



Some keyboard shortcuts

M	Magnify at cursor
F	Expand zoomed view to Fill the screen
D	Demagnify
Home	Zoom Extents
R	View Raster only
V	View Vectors only
B	View Both raster and vectors
Shift+F	Fade raster (makes vectors easier to see)
G	Turn vector Grab Points on/off
C	Turn vector Colors on/off
Ctrl+F8	Clear vectors
Ctrl+D	Measure in pixels.

Color, grayscale or monochrome


When you open a raster file in Scan2CAD there is a number after the file name at the top of the screen. This tells you what type of raster image it is:

- (2) Monochrome image
- (256) Grayscale or 256 colors
- (16.7M) 16.7 million colors


Don't use JPEG or GIF!

- JPEG and GIF files from the web are likely to be too low resolution to vectorize well.
- Saving an image as JPEG or GIF normally reduces its quality.
- JPEGs and GIFs are always color and are unsuitable for black and white drawings.

White lines on a black background

If your image has white lines on a black background click  to reverse it. Scan2CAD works on images with black lines on a white background.

Auto Deskew

If your image is monochrome, you can deskew it automatically by clicking .

Hints & Tips

Scanning Checklist

You can eliminate most vectorization problems by scanning your drawings using the checklist below.

Color, grayscale or monochrome?

Most scanners give you the option of scanning in color, grayscale or monochrome. These options have different names depending on the make of scanner you have.

Color

Your scanner's color option will normally create a raster image with 16.7 million colors.

You should only use this option if you are scanning a color drawing with a view to converting it to a color DXF file.

Do not use your scanner's color option if you are scanning a black and white drawing - it is easy to do this by accident as most scanners default to color.

If you are scanning a color drawing that you want to convert to a color DXF file, experiment with your scanner's settings until the colors on the raster image are as high contrast, vibrant and saturated as possible.


Warning: Color images can be very large. E/A0 size drawings scanned in color at 300 dpi will take up about 385Mb of memory.

Grayscale

Your scanner's grayscale option (often called black and white

photo) will normally create an image that contains 256 shades of gray.

Grayscale images are not normally suitable for raster to vector conversion. You should only select Grayscale if you are going to convert the grayscale image to black and white after scanning using Scan2CAD's Threshold functions:

- Simple Threshold - click .
- Adaptive Threshold - click .

See the Scan2CAD Help for more information on Simple and Adaptive Thresholds.

Warning: Grayscale images can be very large. An E/A0 size drawing scanned in grayscale at 300 dpi will take up about 128Mb of memory.

Monochrome

Your scanner's monochrome option (often called line art, black and white drawing, 1 bit) will create a much smaller image that contains two colors - black and white. This is the option you should normally choose.

When you scan a drawing in monochrome your scanner or scanning software has to make a decision about which parts of the drawing to set to black in the raster image and which to set to white.

Continued overpage ...

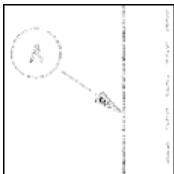


If your drawing is clean and sharp this is not normally a problem. However if your drawing has faint lines or a dirty or tinted background you will have to experiment with your scanner's settings until you get a raster image where, as far as possible, the parts of the raster image that are supposed to be black are black and the parts that are supposed to be white are white.

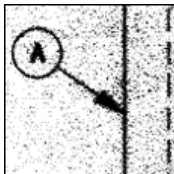
If your scanner or scanning software sets too much of the drawing to white, it may contain breaks and holes. Faint parts may be lost.

If your scanner or scanning software sets too much of the drawing to black, text characters may "bleed" so that white spaces within them or between them become filled and speckles and dirt may appear in the background.

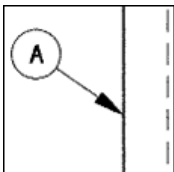
Too much white



Too much black



Optimal



Rather than experiment with your scanner settings until you get optimal levels of black and white you may find it easier to scan your drawing in grayscale. You can then use Scan2CAD's Threshold functions to create a black and white image after scanning. This will allow you to experiment with different levels of black and white without having to rescan the drawing.

Resolution

It is not true that the higher the scanner resolution, the better the vectorization results. For most drawings 200 or 300 dpi is adequate.

However, if a drawing is small (e.g. a logo) or has fine detail, you may need a higher scanner resolution (see **Using Scan2CAD to convert logos** included with these Hints and Tips). On some drawings you may need a lower resolution. Ideally, aim for scanned lines that are about 5 pixels thick.

Scanning physical items


Scanning a physical part like a gasket or similar for profiling can be problematic. Because parts have a thickness they produce shadows when you scan them. Once in Scan2CAD it can be hard to tell where the part ends and the shadow begins. Here are two suggestions to help get around the problem.

Suggestion 1

1. Lay the part on a piece of white paper.
2. Carefully trace around it with a fine, sharp pen to get a tight fitting profile.
3. Scan and vectorize the trace.

Suggestion 2

To reduce shadowing, put a black sheet of paper or card over the part in the scanner. You may also want to try spray painting the part white. When you scan, the shadows will simply become part of the black background.

This will give you a reversed image with a white part on a black background. In Scan2CAD, click  to switch the image so you end up with a black part on a white background.

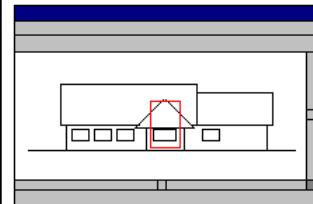
Saving raster files

If you're not scanning directly into Scan2CAD, save scanned drawings as BMP or, better, as packbits, Fax Group 3 or Fax Group 4 TIFF files. TIFF files make more economic use of hard disk space than BMP files.

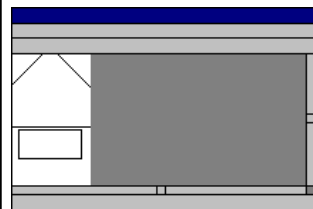
DO NOT save your files as multi layer/page TIFF which Scan2CAD does not support or as JPEG or GIF, which are color only formats.

Filling the gray area on the screen ...

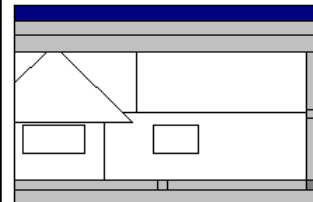
When you select an area to zoom into (e.g. the area enclosed by the red rectangle below) ...



Only the exact area you have chosen is displayed on the screen:



To expand the displayed area so it fills the screen, press F for Fill:



If you press F again, the view will zoom out slightly so you can see more of the image on the screen.

How to use Scan2CAD


This page assumes you are using Scan2CAD v7.5 or later and that you have not turned off the Warning:Color Image dialog that appears if you load an image that contains more than two colors. If you have turned the dialog off, reinstall Scan2CAD to reactivate it.

*This page outlines basic steps only. You may prefer to use **Andrea's Real World Guide**, which tells you how to handle imperfect scans and tweak vectorization settings. You can get a copy by going to www.softcover.com and clicking the Hints and Tips button.*

Convert a black and white image

Without OCR

OCR (text recognition) is optional. Use this method if your drawing has no text or the text is poor quality.


1. Click  to load a BMP, TIFF etc. raster file, or scan a drawing using **File>Acquire**.

The Warning: Color Image dialog may appear. If it does:

- a) Select the second option.
- b) Click OK. If a warning appears, click Yes. You will enter the Simple Threshold dialog.
- c) Move the slider to a position where the lines on your image are as solid as possible and the background is as clean as possible.
- d) Click **OK**.

2. Work through the **Raster Quality Checklist** supplied with these Hints and Tips.

3. Optional (recommended): Click  (**Raster Effects>Smooth**).

4. Make sure you are zoomed out by clicking .

5. Go to the **Type Menu**. This contains vectorization settings.

- Choose the setting that best describes your drawing, e.g. Architectural or CNC Profile.
- If your drawing is a solid shape to be outlined, choose **Outline**.

6. Vectorize the image by clicking on **VEC**. Any text will be converted to short lines.

7. Save the vectors as DXF using **File > Vector > Save As**.

With OCR

Use this method if your drawing has clear sharp text characters that you want to vectorize.


Follow Steps 1 to 5 of Without OCR. Then:

6. Scan2CAD's text recognition recognizes raster text when:

- The text is easily legible.
- Characters do not touch each other or other drawing elements.
- Characters are not at different orientations.
- Characters are in a font that Scan2CAD can recognize.

Work through the **Raster Text Quality Checklist** supplied with these Hints and Tips to ensure your text meets these conditions.

7. Tell Scan2CAD what text size to expect:


- a) Go to **OCR > Char Size**.
- b) Zoom into the biggest character on your drawing by placing your cursor over it and scrolling your mouse wheel forward or pressing the **M** key several times, until you can see the character clearly.
- c) Click on a black part of the raster text character. It becomes enclosed in a box.
- d) Click  to zoom out.

8. Vectorize ALL the drawing, (drawing elements and text, by clicking on **ALL**).

9. Save the vectors as DXF using **File > Vector > Save As**.

*After vectorization press **V** to view **Vectors**, **B** to view **Both vectors and raster**, **Shift+F** to **Fade** the raster, **C** to toggle viewing vectors by **Color** or by **type** and **G** to toggle **Grab Point** display at vector ends. Press **Shift+F8** to clear vectors.*


Create a color DXF file from a color raster image

1. Click  to load a BMP, TIFF etc. raster file, or scan a drawing using **File>Acquire**.

The Warning: Color Image dialog appears. Select the fourth option and click OK.

2. Go to **Palette>Reduce Colors Auto**. Select a manageable number of colors, e.g. 32.

3. Go to **Palette > View/Edit Palette** and group together similar colors:

- a) Select all shades of a color (e.g. all shades of red) - click on the shades in the palette (right), in the Preview Window (left), or both. (You may find this easier if you select Hue in the dialog.)
- b) Click .
- c) Click on one of the colors you selected in (a).
- d) Click Preview Change. The colors you selected in (a) are changed to the color you selected in (c).
- e) Repeat (a) to (e) for all color groups - whites, blues, etc.
- f) Click **OK**.

4. Double click your left mouse button to deselect any selected colors.

You now have two options:

Option 1. This option is better because it uses color information while vectorizing.

5. Go to **Palette > Select Separation Colors**. Click on the colors you want to vectorize and click **OK**.

6. Follow Steps 2 onwards of Without OCR or With OCR.

Option 2. Use this if you were unable to group the colors cleanly in Steps 2 and 3 above.

5. Follow Steps 2 onwards of Without OCR or With OCR **but** just before you save the DXF file go to **Vector Edit>Vector Colors to Raster Colors**.



Not getting the results you were expecting?

If Scan2CAD isn't giving you the results you were expecting:

1. Work through the **Raster Quality Checklist** included with these Hints and Tips.
2. Work through the **Raster Text Quality Checklist** included with these Hints and Tips.
3. Work through the **Color Checklist** included with these Hints and Tips.
4. Work through the **Vectorization Settings Checklist** included with these Hints and Tips.

Alternatively, download and use **Andrea's Real World Guide**, which tells you how to handle imperfect scans and tweak vectorization settings. If you don't already have a copy you can get one by going to www.softcover.com and clicking the Hints and Tips button.

Raster Quality Checklist

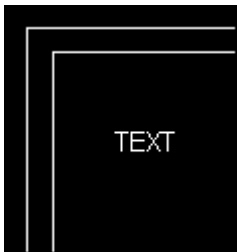
The most common reason for poor vectorization results is a poor quality raster image. Scan2CAD can only give results as good as the raster image you give it to vectorize. Nowhere is the saying "Garbage In, Garbage Out" truer than in raster to vector conversion.

Make sure that your image is suitable for vectorization by going through the Raster Quality Checklist below.

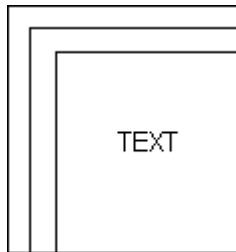
Do this even if your scanned image looks perfect. Poor quality raster images often look fine when viewed full screen - it's not until you zoom into them that you uncover their real horrors.


Is your image negative? (white lines on a black background)

Negative image



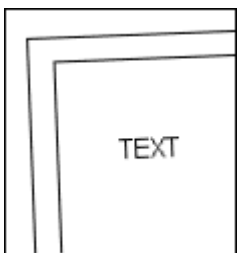
Positive image



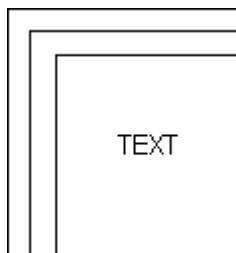
Scan2CAD converts positive images (black or colored lines on white paper). If your image is negative you need to click  (**Raster Effects > Negate**) to convert it to positive.

Is your image skew?



Skew image



After deskew



If your image is slightly skew, deskew it as follows:

- Click  (**Raster Effects > Rotate > Auto Deskew**) to deskew black and white images.
- Click  (**Raster Effects > Rotate > by Line**) to deskew any image.

Deskewing a very skew image can cause significant deterioration in image quality. If your image is very skew, the best thing to do is to rescan your drawing taking care to get the drawing straight on the scanner.



Is your image dirty?

If your image is very dirty, you may not be able to clean it well enough to produce a meaningful vectorization or cleaning it might take too long to be worthwhile.

For example, there is no point trying to clean an image that looks like the one below because there are solid black dirty areas obscuring the drawing.

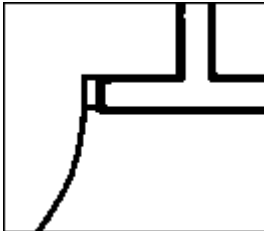


However if speckles and dirty areas do not interfere with the drawing itself you will be able to clean the image quickly and easily.

- To despeckle an image, click  (**Raster Effects > Clean > Remove Speckles**).
- You can erase dirty areas using Scan2CAD's raster erase tools, particularly the area erase (select   ) and the freehand erase (select   )
- There are often dirty areas around the edges of raster images. You can delete these using **Raster Effects > Crop**.

Now, zoom into your raster image by placing your cursor over the image and pressing **M** on your keyboard. Keep pressing **M** until the lines are highly magnified. You can also zoom in by **scrolling your mouse wheel forwards**.

What do you see?

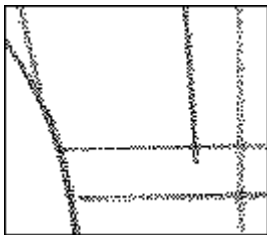
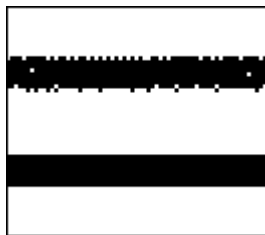


Good quality lines

The lines on the left are clean and strong and distinct. If the lines on your image look like this you will be able to get good vectorization results.

Hairy lines

If the lines on your image have "hairs" like the top line on the right, click (**Raster Effects > Smooth**) to smooth them (bottom line on the right).



Dithered lines

If the lines on your image are dithered (made up of black speckles like the lines on the left), the best thing to do is to rescan your drawing. Experiment with your scanner's

settings until you get a scan with solid, continuous lines that are not dithered (see the **Scanning Checklist** included with these Hints and Tips).

If rescanning is not an option, try using (**Raster Effects > Thicken > Pixels**).

You may need to run **Thicken > Pixels** several times to improve the quality of a dithered image to the point where it can be vectorized successfully. However, use **Thicken > Pixels** with care as it can deteriorate the quality of the image by thickening lines too much and allowing lines that are close to each other to become joined.

Lines with holes

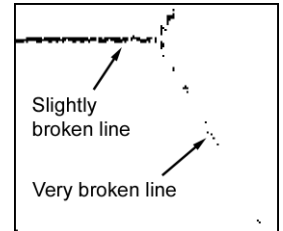
If the lines on your image contain small holes you can remove them using (**Raster Effects > Clean > Remove Holes**). To remove large holes use Scan2CAD's **Flood Fill** command (see the Help).



If your image has holes it may have been scanned at too high a resolution. You may want to try scanning your drawing again at a lower resolution.

Broken lines

If the lines on your image are slightly broken you can probably mend them automatically using one of or a combination of the following methods:



- (**Raster Effects > Thicken > Lines**).
- (**Raster Effects > Thicken > Pixels**).
- Gap jumping. Before you vectorize the image:

1. Select a **Type** from the **Type Menu**.
2. Go to **Type > Settings**.
3. Set a **Gap Jump Distance**.

When you vectorize the image Scan2CAD will jump over breaks that are smaller than the distance you have specified, allowing it to produce continuous vectors despite the gaps.

If the lines on your image are very broken you will not be able to mend them automatically or jump over the gaps using gap jumping. The only way to mend a very broken image is to draw new raster lines and arcs over the broken ones.

If your entire image is very broken it will take too long to improve its quality to the point where it can be successfully vectorized and there is probably no point trying to vectorize it.



Merged lines

If the entities on your raster image are merged together the raster image is too poor quality for vectorization. There is nothing you can do about

this unless the original drawing shows white space between the entities. In this case it may be possible to separate the entities by scanning the drawing again at a higher resolution.

Fuzzy lines

If the lines on your raster image are fuzzy the raster image is too poor quality for vectorization. There is nothing you can do about this except rescan the drawing using the **Scanning Checklist** included with these Hints and Tips.



Fuzziness is most common in JPEG images, so take care not to save your image in JPEG format.

Overlaid information

The drawing on the right contains a lot of overlaid data.

Sadly, Scan2CAD is not human. It doesn't know that it is looking at text and a wiring schedule overlaid on a building plan. All it sees are black patterns on a white background and it is not going to be able to separate the data.

You are not going to be able to get a sensible

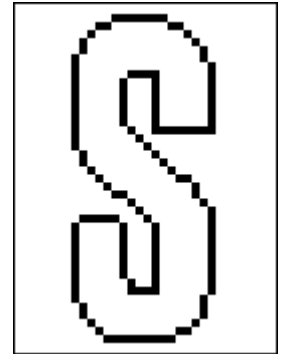


vectorization from an image with overlaid information. There is nothing you can do about this.

Low resolution lines

If shapes in your image are defined by only a few pixels and look jagged, as in the image on the right, your image is too low resolution. This is particularly common in logos and drawings with fine detail.

The drawing needs to be rescanned at a much higher resolution - aim for lines that are about 5 pixels thick.



Raster Text Quality Checklist

Scan2CAD has a capability for converting raster text to vector text using OCR. When you convert raster text using OCR, the vector text is proper editable text rather than a series of uneditable lines and arcs.

Scan2CAD's OCR recognizes raster text where the following conditions are met:

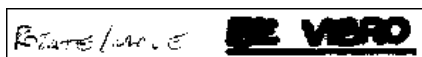
- The raster text is easily legible.
- The raster text characters do not touch each other.
- The raster text characters do not touch other drawing elements.
- The raster text characters are not at different orientations.
- The raster text characters are in a font that Scan2CAD can recognize.

To ensure that your text meets these conditions, work through the following Raster Text Quality Checklist.

First, place your cursor over a piece of text on your image. Press **M** to Magnify. Press **M** again and again until your image is highly magnified. Or, zoom in by **scrolling your mouse wheel forward**. To zoom out again, click .

Is the text easily legible?

If you cannot read the text easily, as in the examples below, Scan2CAD won't be able to read it either.



If the text is not easily legible, the only remedy is to start off with a better quality raster image.

If this is not possible, you will have to retype the text manually. You can either do this in Scan2CAD (see **Typing over poor quality text** included with these Hints and Tips) or in your CAD program after you have imported the converted file into it.

You may want to erase areas of very poor quality text from the raster image so that these areas are not vectorized to lines and arcs.

Are the characters touching?

Scan2CAD cannot recognize characters that touch other characters, even if the characters are only connected by a few pixels:



If the characters touch, try selecting **OCR > Settings > Split** before doing OCR recognition. When this option is selected Scan2CAD will attempt to split and identify touching characters.

This will improve text recognition on some raster images, however on others it may result in a lot of "junk characters" being recognized.

This is because characters that touch are often very poor quality and are unrecognizable even after splitting. For example, the characters in the example above have "bled". Not only has this caused them to touch each other but it has also filled in the "A". This means that the "A" is no longer typical of

an "A" and Scan2CAD may have difficulty recognizing it even if it is not touching other characters.

You can often improve the quality of an image that has been degraded by rescanning it in grayscale and thresholding it (see the **Scanning Checklist** included with these Hints and Tips).

Is the text written over other drawing elements?

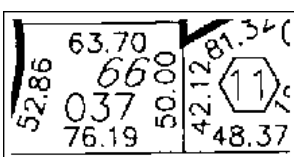
If text is written over drawing elements or is attached to underlining or boxes as in the examples below, Scan2CAD won't be able to recognize it.



Is the text at more than one orientation?

Scan2CAD can only reliably recognize text at one orientation at a time.

Where text at different orientations is physically separate it can be recognized using separate OCR runs. However, where text at one orientation is intermingled with text at another orientation it is virtually impossible to recognize all the text. This typically affects drawings with dimension text at different angles, contour maps and site plan drawings such as the one below.



Can Scan2CAD recognize the font?

By default, Scan2CAD can only recognize text that has been written using a standard font such as the font below.



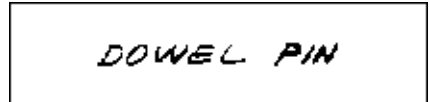
It may not recognize other fonts well. It may also fail to recognize standard fonts that are narrower or wider than normal or that are italicized.

If Scan2CAD's default text recognition cannot recognize a font well and you have a lot of images containing that font, you can train Scan2CAD to recognize the font (Pro version only). You can do this if the font characters are consistent and do not touch.

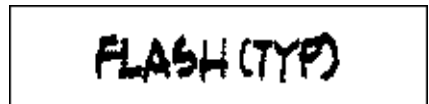
For example:



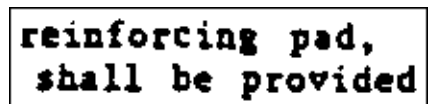
Scan2CAD's default text recognition will recognize this font but it will not recognize it optimally because the font is narrower than normal. You could train Scan2CAD to recognize this font well.



Scan2CAD's default text recognition will recognize this font very poorly because it is italicized and hand written. However, because the characters are clear and do not touch you could train Scan2CAD to recognize it.



Scan2CAD's default text recognition will recognize this font very poorly because it is hand written and because the characters touch each other. You could not train Scan2CAD to recognize this font because the characters touch.



Despite the fact that the quality of this text is poor you could train Scan2CAD to recognize it because the characters are consistent and do not touch each other.

It takes a few hours to train Scan2CAD to recognize a font but it can significantly improve text recognition.

Viewing vector elements

Viewing Grab Points at vector ends is a quick way to see vector extents.

Press **G** to turn **Grab Points On/Off**.

To change Grab Point size go to **View > Grab Point Size**.

You can see different vector types in different colors:

Press **C** to turn vector **Colors On/Off**.

Vector types are shown in the following colors:

Continuous lines	Red
Dash lines	Black
Arrow lines	Gray
Hatch lines	Brown
Polylines	Green
Circles	Dark blue
Arcs	Magenta
Bezier curves	Pale blue
Text	Magenta



Color Checklist

Look at the number after the file name at the top of the screen. If this number is **256** or **16.7M** your image is grayscale or color, **even if it looks black and white!**

If you try to vectorize a grayscale or color image there are three likely outcomes:

The vectors look like crazy paving OR there are no vectors at all OR there are a few horizontal and vertical lines at the image edge.

Solutions

- Use Thresholding to reduce image colors to black and white:
 1. Click  to do a Simple Threshold or  to do an Adaptive Threshold. If a Threshold Information dialog appears, click Yes to continue.
 2. Move the slider(s) to a position where the lines on your image are as solid as possible and the background is as clean as possible. Click the Help button in the Simple or Adaptive Threshold dialog for more information on how to use the sliders.
- Whiten the image background:
 1. Go to **Palette > View/Edit Palette**.
 2. Click on **the colors that look white** so they become selected. (To select a row of colors, click at the right hand end of the row.)
 3. Click on **Change To White**.
 4. Click on **OK**.
- Rescan the drawing using the **Scanning Checklist** included with these Hints and Tips.

Vectorization Settings Checklist

Vectorization settings control the conversion of raster images to vectors. The default settings that are set when you select an option from the Type Menu give good results on most drawings but sometimes you may need to edit them.

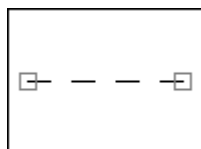
If dash lines are not recognized

Make sure that Type > Settings > Object Identification > Dash Line is selected.

Dash Line
not selected

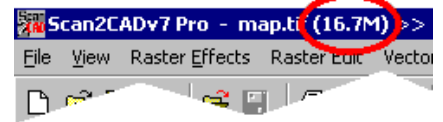


Dash Line
selected



In the diagrams above vector end points are enclosed in small squares.

If Dash Line is selected and dash and dash dot lines are still not being identified try increasing the maximum dash and gap lengths in Type > Settings > Advanced.



A technical explanation

By default, Scan2CAD vectorizes every non-white pixel it sees on a white background. It does not vectorize white pixels.

Sometimes a background that looks white is slightly non-white. Maybe it's criss-crossed by non-white areas leading to crazy paving vectors, or maybe it's completely non-white leading to no vectors.

In a 256 color image 255 of the colors are non-white. Now imagine an image with 16.7 million colors where only one is white! You can see how easy it is to end up with a non-white background!


The problem is particularly likely if you are converting JPEG files because JPEGs can only be color.

If arrows are not recognized

Make sure that Type > Settings > Object Identification > Arrow Line is selected.

If arrows are still not identified try increasing the maximum arrow head length in Type > Settings > Advanced.

Arrows will not be recognized when the arrow tip is touching a line that has a similar width to the arrow head. If an arrow is recognized as a line, you can quickly change it to an arrow as follows:

1. Click .
2. Right click.
3. Select Arrow 1 or Arrow 2 from the dialog.
4. Click on the lines you want to convert to arrows. The arrow head will be at the end of the line you click on.

If polylines are not recognized

Make sure that Type > Settings > Object Identification > Polyline is selected. Alternatively, use Vector Edit > Make Polylines to create polylines after vectorization.



If hatch lines are not recognized

Make sure that the Hatch option corresponding to the angle of the hatch lines you want to identify is selected in Type > Settings > Object Identification.

If hatch lines are still not identified, try increasing the Hatch Line angle tolerance in Type > Settings > Advanced.

If hatch lines are identified but the lines are not parallel, select the angle in Type > Settings > Angle Optimization that corresponds to the angle of the hatch lines you want to identify.

If arcs or Bezier curves are not recognized

If arcs are not recognized make sure that Type > Settings > Object Identification > Arc is selected.

If Bezier curves are not recognized make sure that Type > Settings > Object Identification > Bezier is selected.

You can choose to identify arcs or Bezier curves.

If the image is a typical architectural, mechanical or electrical drawing containing mainly straight lines, select arc. If the image is mainly curvy, like a contour map, ship hull, aerofoil or freeform artwork select Bezier. If you are vectorizing a curvy image but your CAD or CNC program does not support splines you can still select Bezier. You can convert the Bezier curves to arcs or lines on export using File > Vector > Export Options.

If circles are not recognized

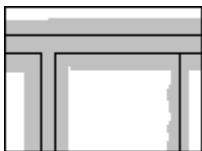
If circles are not recognized make sure that Type > Settings > Object Identification > Circle is selected.

Line Width

If thick lines contain double vectors, increase Type > Settings > General > Line Width.

Double vectors

After increasing
Line Width



If you have to increase Line Width, the lines on your raster image are thicker than normal. Thicker lines have more unwanted protrusions and holes so use Raster Effects > Smooth (☑) and Raster Effects > Clean > Remove Holes (☑) before vectorization. You may want to try rescanning your drawing at a lower resolution to decrease the line thickness.

Deviation Factor

If the vectors do not follow the lines on the raster image closely enough, decrease Type > Settings > General > Deviation Factor.

Loose vectors

After decreasing
Deviation Factor



If you have to decrease the Deviation Factor you may have scanned your drawing at too low a resolution. You may want to try rescanning it at a higher resolution.

Corner Snap

If corners are chamfered, increase Type > Settings > General > Corner Snap to sharpen them. You may also need to increase Type > Settings > Advanced > Corner Snap Angle Tolerance.

Chamfered corner

After increasing
Corner Snap



Pass-Thro Snap

If vectors do not cross neatly at untidy raster junctions, increase Type > Settings > General > Pass-Thro Snap.

Untidy junction

After increasing
Pass-Thro Snap

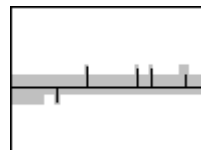


Loose Ends Length

If you have a lot of loose end vectors, increase Type > Settings > General > Loose Ends Length.

Loose end vectors

After increasing
Loose Ends Length



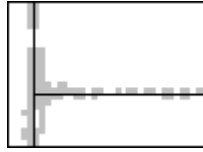
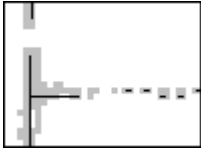
To avoid loose end vectors, use Raster Effects > Smooth (☑) before vectorization.



Gap Jump Distance

If the vectors are broken at breaks in the raster image, increase Type > Settings > General > Gap Jump Distance.

Broken vectors

After increasing Gap Jump Distance



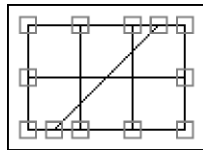
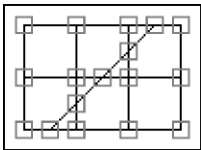
If there are a lot of breaks in your raster image you may be able to jump them more effectively if you use Raster Effects > Thicken > Lines () and Raster Effects > Thicken > Pixels () before vectorization.

Connect Thro Nodes

If you want lines to pass at intersections rather than join, select Type > Settings > General > Connect Thro Nodes.

Lines join at intersections

Lines pass at intersections



In the diagrams above line end points are enclosed in small squares.

Arcs, Bezier curves and Circles always continue through intersections even if Connect Thro Nodes is off.

Align to current grid

If you want to snap vectors to a grid, select a grid spacing using Vector Edit > Grid Snap Distance.

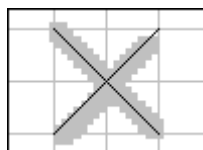
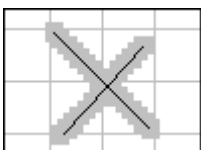
To view the grid, press Shift+I or select View > View Grid. Note that you will only be able to see the grid when you are zoomed in.

Select Type > Settings > General > Align to Current Grid.

In the diagrams below the raster image and grid lines are shown in gray and the vectors are superimposed in black.

Vectors not snapped to a grid

Vectors snapped to a grid



Angle Optimization

If the vectors deviate slightly from their correct angles due to variations in the raster image beneath, select angles in Type > Settings > Angle Optimization. For example:

Angle Optimization
90/180 = off

Angle Optimization
90/180 = on



When 90/180 is on, lines within a user-specified tolerance of 90 or 180 degrees are snapped to 90 or 180 degrees.

Angle Optimization
45 = off

Angle Optimization
45 = on



When 45 is on, lines within a user-specified tolerance of 45 degrees are snapped to 45 degrees.

If Angle Optimization does not appear to be working, this is because Scan2CAD has chosen not to optimize a line or lines. It may do this if optimizing the line(s) would interfere with the logical position of a node.

If Angle Optimization is set on an image that does not have lines at the angles that have been selected for Angle Optimization, **gross distortion of vectors** can result:



In this case, turn Angle Optimization off.

*You may also want to see **Andrea's Real World Guide**, which tells you how to improve vectorizations by tweaking vectorization settings. If you don't already have a copy, you can get one by going to www.softcover.com and clicking the Hints and Tips button.*

In the diagrams in this Checklist the raster image is shown in gray and the vectors are superimposed in black.

Using Scan2CAD to convert PDF files to DXF

You can use Scan2CAD to convert a PDF file to DXF by first converting the PDF file to a raster format such as TIFF or BMP. Once it's in raster format, you can load it into Scan2CAD and convert it to DXF in the normal way.

There are a number of programs available that can convert PDF files to raster. Two - Photoshop and OmniFormat - are described here. OmniFormat is free but displays sponsor pages.

Using Photoshop

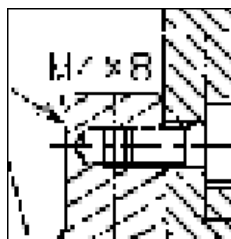
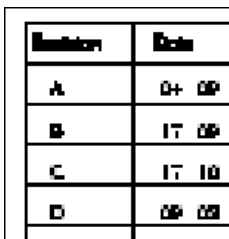
The instructions below have been written for Photoshop CS but may also work with other versions of Photoshop.

1. Load your PDF file into Photoshop by going to Photoshop's **File Menu** and choosing **Open**.

Depending on the properties of the PDF file, it will either open straight up in Photoshop or the Rasterize Generic PDF Format dialog will appear.


If the Rasterize Generic PDF Format dialog appears:

- Leave the Width and Height figures at Photoshop's defaults.
- Set **Resolution**. 300 pixels/inch is good for most line drawings, but on small drawings like logos you may need to try a higher resolution.
- Set **Mode** to **Grayscale**.
- **Switch off** the **Anti Aliased** option.
- Click **OK**. The PDF file will appear in Photoshop.
- Zoom into the file and inspect it. If it is broken, or you can't read the text as in the examples below, the resolution is too low. Scan2CAD will not be able to vectorize the image well. In this case, close the image and load it into Photoshop again, this time choosing a higher resolution.



2. Go to Photoshop's **Image Menu > Mode**. If **Bitmap** is not ticked, click on it. Then:

- a) Click **OK** to the Flatten Layers prompt.
- b) A dialog called Bitmap appears.
- c) Leave the Output Resolution at default.
- d) Set the **Method** to **50% Threshold**.
- e) Click **OK**. This converts the image black and white (2 colors).

3. Save the file in TIFF format. In the TIFF Options dialog set **Image Compression** to **None**.
4. Load the TIFF file into Scan2CAD by starting Scan2CAD and clicking . You can now vectorize the file in the same way as any other raster image.

Using OmniFormat

Downloading and installing OmniFormat

1. Go to <http://www.omniformat.com/download.html>
2. Click on the OmniFormat **Download** link and download OmniFormat (omniformat.exe) to your hard drive.
3. In order to use OmniFormat you will also have to download its sister product PDF995 and the PDF995 printer drivers.

To do this, click on the PDF995 **Download** link. This will take you to another web page.

Download the **PDF995 Printer Driver** (pdf995s.exe) and the **Free Converter** (ps2pdf995.exe) to your hard drive.

4. You should now have three files on your hard drive - omniformat.exe, pdf995s.exe and ps2pdf995.exe.

Install them in the following order: ps2pdf995.exe, pdf995s.exe, omniformat.exe.

Using OmniFormat

Once you've installed OmniFormat you are ready to turn a PDF file into a raster image suitable for Scan2CAD to convert. Do the following:

1. Load the PDF file you want to convert into Acrobat Reader. Make a note of the file's paper size - it's width and height will be displayed at the bottom left of the Acrobat screen (you may need to pass your mouse over the bottom left of the screen to see the width and height).
2. Go to **Start > All Programs > Software995 > OmniFormat**. Sponsor page messages and sponsor pages will appear. Once you have passed these, the OmniFormat dialog appears.
3. Select **BMP Microsoft Windows bitmap image** from the Output Format dropdown.
4. Click the **Options** button. The Options dialog appears.
 - a) Select an appropriate resolution value (see **A note about resolution** overpage).



If your PDF file is smaller than A0/E size (i.e. smaller than 48x36 inches or 841x1189 mm) we suggest you start by trying a resolution of 300. If your PDF file is larger than A0/E we suggest you start by trying a resolution of 72.

b) Click **OK** to exit the Options dialog.


5. Click the **Start Monitoring** button.

6. Use Windows Explorer to copy a PDF file into the Watch Folder specified in the Omniformat dialog. By default the Watch Folder is at c:\program files\omniformat\watch.

VERY IMPORTANT: Omniformat will delete the PDF file from the Watch Folder once it has converted it so it is important that you **COPY** the PDF file you want to convert into the Watch Folder. **DO NOT** put the original there.

Omniformat will automatically convert the PDF file to BMP.

(Note: You can convert several PDF files to BMP at once by copying more than one PDF file into the Watch Folder.)

7. Load the BMP file into Scan2CAD by starting Scan2CAD and clicking .

Omniformat creates 256 color BMP files, so the Warning: Color Image dialog may appear. If it does, select the second or third option and click OK. If the Warning: Color Image dialog does not appear and your BMP file only contains black and white colors you can reduce the size of the file by decreasing its color depth. To do this, go to Scan2CAD's **Palette Menu** and choose **Reduce Color Depth > 1 Bit [Mono]**.

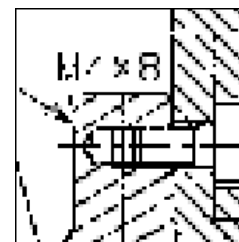
You can now vectorize the BMP file in the same way as any other raster image.

A note about resolution

Omniformat allows you to select a raster file resolution. The correct resolution will depend on your drawing. You may have to experiment with different resolutions to find the best one.

When you have loaded the BMP file that Omniformat has created into Scan2CAD, zoom into it and take a look. If it is broken, or you can't read the text as in the examples below, the resolution is too low and Scan2CAD will not be able to vectorize the image well. In this case, use Omniformat to create the BMP file again, this time using a higher resolution.

Resolution	Result
A	0+ 00
B	17 00
C	17 10
D	00 00



A word of warning: You should be able to convert any file up to A0/E paper size (48x36 inches or 841x1189mm) using Omniformat's maximum resolution of 300 dpi. If the paper size of your PDF file is larger than this, use a lower resolution. Attempting to create a BMP file from a large PDF file can make a file many hundreds of Mb in size that can choke your PC. You can tell the paper size of your PDF file by loading it into Acrobat Reader. The file's width and height are shown at the bottom left of the Acrobat screen (you may need to pass your mouse over the bottom left of the screen to see them).

How to scroll through an image screen by screen

Scrolling through an image one screen at a time allows you to go through the whole image without missing any of it. This is really useful when you're cleaning a raster image, tidying a vector image or just checking results.

1. Zoom into the image so you can see enough detail to be able to clean the image or do whatever you need to do.

When you zoom in, the right hand part of the screen may be gray. **Press F** on your keyboard to **Fill** the gray part of the screen with image.

2. Use the scroll bars to move to the top left corner of the image.

3. Press the **Ctrl+Right Arrow** keys to move one screen to the **right**.

4. Repeat Step 3 until you have moved, screen by screen, all the way across the image.

5. Now press the **Ctrl+Down Arrow** keys to move one screen **down**.

6. Use the **Ctrl+Left Arrow** keys to move one screen to the **left**.

7. Keep moving to the left until you have moved all the way across the image, then move down, then right, then down, then left, then down, etc., until you have moved through the entire drawing.



Using Scan2CAD to convert logos

Sometimes people contact us to say they're having difficulties converting a logo. When they email us their problem logo we usually find that the root of the problem is one of the following:

- The logo is a GIF or JPEG file designed for web use
- The logo has been scanned at too low a resolution

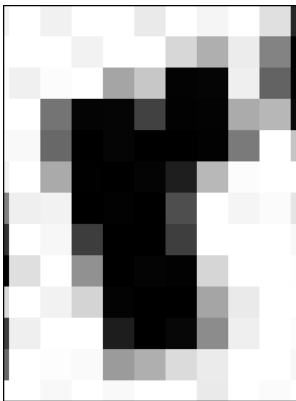
These problems are detailed here, along with the best way to get a logo scan that will give you a good conversion.

The logo is a GIF or JPEG file designed for web use

The JPEG file below, "Jane's Flowers", looks fine on the web, because that's what it's been designed for - web display.



However, if you load it into Scan2CAD, Photoshop or any similar program and zoom into the "r" in the word "Flowers" this is what you'll see:



Looked at close up, the "r" is not discernable even to the human eye. It's not surprising that Scan2CAD has difficulties with this type of logo.

An image with an intended end use of web display requires completely different attributes from an image with an intended end use of vectorization. Images downloaded from the web are generally unsuitable for raster to vector conversion.

The logo has been scanned at too low a resolution

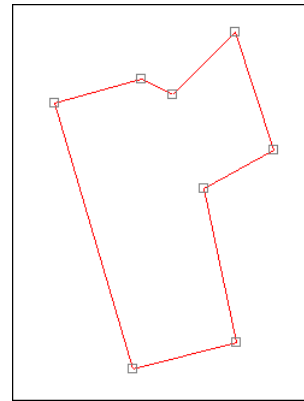
Logo artwork tends to be small and this means that we often see logos that have been scanned at too low a resolution. While we recommend 200 or 300 dpi as an optimal scanning resolution for most drawings, it is too low if the drawing you're scanning is a small logo.

To illustrate the problems you're likely to encounter when scanning a small logo we drew the "Jane's Flowers" logo so that it measured approximately 1.6" x 1" (4cm x 2.5cm) in size.

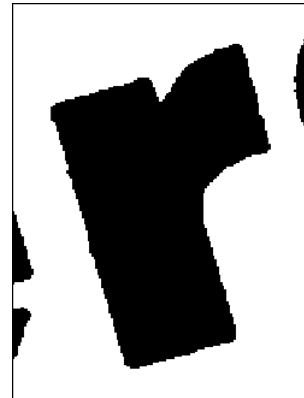
Below is the "r" in the word "Flowers" after scanning the logo at 300 dpi. You can see that the outline of the "r" is very jagged. This means that it is too low resolution.



You will not be able to produce a good vectorization from this image:



After scanning at 1200 dpi (below) the logo outline is much smoother, but scanning at a higher resolution has resulted in a new problem.

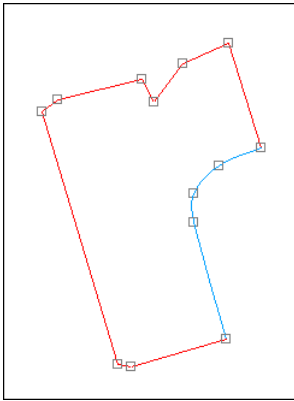


At the higher resolution the scanner has picked out tiny details that are not visible to the human eye when viewing the logo on paper. Because the artwork is so small, these details are large in relation to the size of the logo. This means that the corners of the "r" have become rounded and the lines of the "r" are bumpy instead of straight and smooth.

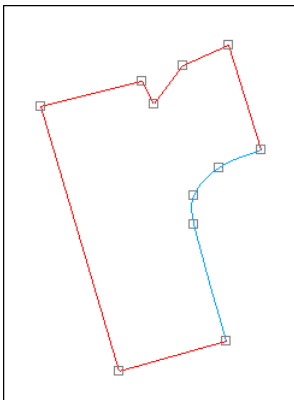
You will be able to produce a usable vectorization from this image, but the vectorization won't be as good as it could be (see **Getting the best possible scan for logo vectorization** overpage).

Note that the rounded corners of the scanned "r" have been reflected in the vectorization by chamfers (see overpage).





To sharpen the corners, do the vectorization again, but before you do it go to the **Type Menu**, select **Settings** and enter a **Corner Snap**. Scan2CAD will then remove all chamfers shorter than the Corner Snap and join the main lines together, giving sharp corners:



To conclude, you will never be able to get a really good scan from small original artwork. This will be reflected in the results you can expect.

Getting the best possible scan for logo vectorization

To get the best possible scan for logo vectorization, start with a bigger logo.

We drew the "Jane's Flowers" logo again, but this time we drew it bigger so that it filled a letter size / A4 sheet.

Here is the "r" in "Flowers" after scanning the bigger logo at 300 dpi. The scanned outline is smooth and clean:

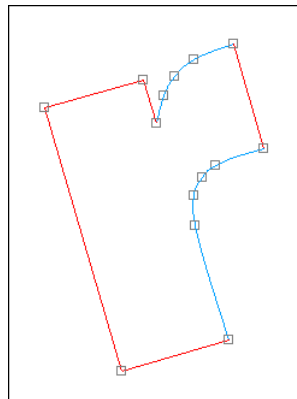


Note that to get a good scan like this your original artwork must be large. You cannot start with small original artwork and enlarge it on a photocopier. This will result in a scan that is no better - and that is probably worse - than the scan you would get if you scanned small artwork at a high resolution.

Once you have a smooth clean scan you can vectorize it as follows.

1. Go to **Type > Outline**.
2. Click **VEC** to vectorize the logo.

This will produce a vector image made up of lines and Bezier curves:



If your CAD/CNC program doesn't support Bezier curves you can convert them to polylines or arcs on export.

Alternatively, you can vectorize the scan as follows:

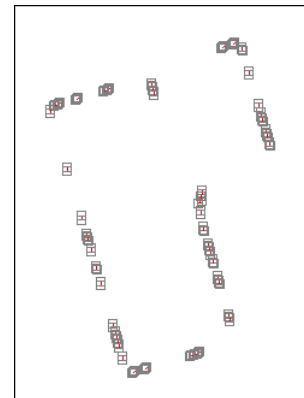
1. Go to **Type > Outline**.
2. Go to **Type > Settings**.
3. Click the **Object Identification Tab**, select **Arc** and click **OK**.

4. Click **VEC** to vectorize the logo.



This will produce a vector image made up of lines and arcs.

If you can't see any vectors after you've done the vectorization, press **C** on your keyboard to display the vectors in different colors.

If you still can't see any vectors, or if your vectors look something like this ...



... it's likely that your image is grayscale or color, even if it looks black and white. Do the following:

1. Press **Ctrl+F8** to delete all vectors.
2. Go to **Palette > Reduce Colors Auto > 2**. This will turn your image into black and white. Turning a grayscale or color image into black and white often gives it ragged edges and leaves white holes in the black areas, so ...
3. Click  (**Raster Effects > Smooth**) to smooth the ragged edges.
4. Click  (**Raster Effects > Clean > Remove Holes**) to fill the holes.

Now repeat the vectorization.

And finally ...

Once you've scanned your logo, don't save it as JPEG as this will almost certainly reduce the quality of your scan. Save it as TIFF or BMP.



How to quickly edit DXF from poor quality scans

If you've vectorized a poor quality scan and ended up with a messy DXF file you can still use it to quickly build up a drawing in CAD. Scan2CAD user Alan Darbyshire describes how.

"I use Scan2CAD on every contract drafting job I do. As I am supposed to be redrafting a drawing from scratch my customers expect 100% first quality but to save myself time I use Scan2CAD to do 80% of the work and I do the rest, thus ensuring that the final results are perfect.

"The problem is that 99% of the drawings I get are copies, not originals. When I scan these poor quality copies and convert them in Scan2CAD the results are not as good as if I was working from the original master drawing. Fortunately, I've developed a way around this problem which has proved very useful when I'm redrawing a very messy DXF file.

"Once Scan2CAD has created the DXF file I import this into the CAD software. In my case, it's AutoCAD. The method I use is as follows. I place the Scan2CAD DXF geometry onto

a faint colored layer that I call 'S2C', dark gray if it's on a black background. Then I create another layer, which I call 'Trace' and make this white. Next, I change all of the perfect geometry from the 'S2C' layer onto 'Trace'. The easiest way to do this is to just select the 'S2C' entities, then pick the 'Trace' layer. This is a standard method of moving geometry from one layer to another in AutoCAD.

"Very quickly I am able to build up the detail required. Note that I am not drawing over the 'S2C' layer, simply changing it to the 'Trace' layer. I use AutoCAD's Offset and Fillet Zero commands to tidy up and modify the Scan2CAD DXF file, plus I am able to 'snap' to the Scan2CAD geometry to add or tidy any items as required. I don't have to start from a clean sheet in CAD. It is surprising how quickly I can build up the detail. Afterwards, I just delete the leftover entities on the 'S2C'

layer using AutoCAD's Properties 'Funnel' to search for all the 'S2C' entities.

"This method allows me to complete the drawing in around half the time it takes to redraw it from scratch. The result is an accurate drawing I can email to my customer who can carry out his amendments in turn.

"When the master drawing is good and I scan it correctly, I have a lot less work to do afterwards. If you have an architectural drawing it is of paramount importance that you scan it in straight as this will affect the results you get. Yes, you can rotate a skew drawing in Scan2CAD but if you scan it straight in the first place it will save you an additional step in the tidying-up process later on.

"Scan2CAD has saved me a lot of time and given me a rapid payback on my investment. It really does help me get my work done more quickly!"

Typing over poor quality text

When the text on your raster image is simply too poor quality to convert to vector text using Scan2CAD's OCR, the easiest way to convert it is to type new vector text over it.

To do this, we suggest you vectorize the drawing in the normal way. Then, for each piece of text, **erase the unwanted vectors** that have been recognized over it and **type the new vector text**. Once you've typed the new text, you may need to **edit it, change its size or move it**. Finally, you may want to **erase the raster text beneath**.

Erasing unwanted vectors

Suppose you've vectorized a drawing that contains poor quality raster text:

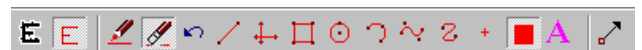
REMOVE PART

The text will vectorize to lots of short vectors:

REMOVE PART

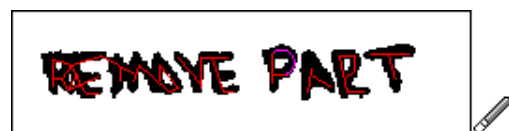
Before you can type new, clean vector text over the raster text, you need to delete the unwanted vectors. To do this:

1. Ensure the **Vector Edit**, **Erase** and **Area Icons** are selected:



If they're not, select them by clicking on them.

2. Drag a box around the area of vectors you want to erase:



It doesn't matter that the raster text is also enclosed within the box. As you are in Vector Edit mode, only the vectors will be deleted.

Typing new vector text

1. Ensure the **Vector Edit**, **Draw** and **Text Icons** are selected:



If they're not, select them by clicking on them.

2. Click at the bottom left of the raster text you want to write over:



The Vector Text Edit dialog appears. If it appears partially over the raster text you want to write over, drag it out of the way.

3. Type the text into the dialog.
4. Press **[Enter]** or click **OK** to exit the dialog. The vector text you have typed appears over the raster text:



Editing vector text

1. Ensure the **Vector Edit**, **Draw** and **Text Icons** are selected:



If they're not, select them by clicking on them.

2. Click on the text you want to edit. The Vector Text Edit dialog appears.
3. Edit the text in the dialog.
4. Press **[Enter]** or click **OK** to exit the dialog.

Changing vector text size

1. Ensure the **Vector Edit**, **Draw** and **Text Icons** are selected:



If they're not, select them by clicking on them.

2. Click on the text you want to change the size of. The Vector Text Edit dialog appears.
3. Edit the **Height** value in the dialog.
4. Press **[Enter]** or click **OK** to exit the dialog.

Moving vector text

1. Ensure the **Vector Edit** and **Move Grab Point Icons** are selected:



If they're not, select them by clicking on them.

2. If grab points are off, press **G** on your keyboard to turn them on. Pressing **G** toggles grab points on and off. If you need to make the grab points bigger so you can see them better go to the **View Menu** and choose **Grab Point Size**.

Grab points OFF:



Grab points ON:



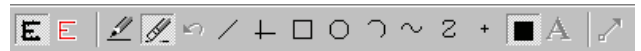
The text's grab point is the gray box at the bottom left.

3. Position the cursor over the text's grab point and drag the text to its new position.

If the text doesn't move, try increasing the Grab Snap Distance. You can do this by pressing the **Period** key on your keyboard (also marked **>**) or by using **Vector Edit > Grab Snap Distance**.

Erasing the raster text beneath

1. Ensure the **Raster Edit**, **Erase** and **Area Icons** are selected:



If they're not, select them by clicking on them.

2. Drag a box around the raster text you want to erase:



It doesn't matter if your newly-typed vector text is also enclosed within the box. As you are in Raster Edit mode, only the raster text will be deleted although initially it will look as though the vector text has been deleted as well.

3. Press **B** on your keyboard or click on the **View Both Icon** to re-display the vector text:



How to edit raster text on a scanned drawing

We've been in contact with a lot of users who are using Scan2CAD as a raster editor and who are using it to re-type and edit raster text.


Rather than using Scan2CAD's raster text writing tool to do this, we suggest the following.

1. Write your new or edited text using Scan2CAD's **VECTOR** text writing tool.

Writing text as vector instead of as raster gives you the advantage of being able to easily change the size of the text, correct any errors you make and move the text around after you have written it. For information on writing, editing and moving vector text, see **Typing**

over poor quality text included with these Hints and Tips.

2. After you have written all your vector text (and deleted any raster text beneath):

- a) Click  to make sure you are fully zoomed out.
- b) Press C to turn the vector text black, if it is displayed in magenta.
- c) Go to File Menu > Vector > Rasterize.

This will convert the vector text to raster.

You can also rasterize individual bits of vector text by windowing them or zooming into them, then choosing File Menu > Vector > Rasterize.

Use Scan2CAD to load raster images into AutoCAD LT!

Because AutoCAD LT's image insert command is disabled, you can't load raster images into it directly.

Scan2CAD's Attach Raster Image option gives you a way to load raster images into LT. See the Scan2CAD Help for more information on the Attach Raster Image option.

If you have Scan2CAD and AutoCAD LT, this opens up a whole range of possibilities. For example you can:

- View and edit the vectors in LT with the raster underneath in a different color (Raster Overlay).
- Vectorize only the parts of a drawing you need to change - and leave the parts you don't need to change in raster format.
- Load just the raster image into LT without any vectors - and trace or draw over it in CAD.

To load the raster image into LT without vectors:

1. Load the raster image into Scan2CAD.
2. Select the Attach Raster Image option as follows:

- a) Go to **File Menu > Vector > Export Options**.
- b) Select the **Attach Raster Image** option.

- c) Select a raster color by entering a number into the **CAD Color Index** box. Good colors to choose for LT are:

- 2 (yellow)
- 8 (dark gray)
- 9 (light gray)

- d) Click **OK**.

3. Create a blank DXF file by clicking .

4. Save the DXF file.

5. Open the DXF file in AutoCAD LT.

Outlining an object on a photo

Users sometimes send us color or grayscale photos of objects they'd like to vectorize the outline of. We've seen cows, cats, cars ...

Unfortunately, vectorizing an object on a photo can be very difficult. This is because before you can vectorize the object you need to divide the photo into two discrete color areas: The object and the background. This is usually hard to do automatically because the object and the

background tend to share colors or shades of gray that make it difficult or impossible to separate them.

Here's a quick "cheat" approach:

1. Get a piece of tracing paper and trace around the object on the photo with a pen or pencil.
2. Scan the traced outline.
3. Vectorize the outline in Scan2CAD.



How to tell if a polyline is closed

A polyline is a series of connected line and arc segments. Some applications - in particular CNC - require closed polylines where the polyline start and end points are the same and where there are no gaps in the line and arc series. This tip shows you how to quickly see if a polyline is closed before you export it to another application.

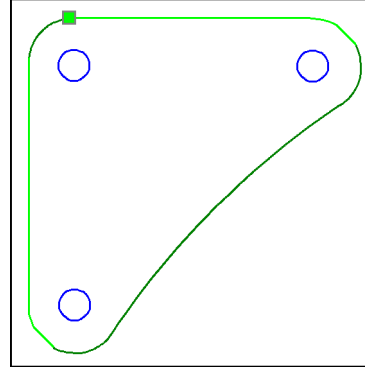
When you vectorize an image using Scan2CAD polylines are displayed in green. Lines within the polyline are displayed in pale green and arcs within the polyline are displayed in dark green. (To toggle between displaying vectors by type or by color, press C on your keyboard.)

If there are no polylines in your vectorized drawing, you can make polylines by selecting Vector Edit Menu > Make Polylines. If there are still no polylines, this is either because the vectors on your drawing are too disjointed to be joined into polylines or because there are Bezier curves (displayed in blue). If there are Bezier curves, close down your vectorization by pressing Ctrl+F8. Go to Type Menu > Settings > Object Identification Tab and make sure that Arc and Polyline are selected. Then revectorize the image.

Once you have a vectorization that contains polylines you can see whether you have a closed polyline as follows:

1. Optional: If grab points (squares at vector ends) are displayed, turn them off by pressing G on your keyboard.
2. Turn on polyline grab points by pressing P on your keyboard.

Green filled squares appear at the start and end points of polylines. There will be one green square marking the start point of a polyline and one green square marking the end point. If it is a closed polyline there will be just one square marking the start and end point of the polyline:



If there are more green squares than expected, the polyline is broken. The breaks are at the positions of the unexpected green squares.

To mend the polyline, you can either:

- Close down your vectorization by pressing Ctrl+F8. Mend the raster image at the polyline break points using Scan2CAD's raster editing tools. Then revectorize the image

Or

- Use Vector Edit > UnMake Polylines to break the polylines so they can be edited. Use Scan2CAD's vector editing tools to mend the breaks. Finally, use Vector Edit > Make Polylines to re-make the polylines.

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