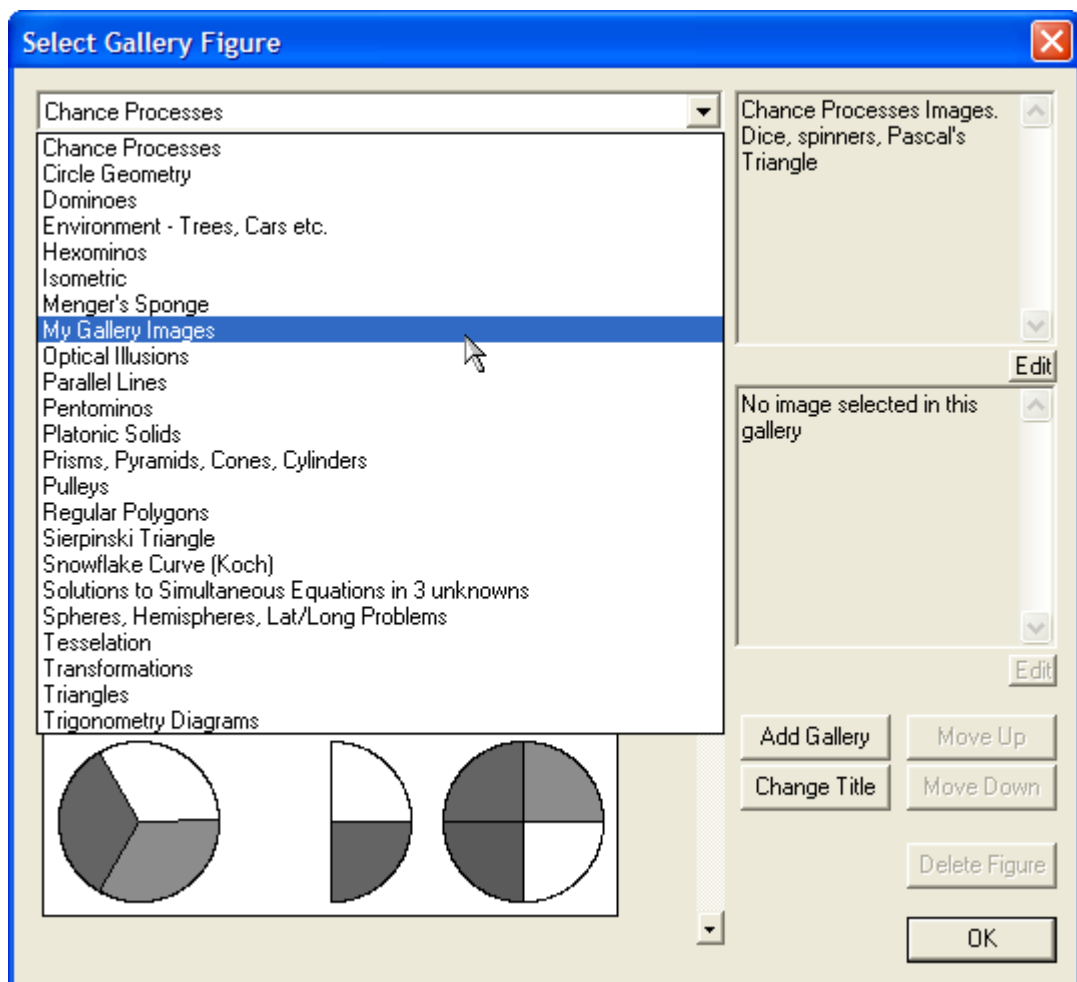
You will be given a list of available galleries and you can save your image into your new gallery or one of our existing galleries.

Once you have built a collection of gallery images, it is a good idea to annotate them so other people know what you were trying to achieve.

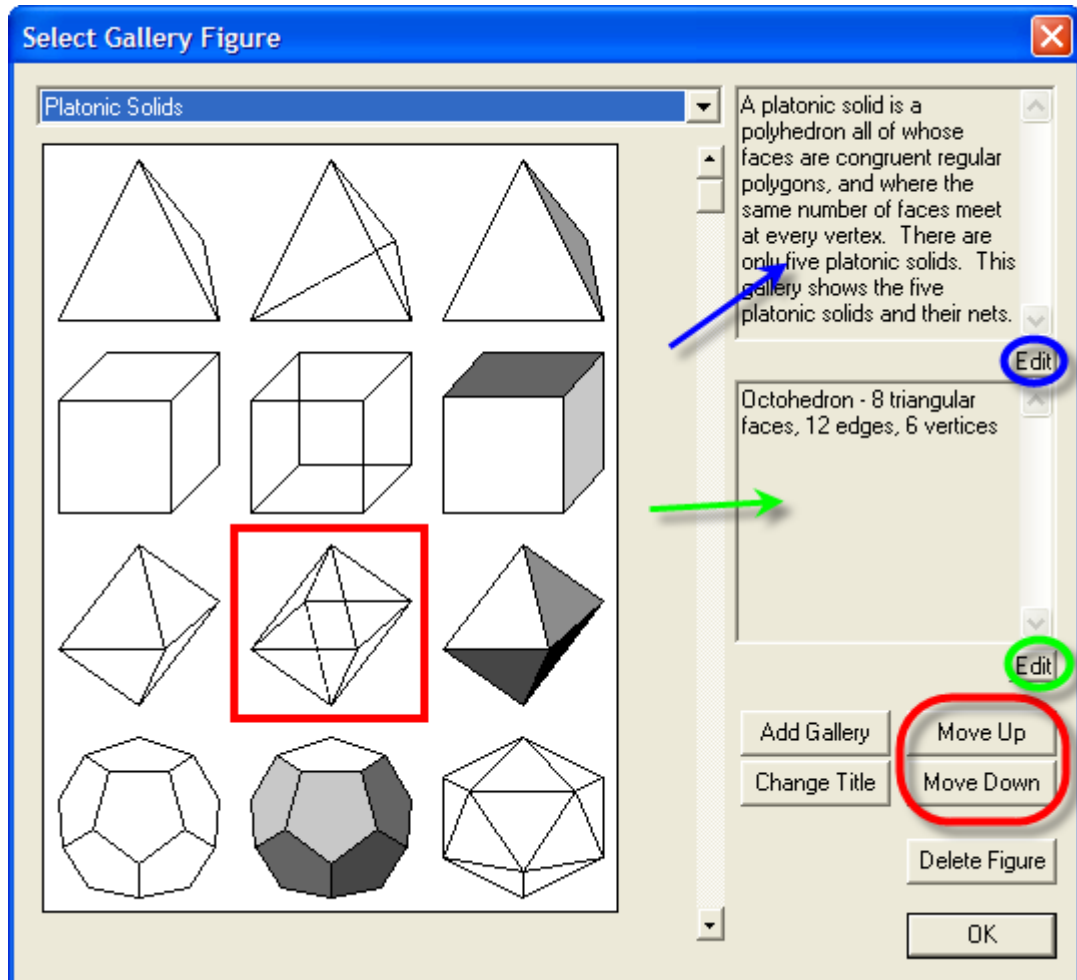
Push the Gallery Library button



and select your gallery from the list. You will see all of your images.



You may need to sort the images into a better order. You do this by clicking on an image and pushing the move up or move down button (marked in red below). You can also delete images.



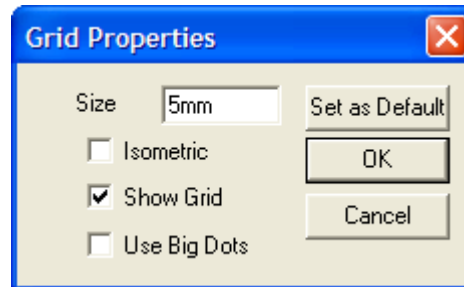
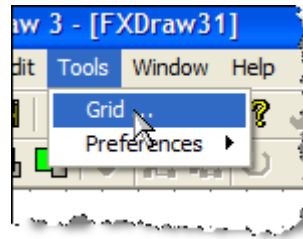
On the right hand side of the gallery library page, there are two grey regions. The top region (blue arrow) should hold a description that is common to all images in the gallery. The bottom region (green arrow) holds information unique to each image. Just below each region you will see a little “Edit” button that allows you to edit the message in each region.

Once you have created your magnificent collection, make sure you send it to us so we can share it with the world!

7 Drawing Isometric Diagrams

By default, the underlying grid is a Cartesian grid with 5mm spacing. You can change it to be an isometric grid that makes drawing isometric diagrams MUCH easier.

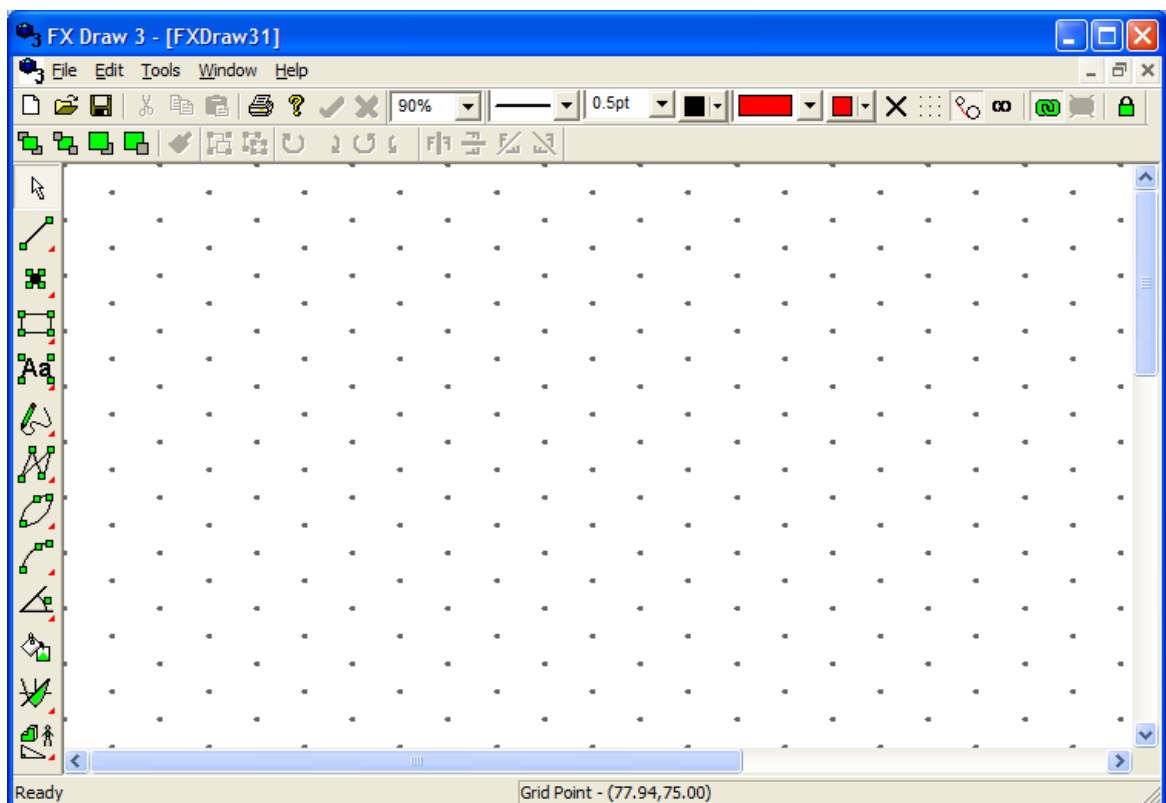
First, go to the Tools menu and choose Grid...



Second, set the grid size to something bigger – we suggest 10mm or larger – as 5mm is too small for isometric diagrams.

Finally put a tick in the Isometric checkbox.

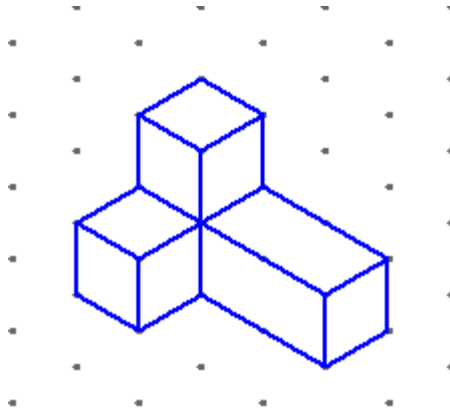
When you return to the main drawing screen, the grid will be isometric (we have also turned on "Big Dots")



It is best to turn GAD OFF when drawing isometric diagrams. Go to the GAD toolbar and push the grid button.



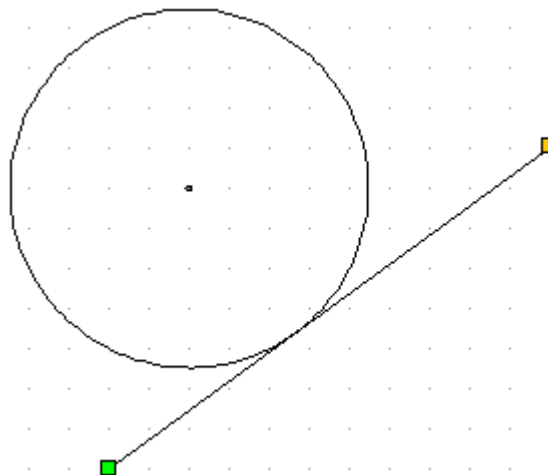
Your cursor will now jump to the underlying isometric dots and isometric drawing is easy.




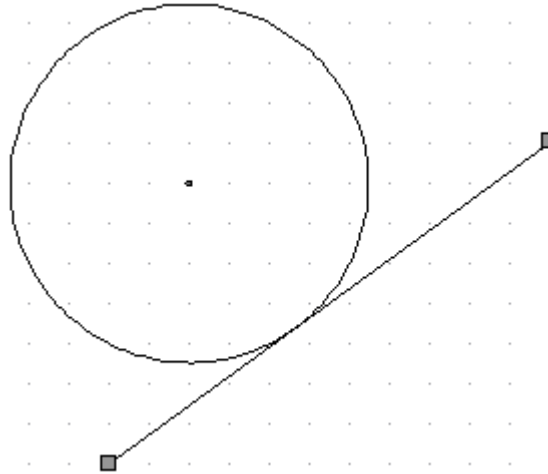
8 Locking Figures

If you have carefully placed a figure in exactly the right spot and want to make absolutely sure that you don't move it accidentally, you now have the option of locking it.

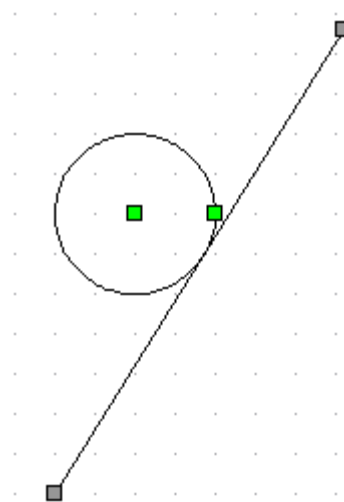
Draw your diagram and select any figures you want to lock.



Now press the lock button  and the figure will be locked in place. FX Draw 3 will change the squares to grey to show you that they are locked.



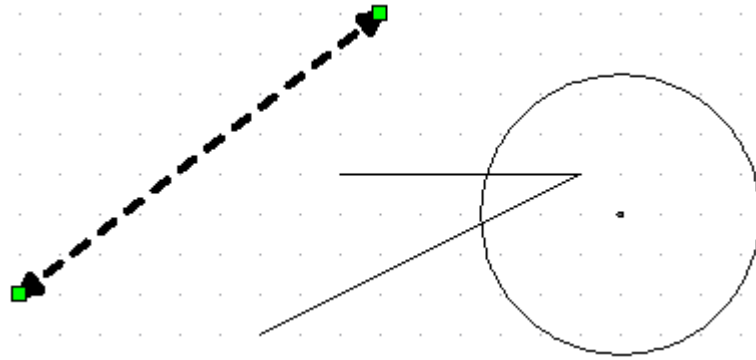
This line is now locked in place and you will not be able to move it at all apart from one important exception - it will still remember and use any GAD Links that were used. Even though you will not be able to directly move the line, if you change the circle, the line will remain tangential.



You can unlock any locked figures by selecting them and clicking on the lock button.

9 Format Painting

The format painter allows you to format one figure exactly as you want and then copy the formatting over to other figures. Format painting is available in a lot of products (such as Word) and ours works in exactly the same way.

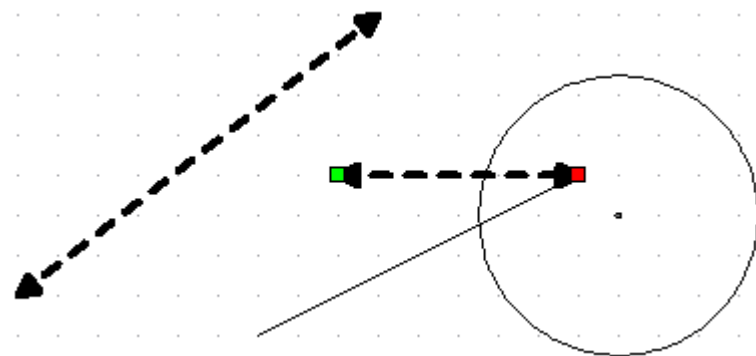


To use the format painter, first format a figure and then select it as shown above.

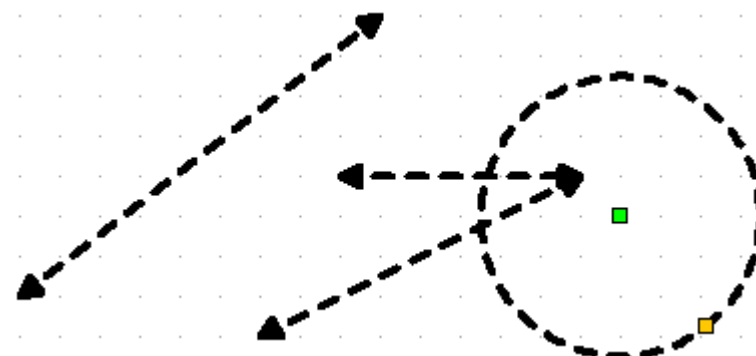
When the SOURCE figure is selected, press the format painter button



Then click on a DESTINATION figure that you would like the formatting copied on to.



To format more figures, keep clicking the format painter button and the next figure.



The format painter will always copy the line style, line thickness, line colour, fill style and fill colour. The more similar the source and destination figures, the more information is painted across.

10 Thick Dotted Lines

FX Draw 3 can draw thick dotted lines - but there is a catch.

Hold on - it's going to get technical for a bit.

FX Draw uses a technology called OLE (Object Linking and Embedding) to "link" into Word. OLE provides the ability to double click on FX Draw images in a Word document and open them up inside FX Draw. OLE provides much of FX Draw's interactivity with Word.

The problem is that OLE is an old technology that Microsoft has almost abandoned and **it doesn't support thick dotted lines**. OLE is so problematic that Adobe (the world's leading general graphics software company) has totally removed OLE support from all of their products - products like Photoshop and Acrobat.

That's the problem. FX Draw can draw the thick dotted lines - it just can't get them back into Word using OLE.

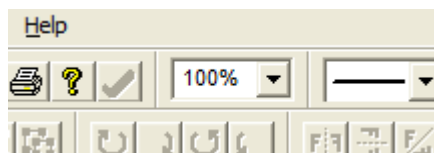
You CAN get thick dotted lines into Word, you just need to copy and paste your image rather than use OLE. The problem with this approach is that you lose the interactivity. Your diagram will need to be saved and stored separately to the Word document.

To copy an image to the clipboard to be pasted into Word.

- Draw your image
- Choose "Copy Image to Clipboard" from the menus or type Ctrl + M.
- Paste into Word.

11 Zooming

FX Draw 3 includes a zooming option



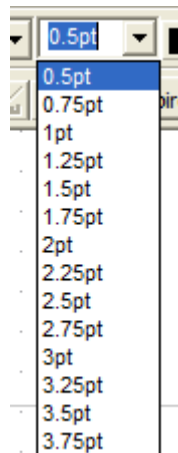
Zoom operates in the same way as in other products but it has a use that may not be immediately obvious.

When people used FX Draw 2 to draw diagrams, they would often complain that the diagram was too big when it was returned to Word. This seemed to be a problem of perception - the diagram looked bigger in Word because it was no longer the "only" thing on the page.

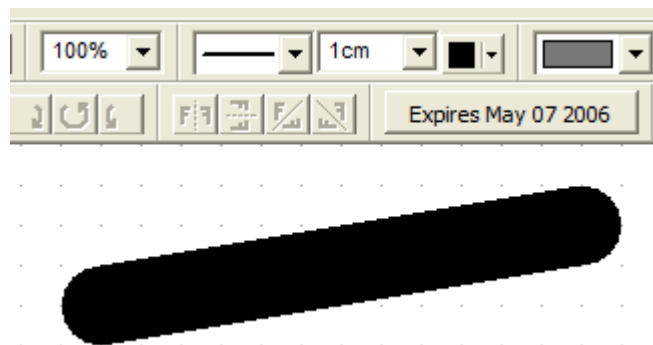
We suggest that you use FX Draw 3's zoom function to overcome this perception problem. Set your zoom to about 140% in FX Draw 3. This allows you to focus on the diagram and include the detail you need - but when you return to Word the diagram will not appear too large.

12 Measurements

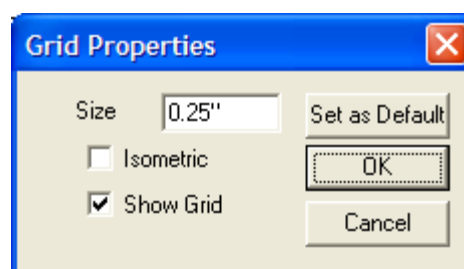
The main line selection toolbar in FX Draw now defaults to sizes in points.



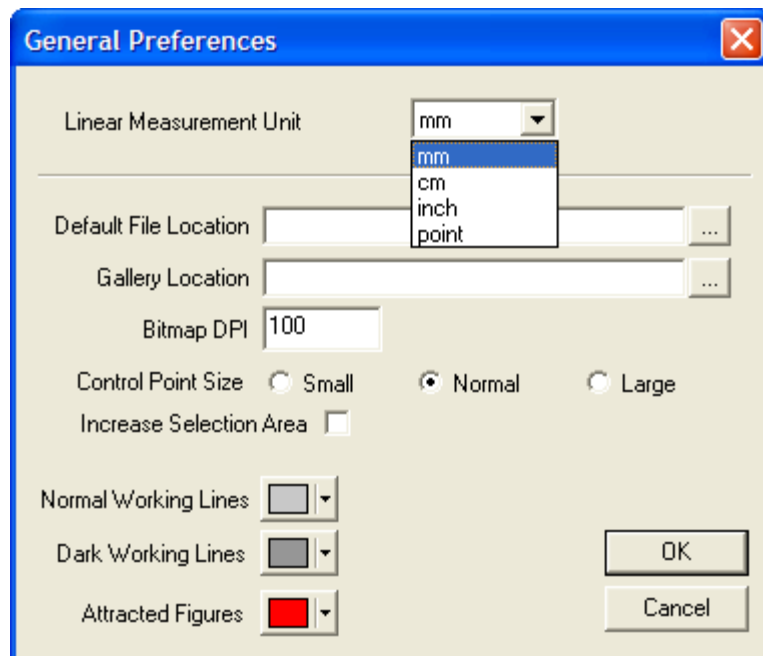
You can select point sizes between 0.25 pt and 4 pt in this drop down list - but FX Draw 3 is much more flexible than this. You can type just about measurement into this space and FX Draw will use it as a line thickness. You can, for example, use a line thickness of 1cm.



This flexibility extends to most places that FX Draw asks for a measurement. You can, for example, specify a grid of 0.25 inches or construct some graph paper with 36 pt dots.



FX Draw will always assume that line thicknesses are specified in points. For all other measurements it assumes the current measurement default unless you specifically add a unit. You can set the default measurement system by going to the Tools menu, choosing Preferences and then General.



The default Linear Measurement Unit is also used in all locations that FX Draw reports lengths or areas, particularly in Figure Information.

This is the last lesson in the FX Draw 3 Advanced lesson set. There are three email tutorials that you should consider after this one.

Efofex Graph Technology
Efofex Equation Technology
Efofex Statistics Technology

We hope you have enjoyed this lesson set and we welcome any suggestions you have to make.