Andrea's Real World Guide to vectorizing a black and white raster image with Scan2CAD.

As those of you I've talked to by email can probably guess, I've vectorized hundreds of black and white images of different types and quality using Scan2CAD. In this Guide, I've written down the steps I take when I vectorize an image.

You'll notice there are a lot of steps - it is *not* a one step process. This is because all raster images are different and most raster images need some tidying before they can be vectorized successfully. If you want a good vectorization, there is no "one size fits all".

If you do follow the steps below they will help you get the best possible vectorization from most black and white images. Once you are familiar with the steps and with what to look for, you'll be able to get good vectorizations very quickly - so long as your images are suitable for vectorization.

Remember that not all raster images can be successfully vectorized. Some images are too poor quality, have been scanned at too low or too high a resolution or have too much overlapping content. You'll see some examples of these in Step 6 below.

For information on getting a good quality scanned image, see the Scan2CAD Hints and Tips sheet. If you don't already have this you can get a copy by going to www.softcover.com and clicking on the Hints and Tips button.

Step 1: Load the raster image.

I load the raster image by clicking 📂.

When I load a raster image, the Warning: Color Image dialog may appear. If it does, it means the image I am trying to load is not black and white, even if it looks black and white!

As a "quick and dirty" solution I normally choose the third option in the dialog to automatically convert the image to black and white. This works fine on most images.

If the image has quality problems (see Step 6 below), I may reload it and convert it to black and white using the second (thresholding) option. For more information about thresholding, see the Scan2CAD Help.

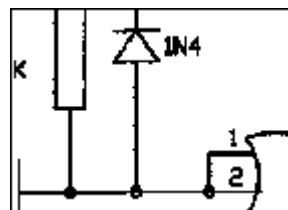## Step 2: Negate the image.
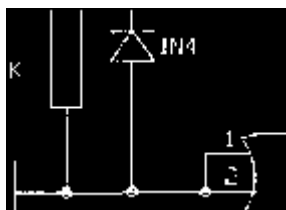
Reversed image   *Image after negation*

If the image is reversed (there are white lines on a black background) I click ▬ to negate it so there are black lines on a white background.

Step 3: Rotate the image so it is the right way up.

I don't like working on images that are the wrong way up! In addition, if I'm going to be doing OCR text recognition there are less settings to worry about if the text is upright.

To rotate the image so it's the right way up I click 🔄 then click on the image.

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Page 1

The Raster Rotate Setting dialog appears. To rotate the drawing by 90 degrees clockwise, I type 90 and click OK. To rotate the drawing by 90 degrees anti clockwise, I type -90 and click OK.

Step 4: Deskew the image.

If the image is skew, I usually click ☐ to deskew it automatically.

If this doesn't deskew the drawing, I click ☐ then drag a reference line over a line on the drawing that should be exactly horizontal.

Step 5: Smooth the image.

I smooth the image by clicking ☐. This removes small crenellations and fills small holes.

Step 6: Zoom into the image and look at it.

I zoom into the image by placing my cursor over it and scrolling my mouse wheel forwards. Once I'm zoomed in I pan around by moving my mouse with the scroll wheel held down. To zoom out again so I can see the whole image, I click ⊕.


■ **TIP:** Before zooming I normally press SHIFT+I to turn on a grid. I keep zooming in until the grid becomes visible (it is not visible when you are zoomed out). If the image is a line drawing, this will give me an idea of how many pixels thick the lines are (each grid square equals one pixel). As a general rule, Scan2CAD is optimized for lines that are about five pixels thick. If your lines are much thinner or thicker than this, you may need to consider scanning your drawing at a different resolution.
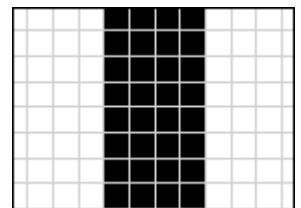
Line width = 4 pixels.

When I'm zoomed in and panning around the image I might see several things:

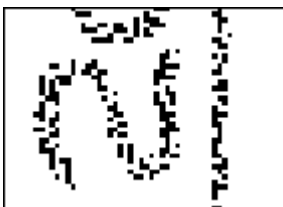### a) A good quality image
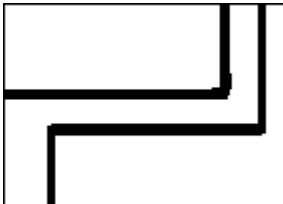
Line drawing   *Solid drawing for outlining*

If the image has clean unbroken lines (line drawing) or a smooth edge (solid drawing for outlining) I can go straight to Step 7.
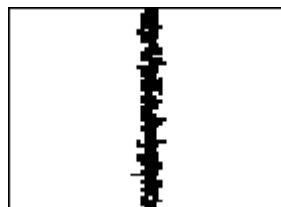
b) A dithered, broken or ragged image

Dithered   *Broken*   *Ragged*   *Ragged*

If the image looks anything like any of the examples above, I'm unlikely to get a good vectorization.

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Page 2

I use 🔲 (Thicken Pixels) to try to mend the image. If the image is made up of disconnected speckles as in the Dithered example above or contains a lot of breaks as in the Broken example, I normally use a value of 2. If the image is ragged but essentially joined as in the Ragged examples I may use a higher value like 4.

Depending on the image I may use 🔲 two or more times, until the image is joined and/or relatively smooth.

If I need to, I can Undo 🔲 by clicking ↩.

After using 🔲 it's a good idea to smooth the image again by clicking 🔲. It's also a good idea to do hole removal on it (see Step 8).

■ **Warning:** When using 🔲, I ensure that the Apply Changes to Full Image option in the dialog is selected or only the area of the image displayed on the screen will be thickened!

■ **Warning:** Using 🔲 can deteriorate the quality of an image by thickening it to the extent that lines that are close to each other become joined. However it is often the only way to make a dithered, broken or ragged image vectorizable.

■ **TIP:** If the image has "clouds" of pixels surrounding ragged lines, I despeckle the image (see Step 7) before attempting to mend it using 🔲.
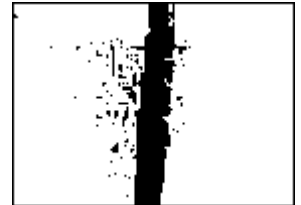
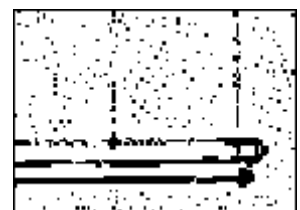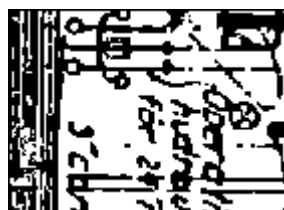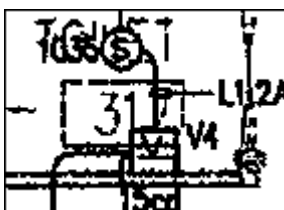## c) An image that is too low resolution

Line drawing   *Solid drawing for outlining*

If the image is too low resolution I won't vectorize it as the results will be nonsensical. If the image is too low resolution, the only remedy is to rescan the drawing at a considerably higher resolution.

For example, the line drawing above includes the characters t, e and a tree, but these shapes are too low resolution to be properly defined. The characters in the solid drawing for outlining are made up of too few pixels to be outlined accurately.

d) A mess

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Page 3

Some images are just a mess, as in the examples above. These typically contain overlaid information (e.g. text on top of wiring on top of a building layout), dirt that interferes too much with the drawing to be removable, or raster lines that are broken or blobby.

If an image is a mess I won't vectorize it as the results will be nonsensical.

## Step 7: If the image has speckles, despeckle it.

If the image has speckles, I despeckle it by clicking ▨.

■ **Warning:** When using ▨, I ensure that the Apply Changes to Full Image option in the dialog is selected or only speckles in the area of the image displayed on the screen will be removed!

■ **TIP:** If there's text on the image I'm despeckling, I normally zoom into an area of text before doing the despeckle. I then set the speckle size so that small items like full stops (periods), decimal points and inch signs (") are not removed.
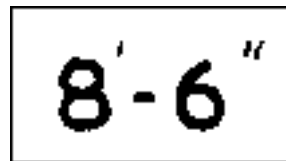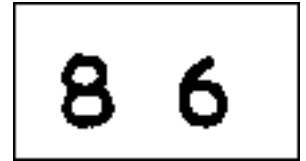

Original   *Speckle size too large*

■ **TIP:** If I'm removing speckles from a solid image that I'm going to be outlining, I usually set the speckle size to the maximum setting to ensure that all speckles are removed.

■ **TIP:** If there are speckle-type hatches on the image I normally use despeckle to remove them. It is better to replace hatches like these in your CAD program later than to try to vectorize them.
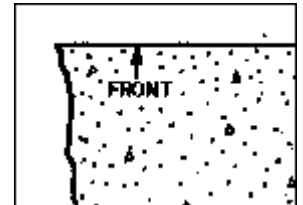
■ **TIP:** If I find I've chosen a speckle size that's too small, I do another speckle removal using a larger speckle size. If I find I've chosen a speckle size that's too large I Undo speckle removal by clicking ↰, then try again with a smaller speckle size.

Step 8: Remove holes from the image.

Even if an image doesn't obviously contain holes, the chances are that there are some! I remove holes by clicking ▨.

■ **Warning:** When using ▨, I ensure that the Apply Changes to Full Image option in the dialog is selected or only holes in the area of the image displayed on the screen will be filled!

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Page 4

TIP: If there's text on the image I'm removing holes from, I normally zoom into an area of text before removing holes. I then set the hole size so that small holes within characters are not filled.

Original   *Hole size too large*

TIP: If I'm removing holes from a solid image that I'm going to be outlining, I usually set the hole size to the maximum setting to ensure that all holes are filled.

TIP: If I find I've chosen a hole size that's too small, I do another hole removal using a larger hole size. If I find I've chosen a hole size that's too large I Undo hole removal by clicking ↰, then try again with a smaller hole size.
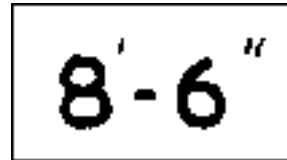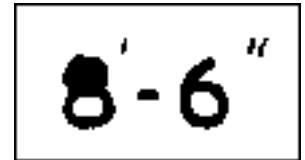
Step 9: Manually remove any obvious remaining areas of dirt.

I do this using Scan2CAD's area erase tool. To use the area erase tool, select the following icons: ⊟ ✎ ■. Then drag a box around the dirt you want to erase.

TIP: When manually cleaning dirt I often scroll through the image screen by screen, as follows:

a) Zoom into the image so I can see enough detail to be able to clean it. To zoom in, I scroll my mouse wheel forwards.
b) Use the scroll bars to move to the top left corner of the image.
c) Clean the part of the image I can see on the screen.
d) Press the Ctrl+Right Arrow keys to move one screen to the right.
e) Repeat Steps (c) and (d) until I have moved, screen by screen, all the way across the image.
f) Press the Ctrl+Down Arrow keys to move one screen down.
g) Clean the part of the image I can see on the screen.
h) Use the Ctrl+Left Arrow keys to move one screen to the left.
i) Keep cleaning and moving until I have cleaned the entire drawing.

TIP: If I erase something accidentally, I Undo the erase by clicking ↰.

Step 10. If the image contains text, tell Scan2CAD what size text to expect.

To do this, I go to the OCR Menu and select Char Size, then click on the largest character in the image.

TIP: The largest character can often be found in the image's title. I may need to zoom into the character to click on it successfully. (To zoom in, I scroll my mouse wheel forwards. To zoom out so I can see the whole image, I click ⊕).

Step 11: Select vectorization settings.

I normally select one of the following settings.

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Page 5

a) If the image contains a lot of straight, orthogonal lines, I select Mechanical.
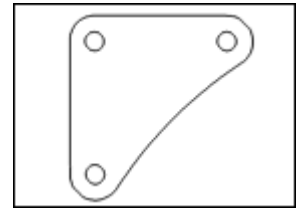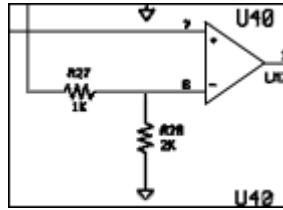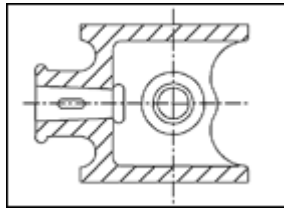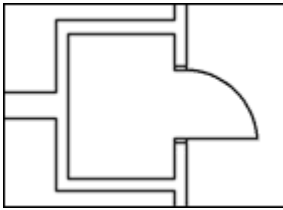
Considerations:

Scan2CAD remembers the last used vectorization settings. If I've been playing around with vectorization settings on previous images I go to Type Menu > Settings and click the Default button to make sure the Mechanical vectorization settings are set to default.

b) If the image contains a lot of straight but non-orthogonal lines, I select Site Plan.

Considerations:

Scan2CAD remembers the last used vectorization settings. If I've been playing around with vectorization settings on previous images I go to Type Menu > Settings and click the Default button to make sure the Site Plan vectorization settings are set to default.

The default Site Plan settings do not recognize dashed lines. If the image contains dashed lines I go to Type Menu > Settings > Object Identification and select Dash Line.

c) If the image is curvy, I select Contour Map.

Considerations:

Scan2CAD remembers the last used vectorization settings. If I've been playing around with vectorization settings on previous images I go to Type Menu > Settings and click the Default button to make sure the Contour Map vectorization settings are set to default.

The default Contour Map settings convert the shape to lines and Bezier curves (splines). While Bezier curves are ideal for curvy shapes, not all CAD and CNC software supports them. If the DXF file is destined for a CAD or CNC program that doesn't support Bezier curves I go to Type Menu > Settings > Object Identification and select Arc. (If a Scan2CAD DXF file looks strange once it's been read into a CAD or CNC program, or if it won't read in at all, the likely reason is that the CAD or CNC program doesn't support Bezier curves.)

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Page 6

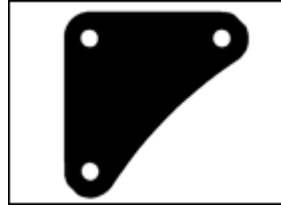**d) If the image is a solid shape to be outlined, I select Outline.**

Considerations:

Scan2CAD remembers the last used vectorization settings. If I've been playing around with vectorization settings on previous images I go to Type Menu > Settings and click the Default button to make sure the Outline vectorization settings are set to default.

The default Outline settings convert the shape to lines and Bezier curves (splines). While Bezier curves are ideal for curvy shapes, not all CAD and CNC software supports them. If the DXF file is destined for a CAD or CNC program that doesn't support Bezier curves I go to Type Menu > Settings > Object Identification and select Arc. (If a Scan2CAD DXF file looks strange once it's been read into a CAD or CNC program, or if it won't read in at all, the likely reason is that the CAD or CNC program doesn't support Bezier curves.)

The default Outline settings assume the shape to be outlined is more curvy than straight. If the shape contains more straight lines than curves, I go to Type Menu > Settings > Object Identification and select Arc. If a lot of the straight lines are horizontal and vertical, I go to Type Menu > Settings > Angle Optimization. I select the Orthogonal 90/180 box and type 8 into the Degrees +/- box.

e) If the image includes some lines and some solid areas, I select Mechanical, Site Plan or Contour Map depending on the image type (see above).
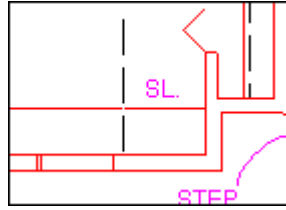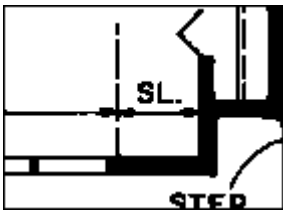
Raster image   *Vector image with solid parts of the image outlined*

When an image includes some lines and some solid areas I count the approximate width of the lines in pixels (see Step 6).

I then go to Type Menu > Settings and set the Line Width option at the top of the General Tab to the width of the lines.

This means that the solid parts of the image will be outlined in the vector image.

<div style="background:#c3e000">

Step 12: Vectorize the image.

</div>

If the image contains text, I vectorize it by clicking `ALL`.

If the image doesn't contain text, I vectorize it by clicking `VEC`.

■ **Warning:** Before vectorizing the image I ensure the image is fully zoomed out by clicking ⊕. If it is not, only the area of the image displayed on the screen will be vectorized!


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Page 7

Once I've done the vectorization I press G to turn on grab points, if they are not already on. Grab points are little squares that mark vector end points and arc and circle mid points. If all the vectors are displayed in black, I press C so that different vector entities are displayed in different colors.

Clusters of grab points in unexpected places may indicate a problem with the raster image or may indicate that I need to change the vectorization settings I've used.
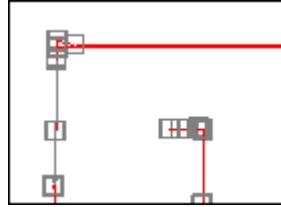
To see what I mean, look at the raster image below.
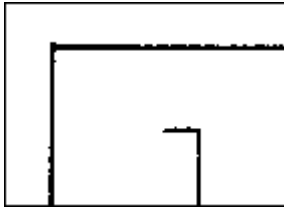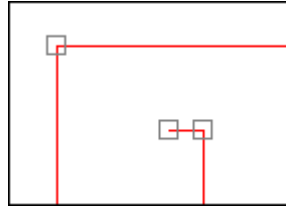
Raster   *Expected vectors*   *Actual vectors with grab point clusters*

After a successful vectorization I would expect neat vectors with grab points at vector ends.

If, instead, I get clusters of grab points, something's clearly wrong and needs further investigation.

To investigate a grab point cluster I zoom into it by placing my cursor over it and scrolling my mouse wheel forwards. (To zoom out again so I can see the whole drawing I click ⊕).

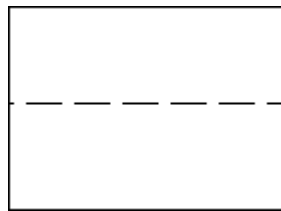Here are some common reasons for grab point clusters, and what I do about them:

a) A dashed line has been recognized as many lines instead of as one dashed line
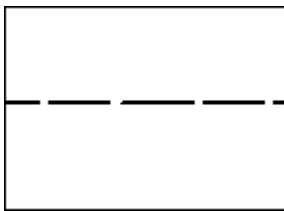
Raster   *Vectors with cluster*   *Vectors after correction*
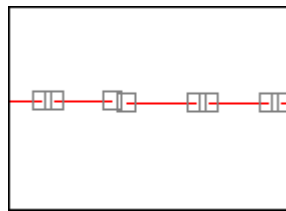
I try this:

I go to Type > Settings.

I go to the Object Identification tab and make sure Dash Line is selected.

If it is, I go to the Advanced tab and double the Max Dash Length and/or Max Gap Length values. (Often, the dash part of the dash line is much longer than the gap part, so I only increase the Max Dash Length.)

I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ᴬᴸᴸ or ᵛᴱᶜ.

If the problem persists after revectorization, I measure the lengths of the dashes and gaps to ensure that the Max Dash Length and Max Gap Length values I have entered are large enough.

I do this by pressing Ctrl+D and dragging the cursor along a dash or gap. (You must have v7.5e to be able to do this. To see which version you have, go to Help Menu > About. If you are a registered user of v7 you can upgrade to v7.5e free of charge by going to www.softcover.com and clicking the Support button.)

If Scan2CAD won't recognize a dashed line even after Dash Line is selected and I have entered sufficiently large Max Dash Length and Max Gap Length values, this could be for several reasons:

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Page 8

- Scan2CAD cannot recognize dashed lines where the dashes are very short (dots).

- Scan2CAD cannot recognize dashed curves or circles.

- Scan2CAD cannot recognize dashed lines where they cross or join other entities.

- Scan2CAD cannot recognize dashed lines if the dashes don't line up properly. To get around this I might try going to Type Menu > Settings and doubling the Deviation Factor. Increasing the Deviation Factor allows Scan2CAD to deviate more from the raster centre line, giving the vector dashes more angular flexibility and therefore a greater chance of being able to meet other dashes.

Warning: Increasing the Deviation Factor often results in less well recognized circles and arcs, so if circles and arcs are important to you you may want to keep the Deviation Factor small. In addition, increasing the Deviation Factor may decrease the accuracy of the vectorization because it allows Scan2CAD to deviate further from the raster image.
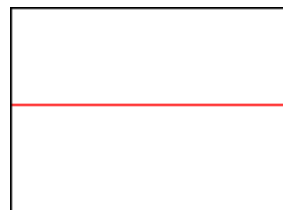
b) There's a gap
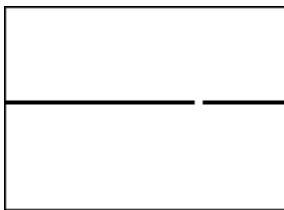
Raster   *Vectors with cluster*   *Vectors after correction*
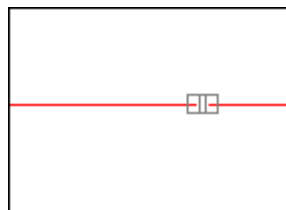
Note that Scan2CAD will only jump a gap when both sides of the gap are on the same directional path. If the place where the gap is is wiggly, Scan2CAD won't be able to jump the gap.

If I have a grab point cluster caused by a gap, I try one of two things: Mend the gap in the raster image or try to jump it during vectorization.

Mending a gap on a raster image

If there are a lot of small gaps on a drawing I may try to mend them by using [icon] (Thicken Pixels) with a value of 2.

Warning: When using [icon], I ensure that the Apply Changes to Full Image option in the dialog is selected or only the area of the image displayed on the screen will be thickened!

Warning: Using [icon] can deteriorate the quality of an image by thickening it to the extent that lines that are close to each other become joined.

If I am vectorizing a profile for CNC and there are just a few gaps around the profile, I may mend them by drawing over them. To do this I make sure that the following icons are selected: [icon] [icon] [icon]. I then drag a line across the gap. If necessary I make the raster pen wider by going to Raster Edit > Pen Size. If I make a mistake I click [icon] to Undo.

Once I've mended the gap(s):

I close the existing vectors by pressing Ctrl+F8.

I click [icon] to zoom out and revectorize the image by clicking [ALL] or [VEC].

Jumping a gap during vectorization

I go to Type > Settings and double the Gap Jump Distance value.

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Page 9

I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ᴀʟʟ or ᴠᴇᴄ.

If the problem persists after revectorization, I display a grid and count the gap length in pixels to ensure that the Gap Jump Distance value I have entered is large enough (see Step 6).

If Scan2CAD won't jump a gap even when I have entered a sufficiently large Gap Jump Distance, the reason is that the two sides of the gap don't line up properly, even if they look as though they ought to. To get around this I might try going to Type Menu > Settings and doubling the Deviation Factor. Increasing the Deviation Factor allows Scan2CAD to deviate more from the raster centre line, giving the vectors more angular flexibility and therefore a greater chance of being able to meet each other on either side of the gap.

■ **Warning:** Increasing the Deviation Factor often results in less well recognized circles and arcs, so if circles and arcs are important to you you may want to keep the Deviation Factor small. In addition, increasing the Deviation Factor may decrease the accuracy of the vectorization because it allows Scan2CAD to deviate further from the raster image.

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c) There's a "loose end"
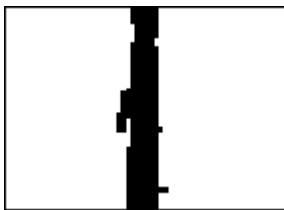
Raster   *Vectors with cluster*   *Vectors after correction*
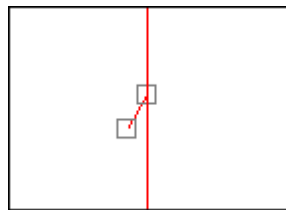
Note that Scan2CAD won't remove loose ends that are made up out of several vectors. If I have a lot of loose ends that are made up out of several vectors the problem is likely that the raster image is ragged and needs to be smoothed (see Step 6 - *A dithered, broken or ragged image*).

If the loose end is just a single vector I try this:

I go to Type > Settings and double the Loose Ends Length value. Vectors that are shorter than the Loose Ends Length and that do not appear to be part of a valid vector path will be removed during revectorization.

I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ᴀʟʟ or ᴠᴇᴄ.

If the problem persists after revectorization, I display a grid and count the pixel length of the loose end to ensure that the Loose Ends Length value I have entered is large enough (see Step 6).

If Scan2CAD won't remove a loose end even when I have entered a sufficiently large Loose Ends Length, the reason is that Scan2CAD thinks that the loose end is a valid vector in its own right. To get around this I might try going to Type Menu > Settings and doubling the Deviation Factor. Increasing the Deviation Factor means that Scan2CAD takes less notice of small deviations, which in turn means it might ignore the loose end.


■ **Warning:** Increasing the Deviation Factor often results in less well recognized circles and arcs, so if circles and arcs are important to you you may want to keep the Deviation Factor small. In addition, increasing the Deviation Factor may decrease the accuracy of the vectorization because it allows Scan2CAD to deviate further from the raster image.

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Page 10

■ **TIP:** If I am vectorizing a profile for CNC and there are just a few loose ends around the profile, I may remove the loose ends by deleting the bumps that are causing them from the raster image. To remove a raster bump, I make sure that the following icons are selected: 𝐄 ✎ ╱ . I then drag a white line across the bump to remove it. If necessary I make the raster pen wider by going to Raster Edit > Pen Size. If I make a mistake I click ↰ to Undo. After removing the bumps, I close the existing vectors and revectorize the image.
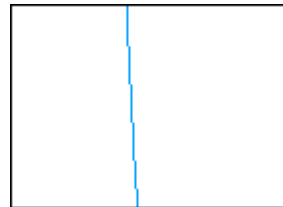
d) There's a hole
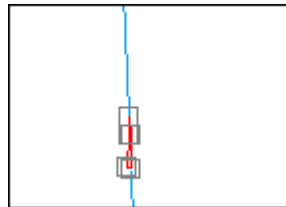
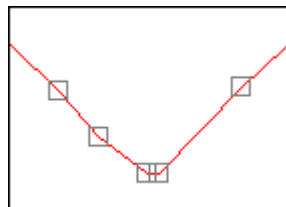*Raster*   *Vectors with cluster*   *Vectors after correction*

If there's a grab point cluster caused by a hole I normally do a hole removal (see Step 8), ensuring that the hole size I choose is large enough to remove the hole.
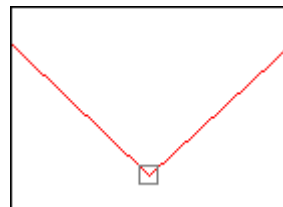
e) An apparently straight raster line or smooth arc is made up of too many vectors

Raster   *Vectors with cluster*   *Vectors after correction*

This normally occurs when raster image entities are thicker than optimal, when they are very long or when the raster entities are rough. Small deviations are seen by Scan2CAD as significant and this is reflected in the vectorization. In other words, Scan2CAD is following the raster image too closely.

I try this:

I go to Type > Settings and double all the values in the General tab.

The value that matters here is the Deviation Factor - increasing the Deviation Factor reduces Scan2CAD's sensitivity to deviations. However, if the Deviation Factor needs increasing it's likely that the other values in the General tab will need increasing too, so I normally double all of them.

I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ᴀʟʟ or ᴠᴇᴄ.

If the problem persists, I will usually ask the customer to rescan the image at a lower resolution. It may sound perverse, but a lower resolution image can often give you better quality vector results.

■ **Warning:** Increasing the Deviation Factor often results in less well recognized circles and arcs, so if circles and arcs are important to you you may want to keep the Deviation Factor small. In addition, increasing the Deviation Factor may decrease the accuracy of the vectorization because it allows Scan2CAD to deviate further from the raster image.

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Page 11

■ **TIP:** If rescanning at a lower resolution isn't an option, I try scaling the raster image down to a smaller size. I do this by going to Raster Effects Menu > Scale and typing 0.5 and 0.5 into the Scale X and Scale Y boxes. If you do this, remember to take into account the fact that you have scaled the raster image when you scale the DXF file.

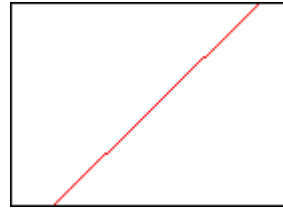## f) Too many arrows have been recognized
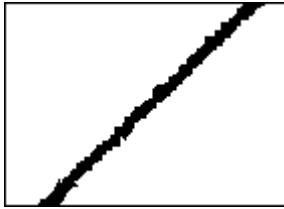
Raster   *Vectors with clusers*   *Vectors after correction*
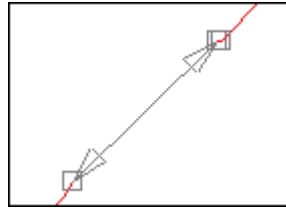
This normally occurs when raster image entities are thicker than optimal and when the raster image is ragged.

If the nature of the image means that arrow recognition is unimportant, I try this:

I go to Type > Settings > Object Identification tab and deselect the Arrow Line option.

I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ALL or VEC.

However if arrow recognition is important, I go to Type > Settings and double all the values in the General tab.

The value that matters here is the Deviation Factor - increasing the Deviation Factor reduces Scan2CAD's sensitivity to the roughness in the raster image and makes it less likely to see arrows that are not there. However, if the Deviation Factor needs increasing it's likely that the other values in the General tab will need increasing too, so I normally double all of them.

I close the existing vectors by pressing Ctrl+F8.

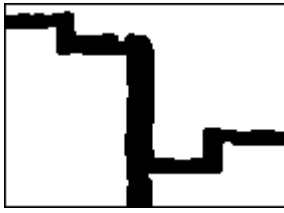I click ⊕ to zoom out and revectorize the image by clicking ALL or VEC.

If the problem persists, I will usually ask the customer to rescan the image at a lower resolution. It may sound perverse, but a lower resolution image can often give you better quality vector results.

■ **Warning:** Increasing the Deviation Factor often results in less well recognized circles and arcs, so if circles and arcs are important to you you may want to keep the Deviation Factor small. In addition, increasing the Deviation Factor may decrease the accuracy of the vectorization because it allows Scan2CAD to deviate further from the raster image.

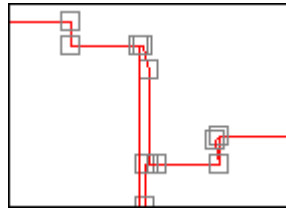■ **TIP:** If rescanning at a lower resolution isn't an option, I try scaling the raster image down to a smaller size. I do this by going to Raster Effects Menu > Scale and typing 0.5 and 0.5 into the Scale X and Scale Y boxes. If you do this, remember to take into account the fact that you have scaled the raster image when you scale the DXF file.
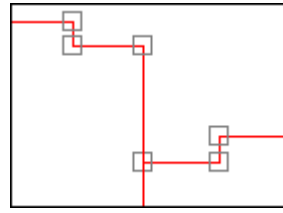
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Page 12

g) Raster image entities are thicker than the currently set Line Width

Raster *Vectors with cluster* *Vectors after correction*
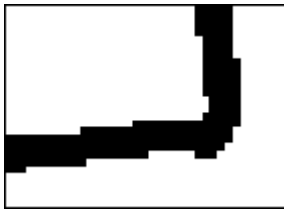
I try this:

I go to Type > Settings and double the Line Width.
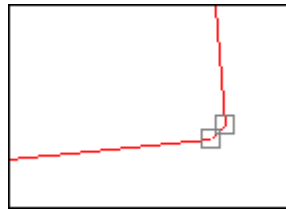
I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ALL or VEC.

If the problem persists I simply keep doubling the Line Width in Type > Settings until the raster entity is recognized as a single line.

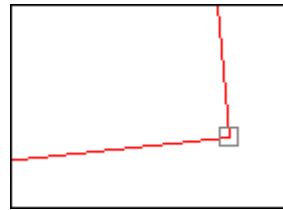## h) Grab point clusters at corners and junctions

Raster *Vectors with cluster* *Vectors after correction*

(If the junction is a corner with an angle of less than 90 degrees, see also *Grab point clusters at corners where the angle is less than 90 degrees*, below.)

I try this:

Depending on the type of junction, I double the Corner Snap (junctions where lines meet) and/or the Pass-Thro Snap (junctions where lines cross). Increasing these values means that grab points at junctions are more likely to fall within the snap distance and be snapped together.

I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking ALL or VEC.

If the problem persists after revectorization, I display a grid and count the pixels between the grab points to ensure that the Corner Snap / Pass-Thro Snap I have entered is large enough (see Step 6).

If Scan2CAD won't tidy a junction even when I have entered a sufficiently large Corner Snap / Pass-Thro Snap, the reason is that snapping the grab points together will cause vectors in another part of the image to deviate too far from the raster image. To get around this I might try going to Type Menu > Settings and doubling the Deviation Factor. Increasing the Deviation Factor allows Scan2CAD to deviate further from the raster image.

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Page 13

■ **Warning:** Increasing the Deviation Factor often results in less well recognized circles and arcs, so if circles and arcs are important to you you may want to keep the Deviation Factor small. In addition, increasing the Deviation Factor may decrease the accuracy of the vectorization because it allows Scan2CAD to deviate further from the raster image.
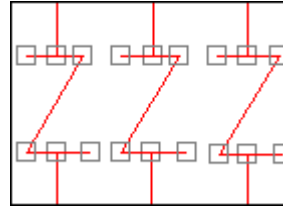
i) Grab point clusters at corners where the angle is less than 90 degrees
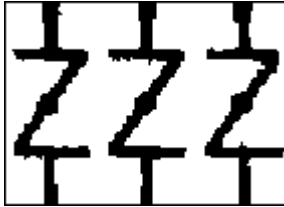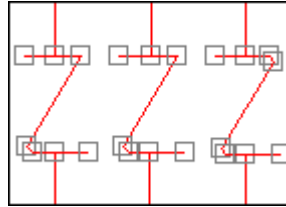
Raster   *Vectors with clusers*   *Vectors after correction*

This situation is most likely to occur on schematic drawings as valve symbols have a lot of acute angles.

I try this:

I go to Type Menu > Settings > Advanced Tab and increase the Corner Snap Angle Tolerance to 45. This means that Scan2CAD will try to sharpen any corner that has an angle of 90 degrees +/- 45 degrees. This allows it to sharpen more acute angles than the default settings allow.

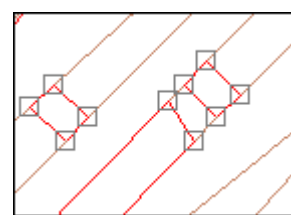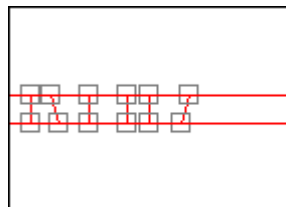I close the existing vectors by pressing Ctrl+F8.

I click ⊕ to zoom out and revectorize the image by clicking `ALL` or `VEC`.

If the problem persists, see *Grab point clusters at corners and junctions*, above.

j) Parallel or concentric raster entities touch
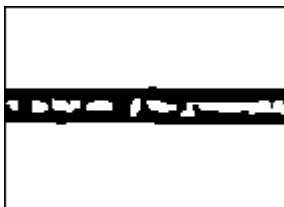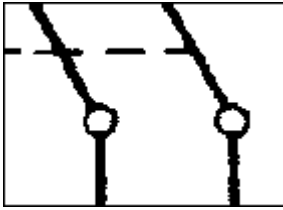

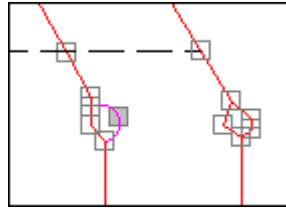*Raster*   *Vectors with cluster*

If parallel or concentric raster entities do not have clean white space between them there is going to be a mess of vectors. There is nothing I can do to improve vectorization in these situations except ask the customer to rescan the drawing in such a way that there is white space between the entities. This might involve rescanning at a higher resolution or rescanning in grayscale and using Scan2CAD's thresholding to convert the drawing to black and white. See the Scan2CAD Help for more information on thresholding.
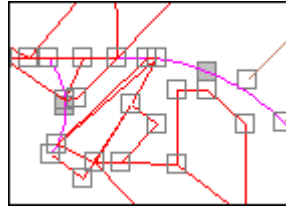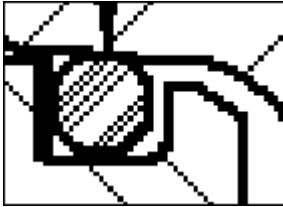
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Page 14

k) There's a small detail

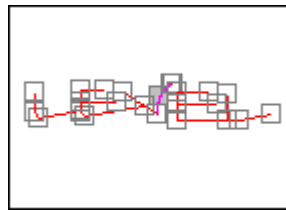*Raster*   *Vectors with cluster*

An image that is largely good quality and that has been scanned at a resolution that is optimal for most of the drawing may contain some small details that are made up of too few pixels to be sufficiently defined for raster to vector conversion. Such details will cause a mess of vectors. There is nothing I can do to improve vectorization in these situations.

l) There's some text that Scan2CAD can't do OCR on

Raster   *Vectors with cluster*

There are a number of reasons why Scan2CAD might not be able to do OCR on text. See the Raster Text Quality Checklist for more information. This is in the Scan2CAD Help and on the Scan2CAD Hints and Tips sheet. To get the Hints and Tips sheet, go to www.softcover.com and click on the Hints and Tips button.

Step 14: Scale and save the vector image

Once I'm happy with the vector image I save it using File > Vector > Save As.

Scan2CAD asks whether I want to set scaling options (scale the vector image). If I know the scale of the raster image (e.g. 1:1, 1:50, 1 inch to 1 foot) I click Yes and use the Vector Scale Settings dialog to scale the vector image to the correct size before saving. (Click the Help button in the Vector Scale Settings dialog for more information on scaling.)

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Page 15