

Quick Start

WiseImage Pro X for AutoCAD

WiseImage is a professional hybrid graphics editor and raster-to-vector converter that work inside AutoCAD 2000/2000i/2002/2004/2005/2006 and AutoCAD LT 2002/2004/2005/2006.

This Quick Start guide has been designed to teach you how to use WiseImage and WiseImage Pro for AutoCAD. You will be guided step by step through common operations and tasks. Please note that this Quick Start will not describe every command in detail. For detailed information refer to the User's Guide and the Help.

The procedures, buttons, and other interface elements, only available in the Pro version of WiseImage, are hereafter marked with 'Pro Only'. The features and functions specific to WiseImage for AutoCAD LT are marked with 'LT Only'.

Contents:

Lesson1: Getting started	3
Lesson2: Enhancing Scanned Images	7
Lesson 3: Calibration	15
Lesson 4: Restoring Images of Poor Quality	19
Lesson 5: Raster Selections	23
Lesson 6: Raster Editing	28
Lesson 7: Editing color images	31
Lesson 8: Separating color images to monochrome layers	36
Lesson 9: Rasterizing, merging raster images	38
Lesson 10: Tracing.....	40
Lesson 11: Automatic vectorization, text recognition	47
Lesson 12: Customizing WiseImage	56

Lesson1: Getting started

Brief description: This section provides you with a basic knowledge of WiseImage – using WiseImage commands, loading and saving raster files, and tools to aid precision drawing.

To run WiseImage

1. Click *Start* on the taskbar, then point to *Programs*.
2. Click on WiseImage, then choose WiseImage from the folder. AutoCAD starts automatically, and then WiseImage is loaded.

Using WiseImage commands

There are three options to run WiseImage commands:

WiseImage toolbars:

Most of WiseImage commands can be run from one of the WiseImage toolbars. You can manipulate WiseImage toolbars with the standard AutoCAD TOOLBAR command.

The WiseImage Menu:

This menu contains all WiseImage commands

The Command Line:

Each WiseImage command can be run from the command line. WiseImage commands start with the character *r*

Example: *rNew*, *rTrace*...

While performing most WiseImage commands, you can use the *cursor menu* for fast option selection. These are displayed if you right-click. The same menus are displayed if you right-click on some of the dialog box elements. These menus contain commands which can be applied to the selected element of the dialog box, or facilitate character entry in the dialog box.

Working with Raster Images

You can scan raster images directly from the program, load existing images and create new raster images. The program can handle any type of raster images that can be loaded into AutoCAD, with no size restriction.

Scanning with WiseImage

You can scan directly from AutoCAD with WiseImage, if you are using a CONTEX scanner or a scanner with TWAIN-driver.

If a support scanner is installed, then choose it with the **Select Source** command of the **rFile** menu. Then start the **Acquire** command. The displayed dialog depends on the scanner and driver version.

Loading Raster Images

In AutoCAD 2000/2000i/2002/2004/2005/2006 you can use the **ImageAttach** AutoCAD command.

In AutoCAD LT 2002/2004/2005/2006 you must use the **rOpen** command instead.

Creating New Raster Images

You can create a new raster image. Choose **New** from the **rFile** menu. Specify type, size, resolution and other properties for a new image.

Saving Raster Image

If you want to save the raster image, then use **rSave** or **rSaveAs** command.

When you are saving an AutoCAD drawing WiseImage automatically saves all changed raster images inserted into the current drawing. If new images were created, then the program opens a dialog box for saving a new raster image where a user should specify the raster file name, location and format.

Selecting an Image with WiseImage Commands

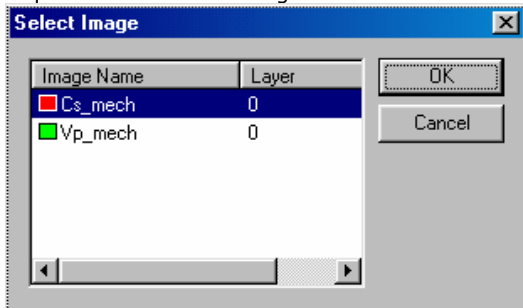
Most WiseImage commands require that a user select the images to be operated on. Two standard selection procedures are provided: selecting one image and selecting a group of images.

Selecting a Single Image

If there is only one available image in the drawing, then it is automatically selected.

To select a single image click on its border.

If there are several available images, then you can select the required one after running command in the following dialog box:

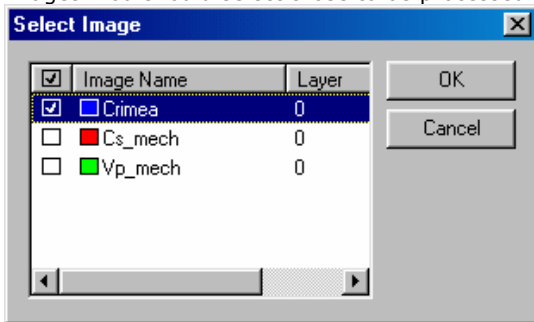


If you drag the cursor to the AutoCAD screen and hold it on an image, then its name will be highlighted in the list and it will also appear near the mouse cursor. To select the image, click on it. (Close the dialog by pressing the OK button.)

Selecting Several Images

If there are several available images, then you can select the required ones before calling the command. In this case the operation will commence on the selected images.

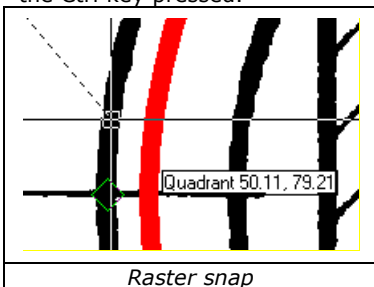
If you have not selected any image before starting the command, then a dialog box is displayed, containing a list of all available images. You should select those to be processed.



Raster Snap

WiseImage allows you to snap to characteristic points of raster objects. You can only use raster snap on monochrome raster image. When you select points on the image with raster snap mode on, a square *raster snap pickbox* appears on the cursor cross. Furthermore, you can snap to vector and raster objects at the same time. Raster Snap uses the same settings from Object snap settings as AutoCAD Vector Snap. The snap to a raster has lower priority. You can also use running snap and snap on demand.

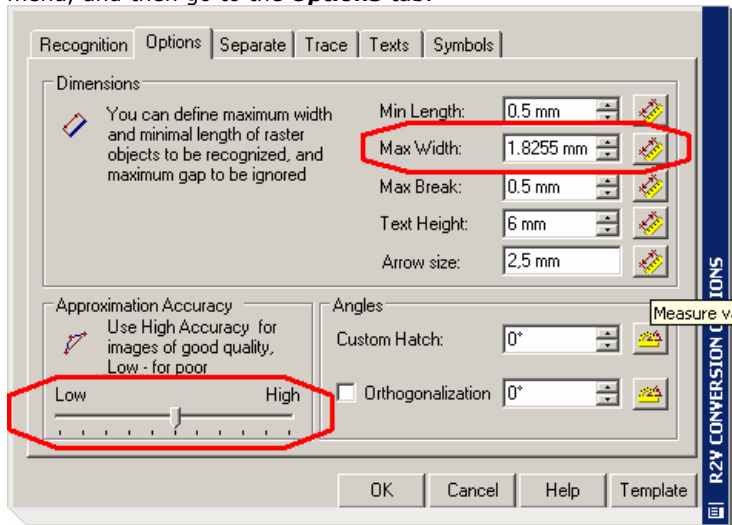
Note: You choose Raster Snap on demand by right-clicking with the Ctrl key pressed.



Tuning the raster snap

Note: Raster snap quality is influenced by your image.

You can tune raster snap using the **R2V Conversion Options** dialog box. Choose **Conversion Options** from the **rConvert** menu, and then go to the **Options** tab.



Specify the following values:

Max Width – maximum width of a raster object, to which characteristic points you want to snap. Specify this parameter's value as slightly greater than the maximum width of the raster line.

Accuracy – parameter corresponding to your raster image accuracy. Use greater values for images of good quality and smaller values for images of poor quality.

To turn on the running raster snap

1. Using AutoCAD commands (DDOSNAP) turn on one or several object snap modes.
2. From the *rImage* menu select *Raster Snap*, and then *On*.

To turn off the running raster snap

In the *rImage* menu select *Raster Snap* and then *Off* or click the button in the *Raster Snap* toolbar.

Using Templates

A *template* is a set of all dialog box settings, saved to a separate file on a disk. Template files are stored in corresponding subfolders of the **TEMPLATE** folder in the **WiseImage** root folder. You can use templates to save and restore the parameters of commands

Lesson2: Enhancing Scanned Images

Brief description: This section demonstrates ways of enhancing scanned monochrome images: deskewing and filtering.

Deskewing

When paper is fed through a scanner the direction of the paper often deviates from the orthogonal, therefore the resulting scanned image is skewed, sometimes rather considerably.

The special command – **rDeskew** is used to deskew an image.

The command works in two modes:

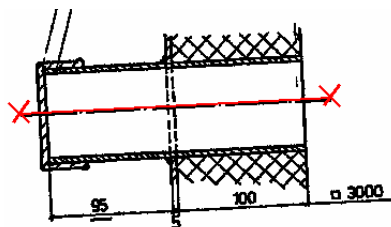
1. **Auto Deskewing** – program automatically estimates the skew value, and then performs deskewing.

Choose **Deskew** from the **rImage** menu, and then –**Auto**.

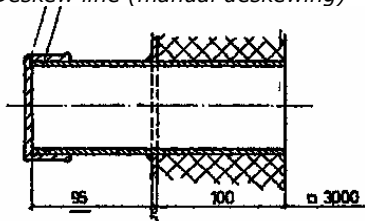
2. **Manual Deskewing** – you can use this mode, if the result of Auto Deskewing is not satisfactory. In this mode you can specify a skew angle by specifying a line, which must be horizontal or vertical.

Choose **Deskew** from the **rImage** menu, and then –**Manual**.

Press the **Measure Angle** button in the displayed **Deskew** dialog, and then specify the deskew line with two points. You can use snap tools during this operation.



Deskew line (manual deskewing)



After deskewing

Filtering Monochrome Images

In WiseImage a number of different filters allow you to enhance the scanned monochrome raster image. You can apply filters to the whole image or to a fragment. You can also apply filters to several raster images simultaneously.

Using the filters, you can

- Remove raster speckles,
- Remove holes (white points in black raster lines or filling),
- Invert images,
- Smooth raster objects,
- Thin and thick raster objects and
- Transform a filled raster area to one-pixel contour.

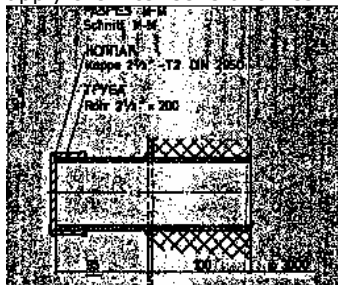
All commands for filtering monochrome images are located in the **rFilters** menu.

Speckle Remover

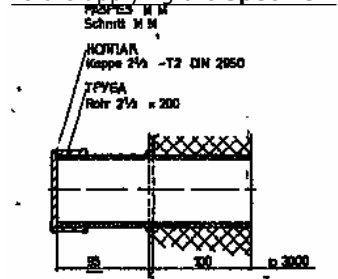
Choose **Speckle Remover** from the **rFilters** menu

You can specify the size of raster speckle on the screen using the measure buttons of the **Speckle Remover** dialog.

If the **Auto Estimating** is on, then the program automatically estimates the speckle size. You can apply the filter several times.



Before applying the **Speckle Remover**



After applying the **Speckle Remover**

When applying the filter to the image of very poor quality some data may be lost. To avoid it, you can use the operation of separation by size.

Hole Remover

Choose **Hole Remover** from the **rFilters** menu
You can specify the size of raster speckle on the screen using the buttons of the **Hole Remover** dialog box. If the **Auto Estimating** is on, then the program automatically estimates the speckle size.



Before applying the **Hole Remover**



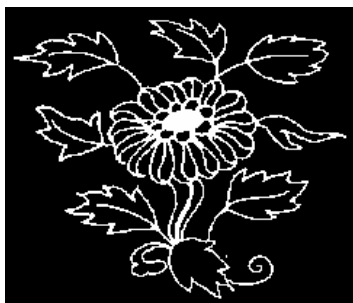
After applying the **Hole Remover**

Inversion

Choose **Inversion** from the **rFilters** menu
This filter reverses the color of the monochrome image After applying this filter the background dots become the image dots and vice versa.



Before applying **Inversion**



After applying **Inversion**

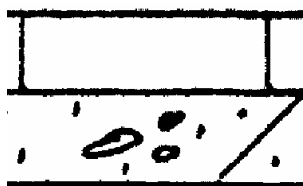
Smoothing

Choose **Smoothing** from the **rFilters** menu

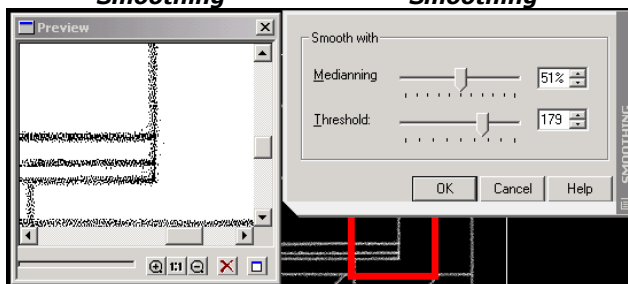
This filter smooths raster object outlines, fills edge and inner background droplets, and partially removes raster speckles



Before applying
Smoothing



After applying
Smoothing



The Smoothing filter is tuned by setting optimal values of Medianning and Threshold. You can tune and estimate the result before applying the filter in the preview window.

Thinning and Thickening

Choose **Thinning (Thickening)** from the **rFilters** menu.

Thinning filter makes raster objects thinner in the specified directions; by one pixel for each pass. You can specify a number of passes.



Before applying **Thinning**



After applying **Thinning**

If needed, then you can apply the mode of thinning raster objects up to skeleton - i.e. only pixels in the middle are left.

The **Thickening** filter makes raster objects thicker in the specified directions. You can specify a number of passes and choose any combination of thickening directions.

Contour (4-coupling and 8-coupling)

Choose **Contour** from the **rFilters** menu.

The **Contour** filter converts filled raster areas to one-pixel contours.



Before applying **Contour**



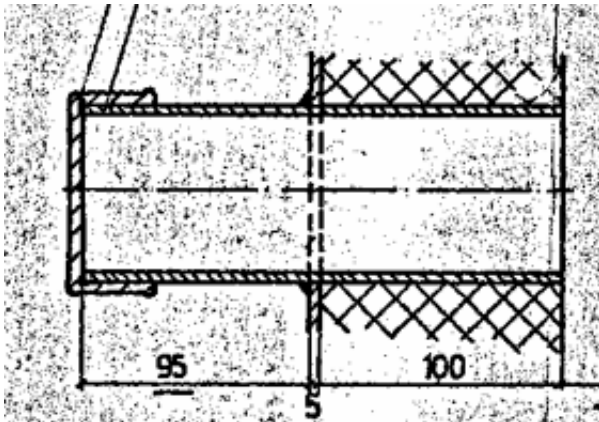
After applying **Contour**

Separating Monochrome Images by Size

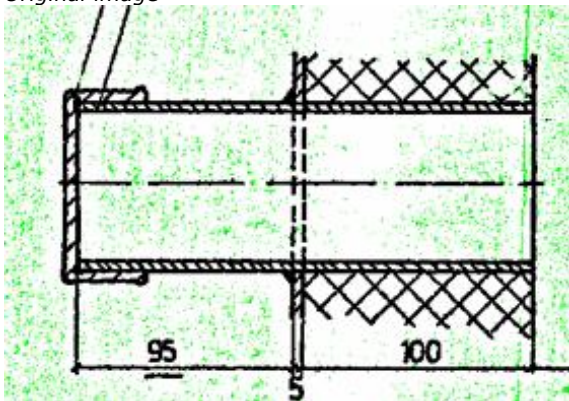
This operation is effective in the following two cases:

- Some small objects (dots in dashed-dotted lines, lines which consists of multiple small fragments, delimiters, etc.) are not speckles and should not be removed.
- The image is of very poor quality.

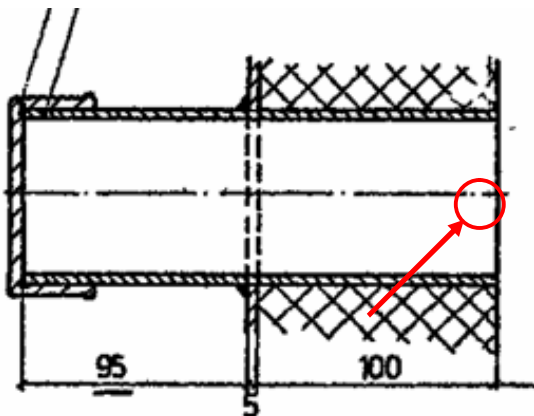
The principle of the separation by size operation is similar to speckle removing, except speckles are not removed but transferred to a new raster layer. The user can select fragments incorrectly transferred to this 'speckle' layer and bring them back to the drawing.



Original image



The result of separating to basic and 'speckle' layers

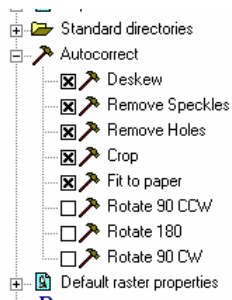


The significant elements have been brought back from the 'speckle' layer to the basic layer; the 'speckle' layer is removed

Autocorrecting an Image

Autocorrect runs a set of pre-defined operations.

How to apply autocorrection



- Choose **Options** from the **Tools** menu. Go to the **WiseImage** tab.
- Specify a set of commands to apply with auto correction. Close **Options**.
- Choose **AutoCorrect** from the **rImage** menu.
- If you have more than one raster image in your document, then select image(s) to apply autocorrection to.

NOTE: The program automatically defines all parameters of the commands included in the autocorrection set (except **Rotate**). For, example, automatic deskewing, removing speckles with automatic estimation of speckle size, and etc.

Lesson 3: Calibration

Brief description: In this section you will learn how to eliminate distortions using calibration and four-point correction.

Calibration is used to eliminate arbitrary (both linear and non-linear) distortions of monochrome, gray-scale and color raster images.

Note: You should calibrate the raster image before applying vectorization (tracing), because in case of vectorizing the distorted image you consequently obtain distorted vector data that is impossible to correct later.

The original image must contain points with known coordinates. These points are called **real** points. You can use nodes of a rectangular grid as real points (if you work with mapping materials) and/or other points whose coordinates are known or can be calculated.

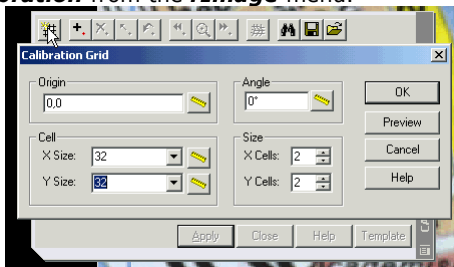
The points, which correspond to the real ones on the distorted image, are often located with some displacement (i.e. they have different coordinates). These points are called **measured** points, as their coordinates value can be measured on the raster image.

By applying calibration, the raster image is transformed so that the measured points coincide with or are extremely close to the real points.

A *transformation method* is a parametric transformation used for calibration. Each model defines a family of transformations of the same type. There are several transformation methods: affine, bilinear, polynomial, spline, etc.

How to calibrate an image

Choose **Calibration** from the **rImage** menu.



Defining real points

We can define rectangular grid nodes and points with known (estimated) coordinates.

Step 1. Defining grid:

Grid is defined by the three parameters: start point (coordinates of lower-left node), cell size (by X and Y axis), and grid size (by X and Y axis).



Press **Define Grid** on the **Calibration** dialog. In the **Calibration Grid** dialog:

Specify the number of grid cells along the X and the Y axis.

Specify the base point.

Specify the cell size.

Step 2. Specifying measured points

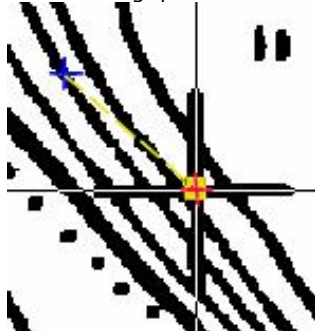
Press the **Repick** button on the **Calibration** dialog. Specify a point on the image. To shift to the next point press **Next**



Point. Program places the next point in the screen center and highlights it with grips.



You see the real (correct) location of the first point with grips.



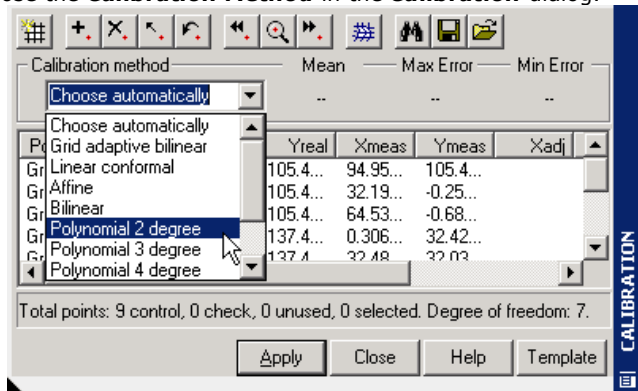
Drag grips to the grid node on the scanned image – so you specify the 'measured' point.

Specifying points with known coordinates:


Press the **Add point** button from the **Calibration** dialog. You can enter a name for the points in **Label** field.

Step 3. Choosing calibration method

Choose the **Calibration Method** in the **Calibration** dialog.



How to choose?

- If you are sure of the proper method, choose it from the list. Estimate the accuracy of this method by pressing the **Estimate**  button.
- If you are not sure of the proper method, then select **Choose automatically**.

Step 4. Running Calibration

Run calibration by pressing the **Apply** button on the **Calibration** dialog.

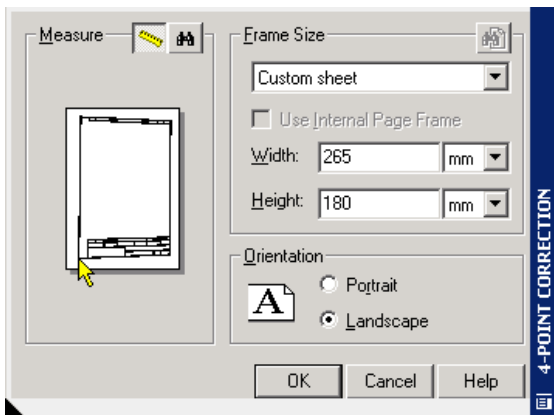
If you have more than one raster image in your document, select image(s) to calibrate.



Four-point correction

You can use this operation for quick correction of scanned technical drawings, which contain a frame. This operation assumes that both frame and contents of the image have the same distortion.

How to correct an image by 4 points

- Choose **4 point correction** from the **rImage** menu.



- Enter the frame size in the **Width** and **Height** fields of the **4-point correction** dialog. You can also choose a standard frame size from the list of **Frame Size** or find the closest by pressing **Find Closest paper**.
- Press **Find Frame**  – the program finds and highlights the image frame. If the frame is defined correctly, then press OK. Otherwise, press **Measure frame** , and then specify four points of the frame on the screen. Finally press OK.

Lesson 4: Restoring Images of Poor Quality

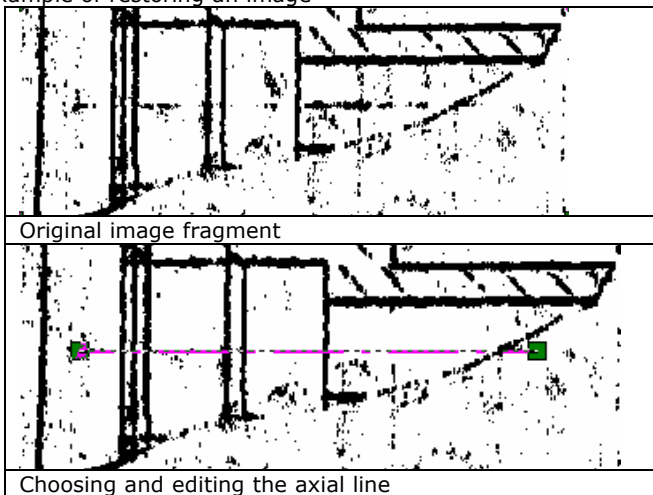
Brief description: In this section we give you some recommendations about restoring images of poor quality.

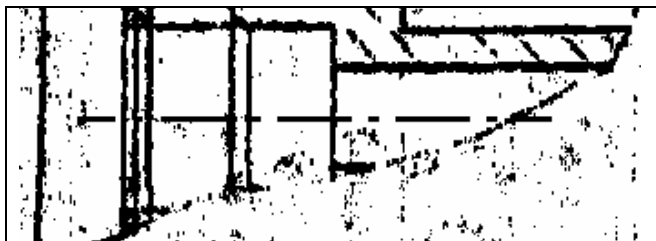
How to work with a raster image of poor quality? There is not much choice – either redraw it in the document with the corresponding program or restore it with a hybrid editor (Vectorization of such document produces poor results.).

The purpose of this section is not to discuss the plus and minus points of each method, but to show you some methods to restore scanned documents of poor quality:

- Separating an image by size – can be used for blueprints, images on dark backgrounds, with lots of speckles.
- Editing selected raster objects (modifying their properties, geometry using «grips» and others).
- Tracing in smooth mode.
- Tracing in vector producing mode, followed by editing and rasterizing the obtained vector objects.
- Drawing missing raster lines in Raster drawing mode.
- Editing raster texts.

Example of restoring an image

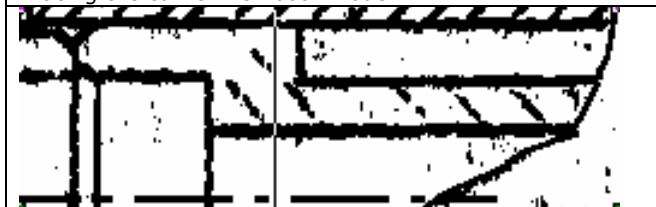




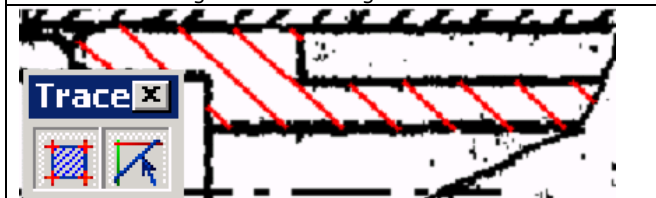
Result of editing the axe line



Tracing the curve in smooth mode



Hatch on the original raster image

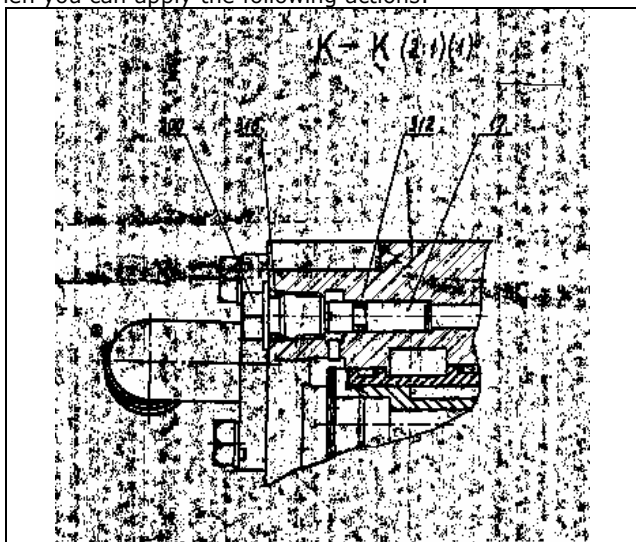


Tracing the hatch in Create Vector and Keep Raster mode

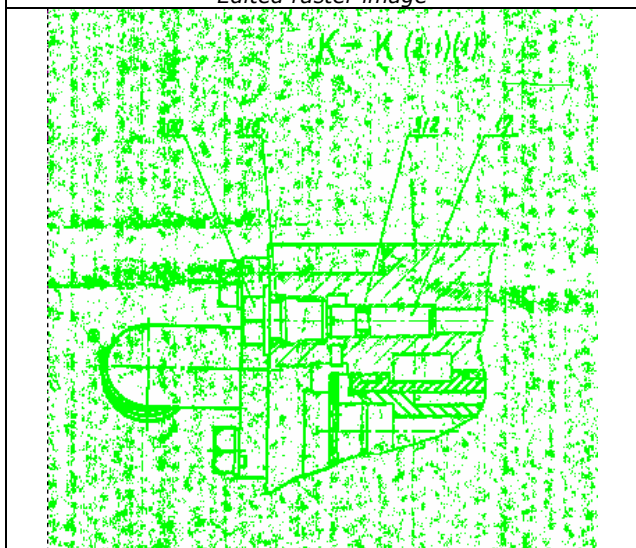


Rasterizing the vector hatch

Then you can apply the following actions:

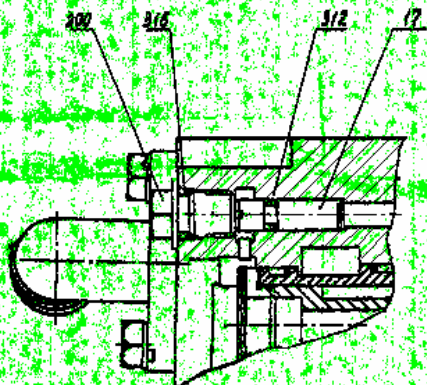


Edited raster image



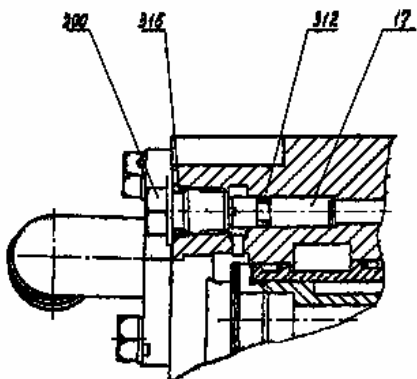
Selecting the whole raster image (or fragment)

K-K (2:1)(1)



Deleting isolated raster fragments from the selection

K-K (2:1)(1)



Deleting speckles that were not selected

Lesson 5: Raster Selections

Brief description: to perform different operations – such as edit, modify an object's properties with the Inspector, and others – you need to select data to apply commands to. In this section we consider raster and vector data selection technology (raster images and their fragments; raster objects). You will learn about different selection modes and methods of data selection, and tuning raster selection.

WiseImage allows selection of raster data. Selection technology and data selection methods are extremely close to vector object selection technology.

Raster Selections:






- **Raster objects** (raster lines, arcs, circles, selected with object selection methods, which come with 'grips', properties and precise geometry).
- **Area fragments** of the raster image.
 - Selected with window or polygon.
 - Raster line segments of arbitrary shape. (A segment represents a raster line of arbitrary shape, limited by points of intersection with other raster lines or endpoints).
 - Isolated raster fragment.

There are two toolbars for data selection: **Raster Select** and **More Selection**.

Note: When selecting data, you need to define the selection parameters:

- **Selection modes** – add to selection, remove from selection, single selection
- **Selection method** – by picking, within window, crossing polygon and others.

Selection modes



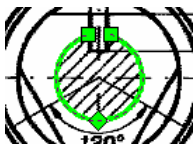




	New data is added to selection
	Selected data is removed from selection
	Every new selection deselects previously selected data
	Selects all raster image contents
	Deselect All

Raster Selection Methods




Table 2 *Selection methods*

Object selection methods

You can select raster objects (raster line, arc, circle) using **object selection methods**:

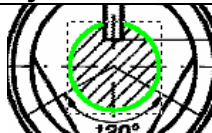
	By Picking (Auto)		By Crossing a Window	
	Within a Window		By Crossing a Polygon	
	Within a Polygon		By Fence	

You can also select raster objects **by reference objects**:

	raster line or its segment by 2 points
	raster arc or its fragment by 3 points
	raster circle by two points

How to obtain area selection using object selection methods




IMPORTANT: If you need to obtain an area selection when selecting raster objects, then press the **Disable Raster Object Production** button, located on the **Select** toolbar.



Selecting area raster fragments

Selecting inside rectangle or polygon






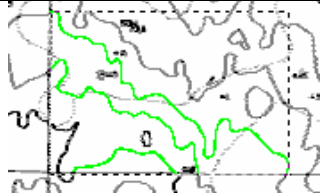
You can select rectangular or polygonal fragments of raster image area using **Select by Rectangle** and **Select by Polygon**, located on the **Raster Select** toolbar.

	rectangular fragment of raster image
	polygonal fragment of raster image
	

Selecting raster segments





Segment represents part of a raster line of arbitrary shape, limited by intersection points with other raster lines or endpoints.




You can select raster line segments:

	Within a window
	Within a polygon
	By crossing a window
	By crossing a polygon
	By fence
	

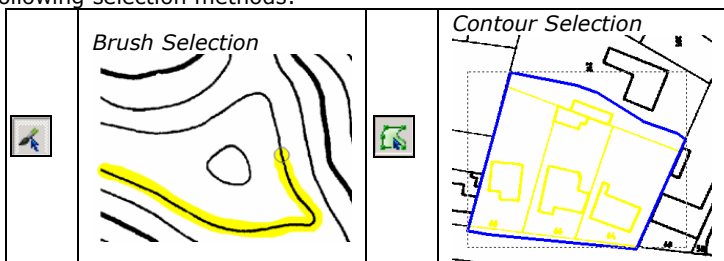
Selecting isolated raster fragments

You can select isolated raster objects:

	By picking
	Within a window
	Within a polygon
	By crossing a window

	By crossing a polygon
	By fence
	

It is convenient to select raster areas of irregular shape using the following selection methods:

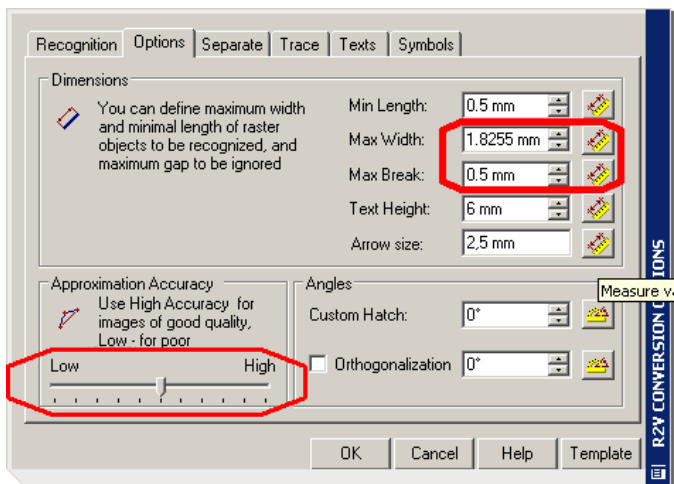


Tuning raster selection

You need to tune the geometry of raster data to obtain the best results when selecting raster objects and raster segments.

How to tune raster selection

The selection geometry is tuned using the **R2V Conversion Options** dialog.



To open this dialog, choose **Conversion Options** from the **rConvert** menu, and then go to the **Options** tab.

Specify the following values in the **Options** tab:

Max. Width – maximum width of raster objects to select. Specify this parameter's value as slightly greater than maximum width of raster objects or raster line segments.

Max. Break – length of ignored break of raster lines.

Accuracy – your document accuracy. For example, if when selecting a raster circle by picking, then the program only selects its fragments (arc), reduce the accuracy value.

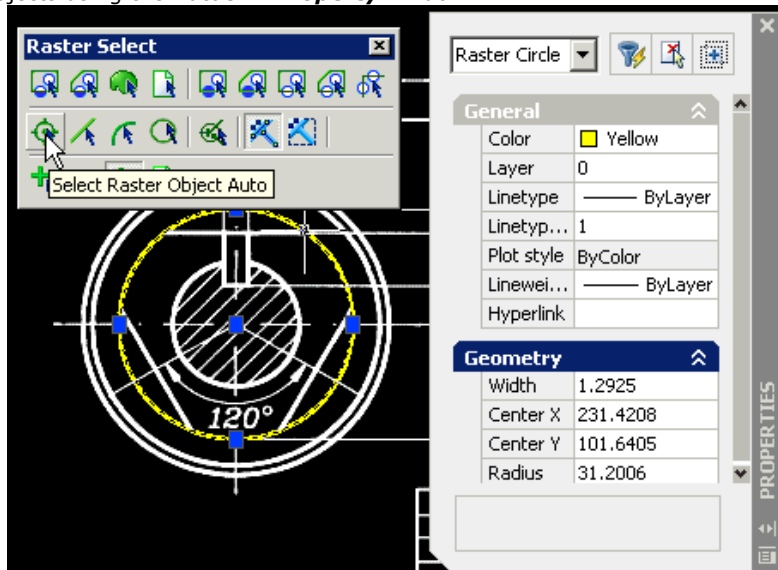
Lesson 6: Raster Editing

Brief description: This section provides you with different methods of editing selected data – raster, and also the commands designed for editing raster images.

Editing data, selected with object selection methods

Let us consider different methods of editing raster data, selected with the object selection methods:

You can view and edit the properties and geometry of selected objects using the AutoCAD **Property** window.



Selected raster object

The raster object properties in the Properties window

- You can change the geometry of raster objects, and also the location of selected objects on screen using 'grips'.

Editing Raster Image

The commands from the **rImage** menu are designed for editing raster images.

The commands from the **rImage** menu modify the raster image contents – resolution, real size, size in pixels, point's positions. You should know the difference between the editing images using AutoCAD commands, and those of the **rImage** menu. Unlike the

commands of the **rImage** menu, the AutoCAD commands do not change the raster image contents. For example:

- The AutoCAD **Scale** command of the AutoCAD **Modify** menu only changes the scale of raster insertion; the raster image contents (resolution, number of points and location) are not changed.
- Using the **Scale** field of the **Resample** dialog box, you can modify the raster image contents – resolution and/or the number of points the image is composed of.

Change Image Size

Choose **Change Size** from the **rImage** menu

Using the **Change Size** dialog box you can:

- Change the image size to the desired format:
Change the desired format from the list of **Standard Paper Size**. Set the orientation – **Portrait** or **Landscape**.
- Change the image size to the closest standard format:
Press **Find Closest**.
- Add (cut) image margins:
Specify values to added (cut) margins in the **Alignment/Margins** field.

You can also align the image position relative to its margins:

- Using one of the nine buttons of the **Alignment/Margins** field.
- Entering the margin values in the **Alignment/Margins** section with the **Fixed Size** checkbox set to on.

Resample

Using the **Resample** dialog from the **rImage** menu you can:

- Proportionally change the image size with fixed resolution.
 - Choose measurement units from the list; you can choose pixels as measurement units.
 - Enter the new values in the **Width** and **Height** fields.
 - The **Fixed size in pixels** checkbox is off.
- Change the image size according to the specified Scale value with fixed resolution.
 - Enter the new scale value in the corresponding field.
 - The **Fixed size in pixels** checkbox is off.
- Change the image resolution; with fixed size.
 - Enter the new resolution value in the corresponding field.
 - The **Fixed size in pixels** checkbox is off.
- You can change the image resolution (size); the number of pixels is fixed.
 - Turn on the **Fixed size in pixels** checkbox.
 - Enter the new resolution (size, scale) value.

Cropping Image

Cropping commands are located in the **Crop** submenu of the **rImage** menu.

You can:

- Crop blank margins of the raster image.
- Crop the raster image by its frame.
- Crop the raster image by a rectangle specified on screen.
- Crop the raster image by clip.

Rotate and mirror

These commands located in the **rImage** menu, allow you to rotate an image by 90° , 180° , 270° , or by an arbitrary angle; and also mirror an image about the X or Y-axis.

Lesson 7: Editing color images

Brief description: This lesson is devoted to methods of enhancing color and grayscale raster images – correcting image brightness, contrast, hue, and saturation; correction by histogram, and filtration. You will also learn about converting images to RGB, 8-bit indexed and grayscale; layering color and grayscale images to monochrome layers.

Correcting image brightness, contrast, hue, and saturation

You can tune brightness, contrast, hue and saturation of color and *grayscale* images.

Choose **Brightness/Contrast** from the **Image** menu.

Using **Brightness/Contrast** dialog, you can tune:

- Brightness of color and *grayscale* image
- Contrast of color and *grayscale* image
- Hue of color image
- Saturation of color image

You can tune the parameter's value using the sliders or entering the values in the corresponding fields.

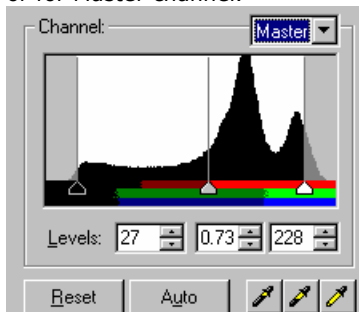
Correction by histogram

Using correction by histogram you can tune the image brightness, hue and contrast. You can apply automatic correction or tune the parameters manually.

Choose **Equalize** from the **rImage** menu.

To correct an image by histogram automatically use the **Auto** button of the **Equalize** dialog.

To correct an image manually you need to specify three values: lightest and darkest levels, and image gamma – for each channel or for Master channel.




- The darkest level (the left slider

position) is set with the dark eyedropper



, using which you can specify the colors to turn black. All pixels included in the histogram area from 0 to the left slider, will turn black.

- The lightest level is set with the light

eyedropper , using which you can specify the colors to turn white. All pixels included in the histogram area from the right slider to 256, will turn white.

- Using the middle slider, specify the value of image gamma.

Moving the middle slider to the left increases the gamma value; the image becomes lighter.

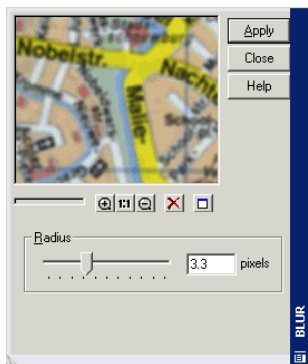
Moving the middle slider to the right reduces the gamma value; the image becomes darker.

- When you achieve satisfactory results in the Preview window, press **Apply**.

Color filters

Blur

This filter produces a blur effect on an image. For example, you can apply the Blur filter to an image area that has texture fills.



Choose **Blur** from the **rFilters** menu.

- Set *Radius* for the filter. Increasing the Radius value also increases image blurring. To modify the Radius value, use the slider or enter the value in the field.
- When you achieve satisfactory results in the Preview window, press the **Apply** button.

Unsharp Mask

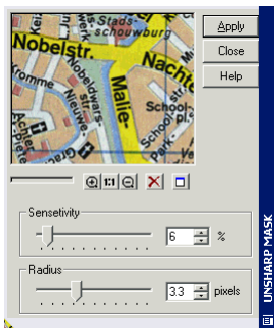
This filter is designed to increase the sharpness of color boundaries, producing an overall increase of image sharpness. This filter can be used to correct images that became blurred after

interpolation – e.g., after such operations as *rotate*, *scale*, *alignment*, *calibration* or *four-point calibration*, and also resize and resample.

Choose **Unsharp Mask** from the **rFilters** menu.

Set *Radius* – ‘level’ of the filter effect. Increasing the Radius value increases a number of pixels surrounding the color transition boundary that are to be processed. Applying small *Radius* values results in an increase of sharpness only on color boundaries.

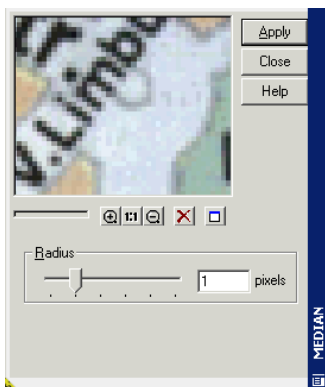
- Set *Sensitivity* for the filter using the slider or enter the value in the corresponding field. Increasing this value provides a stronger effect.



- When you achieve satisfactory results in the Preview window, press the **Apply** button.

Median

This filter reduces image noise analyzing all pixels within the specified radius and assigning the central pixel the averaged value of reviewed pixels. As a result, pixel color and brightness are evened. For example, Median filter can be used to eliminate image ‘grain’.



Choose **Median** from the **rFilters** menu.

- Set *Radius* for the filter – area within which color values are to be analyzed.
- When you achieve satisfying results in the Preview window, press **Apply**.

Convert to 24-bit RGB, grayscale, indexed

Convert to RGB (grayscale)




- If your document contains several raster images, select the one(s) to convert to RGB (grayscale).
- From the **rImage** menu, choose **Convert to**, and then **Convert to RGB (Convert to grayscale)**








Convert to indexed

You can convert full-color images (24 bit per pixel) and monochrome images to 8-bit indexed (8 bits per pixel).

This operation can be used to reduce the size of a full-color file, and therefore speed up working with it. Note, that in some cases the converted image might have lower quality due to some information loss.

- If your document contains several raster images, then select the one(s) to convert to 8-bit indexed.
- From the **rImage** menu, choose **Convert to**, and then **Convert to indexed**.

Execution order	
Calculating the optimal palette for the selected image(s)	Press Set auto palette  .
Recalculating of palette for specified color number	Specify the color number in the Colors  field. Press Reset Palette  button.

<p>Selecting colors from the palette</p>	<p>Press Shift, select colors from the palette by clicking on them (if only selecting one color, then there is no need to press Shift.). Note: You can view selected colors in the Preview window, – select the Light Paint  <input checked="" type="checkbox"/> Light Paint  checkbox.</p>
<p>Merging selected colors</p>	<p>Press Merge Colors  button</p>
<p>Deleting selected colors</p>	<p>Press Delete Colors  button</p>
<p>Changing selected color(s)</p>	<p>To change selected color(s): To the specified color– Press Get color to set  and choose a desired color from the Color box. To one color of the image– press the button with eyedropper , and then specify a desired color on screen.</p>
<p>Adding color(s) to the palette</p>	<p>Enter desired number of colors in the Colors field. Press Set auto palette  – or – Click on a blank palette cell. Click on the added field, and assign the color as described above in section <i>Changing selected color(s)</i>.</p>

Lesson 8: Separating color images to monochrome layers

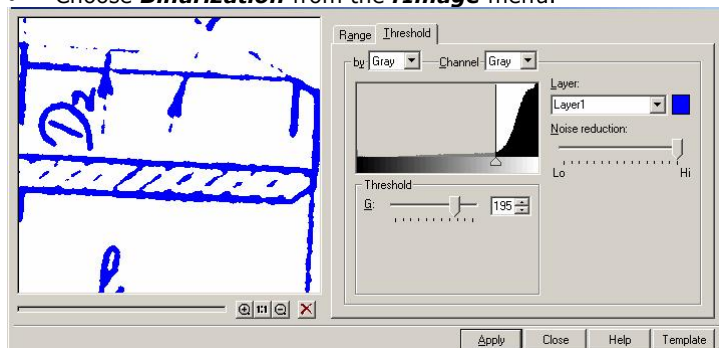
Brief description: This section describes the operation of separating color or grayscale raster images to monochrome layers. Binarization allows you to extract pixels of specified colors (or close to them) to a monochrome layer. For example, when you binarize a map, first you get a monochrome layer that contains isolines; then a layer that contains roads, etc.



Color Separation allows you to separate a color and grayscale image to several monochrome layers with a single operation; each image pixel is transferred to one of the resulting monochrome layers.

Binarization

Using binarization you need to specify the color range(s) for a created layer, e.g., for hydrographic layer – from light-blue to dark-blue.

- Choose **Binarization** from the **rImage** menu.



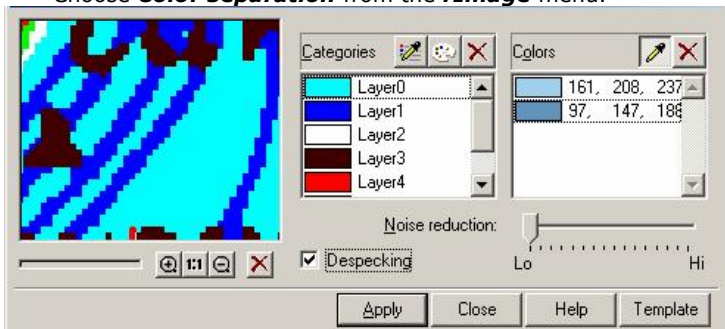
- Choose binarization method – **Range** or **Threshold**. Set the parameters for the chosen method (Color model (RGB, HSV, Gray), channel (gray, red, green, blue, hue)).
- Specify a layer and its color to place the new monochrome image to.
- Using one of these eyedroppers  specify the colors on screen; they are added to the **Colors** list. The estimated binarization results are highlighted in the preview window. You can choose any incorrectly selected color from the list, and then remove it using **Delete**  button.
- Tune the results using the sliders, located in **Ranges** (**Threshold**).



- You can delete small speckles that appear using the slider **Noise Reduction**.
- When you achieve satisfactory results in the Preview window, press the **Apply** button.

Color separation

To execute Color separation you first set color categories (thematic layers), by which you want to separate the image, and then you set a list of colors for each category.

- Choose **Color separation** from the **rImage** menu.

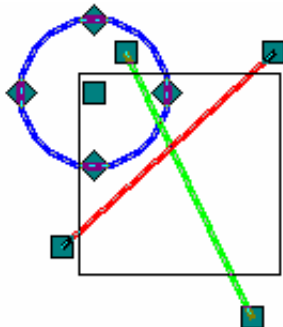


- Specify the first category color on the image using the eyedropper **Add category** . Choose a standard color; specify a name for the category in the displayed **Category name and color** dialog.
- Using the eyedropper **Add color** specify all colors of the image, which should fall within this category.
- Repeat the previous two steps for all categories, which you want to set on a new layer. Incorrectly defined categories and colors can be selected and deleted from the list using the **Delete**  button.
- Using the **Noise Reduction** slider you can adjust the sensitivity of **Color separation** – smooth contours.
- Deleting small-sized speckles is executed when the **Despeckling** checkbox is set to on.
- When you achieve satisfactory results in the Preview window, press the **Apply** button.

Lesson 9: Rasterizing, merging raster images

Rasterizing Vector Data

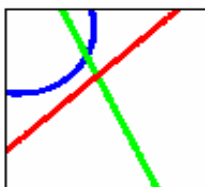
Brief description: You can rasterize vector objects on raster images. Select the vector objects, located over the raster image, and then start the **Vector To Raster** command from the **rConvert** menu.



Original vectors



Rasterizing on monochrome raster



Rasterizing on color raster

If you have more than one raster image in your document, select the image(s) to place rasterized vectors on.

Merging raster images

You can merge a raster image or raster selection with another raster image.

Select a raster image (or its fragment) and choose **Merge** or **Merge a Copy** from the **rEdit** menu.

If part of raster selection is placed outside the destination raster image area, then it disappears.

To perform the operation, first you select the source images. They are selected as AutoCAD objects. You can select a raster image of any type (color, grayscale or monochrome) as a source image. Raster selection can also be used as a source image.

In the second step, you select the destination images. This selection is made from the selection dialog box.

If you have more than one raster image to merge in your document, then select image(s) to merge.

When selecting destination images, the program considers the types of previously selected source images. You are allowed to insert the data of the source images with less color depth into the destination images with a greater color depth: monochrome into grayscale and color, grayscale into color (not into monochrome) color into color only. The names of images that do not fit are excluded from the list of the dialog box.

Merging a Copy (i.e. duplication) works in a similar way as merging except it does not erase the source image from the drawing.

To perform duplication you perform the same actions as when merging except the command is called *Merge a Copy* and the

button looks like .

Transforming Selection Set into Separate Image

The detaching operation transforms a selection set into a separate image (or a group of images, if a selection was made on several images) without changing the position or size of raster selection.

A selection set is always transformed into a separate image if its position or size is changed.

In some cases it is necessary to transform a selection set into a separate image, without changing the raster selection position or size. For example it is necessary when layering raster images, when the original image is divided into two images of the same size, lying one above another. Such *raster layers* creation allows separating raster image objects of different types onto separate layers as it is made in AutoCAD for vector objects. For example, you can select all raster texts and move them to a separate layer in order to further recognize texts.

To create an image, containing part of another image

1. Select raster data.
2. From the rEdit menu select ***Selection to New Image***.

- or - Click the button  on the *WiseImage* toolbar.

Lesson 10: Tracing

Brief description: To describe the use of tracing as an interactive (or semi-automatic) vectorization procedure.

During the tracing procedure raster objects are specified one by one; these are then recognized and converted to corresponding vector objects. In the process of tracing the initial raster objects can be deleted, smoothed or left intact.

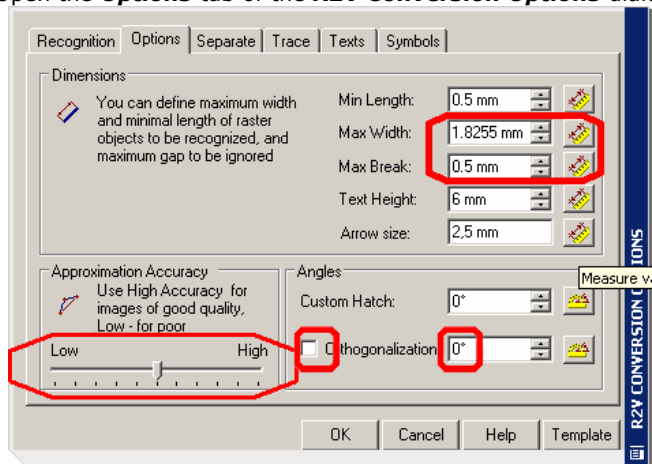
Tuning tracing

You should tune the tracing parameters before applying this procedure.

Tracing is tuned in the **R2V Conversion Options** dialog. Choose **Conversion Options** from the **rConvert** menu.

Tuning geometry of traced objects:

Open the **Options** tab of the **R2V Conversion Options** dialog.



Max. Width – maximum width of traced raster objects. Measure width of the widest traced lines. Set this parameter's value as slightly greater than the measured width.

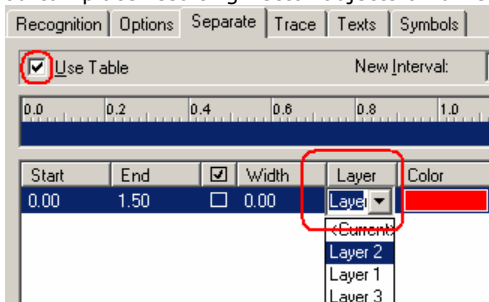
Max. Break – length of ignored break of raster lines. If you trace dashed lines, then set the value of this parameter as slightly greater than the maximum gap between dashes.

Accuracy – set the maximal accuracy value for tracing polylines to high (for a closer approximation of raster curves with vector polylines). In other cases increase the

accuracy value for images of good quality; and reduce the value– for images of poor quality.

Layering resulting vector objects

You can place resulting vector objects on different layers:



- Open the **Separate** tab of the **R2V Conversion Options** dialog.
- From the pull-down list of **Layer** select one to place the traced vector object.
- Select the **Use Table** checkbox.

Orthogonalization mode with tracing

When tracing lines and polylines, you can use **orthogonalization mode**, which allows you to obtain orthogonal lines or polylines that consist of orthogonal segments (the base angle can be calculated automatically or specified).

- **Tracing lines with orthogonalization**

Note: The operation can only work if the raster line you want to trace deviates from the orthogonal (specified) direction by not more than 2° .

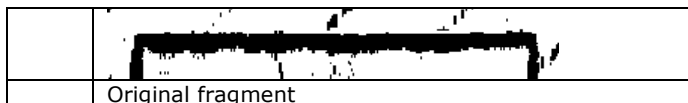
To turn on line orthogonalization mode:









- Open the **Options** tab of the **R2V Conversion Options** dialog. Select the **Orthogonalization** checkbox.
- enter the base angle value in the **Base Angle** field.

Tracing modes and commands

Before executing tracing, you should choose a tracing mode.









Tracing modes



	
	Produce vector and keep raster
	
	Produce vector and erase raster
	
	Erase raster without producing vector
	
	Smooth raster without producing vector

Tracing commands

You can trace:

	Lines, arcs, circles with auto recognition
	Lines by two points
	Arcs by three points
	Circles by two points
	Hatches
	Raster symbols
	Polylines
	Outlines

How to trace

- Set the tracing parameters
- Choose from the **Raster to vector** toolbar or the **rConvert** menu:
 - Tracing mode
 - Tracing command

Tracing lines, arcs, circles, and outlines



You can trace raster lines, arcs, circles, and outlines with automatic recognition of their type



– click once on the desired object.

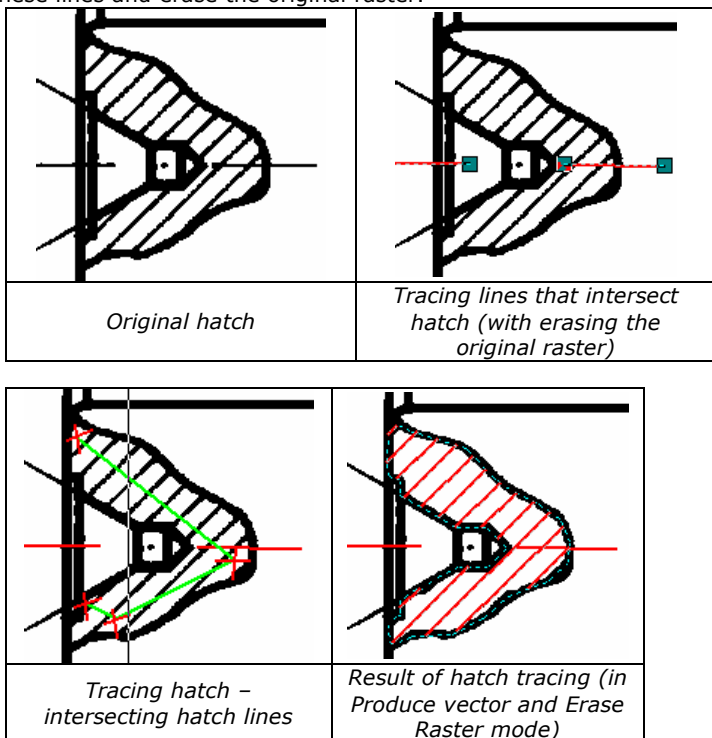
If you work with a complicated image, or an image of poor quality, or you need to vectorize only part of a raster entity, then you can apply forced tracing.

Auto extension mode: When tracing lines or arcs you can use **Auto extension** mode – you only specify a fragment of the object, but the program recognizes the whole object. To switch to this mode, select the **Auto extend vectors** checkbox in the **Trace** tab of the **R2V Conversion Options** dialog.

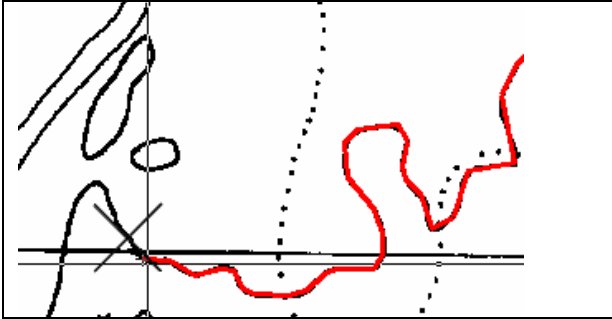
Tracing Hatches

To trace a hatch, you need to intersect all its lines with a crossing polyline.

Tip: raster lines that cross the hatch, interfere in the recognition operation, so before tracing the hatch it may be useful to trace these lines and erase the original raster.



LineFollowing









LineFollowing produces vector polylines that approximate complex raster curves.

To increase accuracy of approximating vector polyline to the original raster curve increase the **Accuracy** slider in the **Options** tab of the **R2V Conversion Options** dialog.

How to trace polyline?

- Select tracing mode (e.g., Produce Vector and Keep Raster).
- Press the **Trace Polyline** button.
- Specify a point on the raster curve – the program tracks this curve up to the nearest intersection and waits for you to indicate the direction in which tracing should continue. You can also use the **Autodetect direction** mode: Open the **Trace** tab of the **R2VConversion Options** dialog. Select the **Autodetect direction** checkbox. Set the waiting period (in sec) in the **Pause** field.
- If you turn on the **Autodetection direction** mode, and you are satisfied with the direction, indicated by cross, then press the **Space** key (Alternatively, the program continues tracing after the waiting period expires.). If you are not satisfied with the direction as suggested by the program, then specify the right direction on the screen. If **Autodetection direction** mode is Off, you must specify the next fragment of the raster curve on screen (fragment between two nodes or between node and end point of the raster line).

When tracing polylines you can use several input options: to enter a key letter into the command line, the cursor menu, or the *Line Following* panel buttons.

Button and option	Description
 Direction	Reverses a tracing direction
 Backstep	Cancels the latest tracing step
 BackSegment	Cancels the latest polyline segment
 DrawLine	Enables adding a linear segment of a polyline without tracing. Several segments can be added with SHIFT pressed.
 Center	Zooms the image to show the last added polyline vertex in the screen center
 Redraw	Redraws AutoCAD screen in the <i>Line Follow</i> mode

- If you need to change the tracing direction, then chose **Change direction** from the Right Button Menu.
- To cancel the last segment of the vector polyline, select BackSegment from Right Button Menu.
- To cancel the last step, select BackStep from Right Button Menu.
- If needed you can draw segments in **Free Hand Drawing mode**, then select DrawLine from Right Button Menu. and specify the new nodes of the vector polyline on screen.
- When you have completed tracing the polyline, press **Enter**. You can use the **Centralize View** command of the context menu.

Tracing polylines with orthogonal segments

When tracing, you can obtain vector polylines with orthogonal segments. For example, this mode can be used to trace buildings on scanned maps.

The angle for orthogonalization can be estimated automatically or specified.










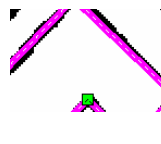
To obtain polylines with orthogonal segments:

Open the **Trace** tab of the **R2VConversion options** dialog. Select the **Line Follow Orthogonalization** checkbox.

Select the **Autoestimate base angle** checkbox.

Tracing Outline

You can trace raster outlines. Tracing results depend on the parameters and mode of tracing. Tracing parameters are set in the **Trace** tab of the **R2V Conversion Options** dialog.

Setting parameters of tracing outline			
Auto Extend vectors – Off	Creates vector on two colors boundary.		
Auto Extend vectors – On	Creates vector at the center of raster line.		
Export single contour – Off	Creates outer and nested outlines.		
Export single contour – On	Creates the outer outline only.		
Auto Extend vectors – On Export single contour – On  Trace mode – keep raster	Raster data inside the outline is kept.		
Auto Extend vectors – On Export single contour – On  Trace mode – erase raster.	Raster data inside the outline is erased.		

How to trace outline?

- Run the **Trace Outline** command.

If several available raster images are inserted into a drawing, then a selection dialog box appears.

- Specify a point inside the outline.

Lesson 11: Automatic vectorization, text recognition

Brief description: Automatic vectorization is a procedure for converting raster data to appropriate vector objects.

WiseImage recognizes the following objects on monochrome rasters when vectorize: lines, arcs, circles, hatches, texts and symbols. Raster curves and filled contours can be approximated with polylines.

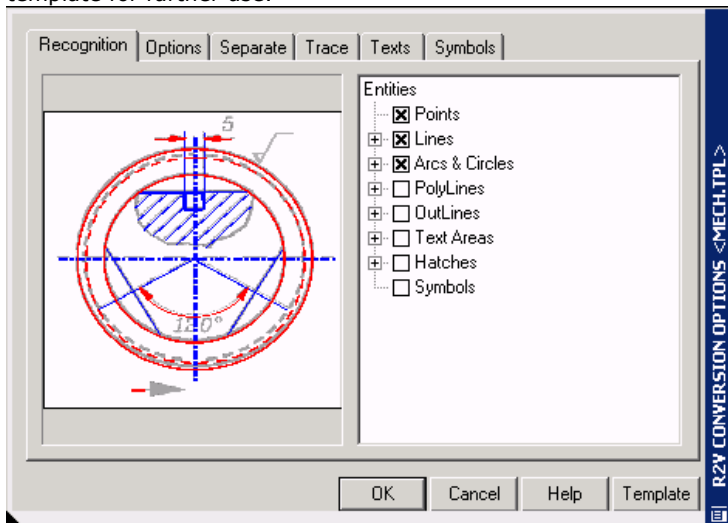
Color raster images can be converted to vector polylines.

The program can recognize line styles and arrows on line and arc ends.

You can round vector object widths to previously specified values. You can also place vector objects corresponding to raster lines of various widths on different layers and/or assign different colors to them.

Tuning Vectorization

You can use one of the pre-defined templates or tune the parameters yourself. Vectorization settings can be saved as a template for further use.



Automatic vectorization is tuned in the **Conversion Options** dialog. To open this dialog, choose **Conversion Options** from the **rConvert** menu.

Select objects to recognize:

Open the **Recognition** tab of the **Conversion Options** dialog.

Entities
<input type="checkbox"/> Points
<input checked="" type="checkbox"/> Lines
<input checked="" type="checkbox"/> Line Types
<input checked="" type="checkbox"/> Arrows
<input checked="" type="checkbox"/> Arcs & Circles
<input checked="" type="checkbox"/> PolyLines
<input checked="" type="checkbox"/> Line Types
<input checked="" type="checkbox"/> Create Vertex On Intersection
<input type="checkbox"/> OutLines
<input checked="" type="checkbox"/> Text Areas
<input checked="" type="checkbox"/> Hatches
<input type="checkbox"/> Symbols

Select the entities, which you want to obtain after vectorization.

The additional parameters for recognized objects, such as line type, arrows, hatch angle, and others are located on the second level. Click on the '+' to get access to these parameters.

Points

WiseImage will recognize a raster point with a size not less than 2x2 pixels (Objects smaller than this are considered as speckles and thus ignored.), and which maximum vertical and horizontal extents are not greater than *Max Width* value.

Do not switch on this mode when recognizing images of poor quality or images containing many speckles, since speckles can be recognized as points.

Lines

Turns On the algorithm for line recognition. As a result LINE entities are created.

Arcs and Circles

Turns on the algorithm for recognizing raster circles and arcs.

Polylines

This algorithm approximates central lines of raster objects by polylines (*POLYLINE*). The algorithm creates polylines consisting of straight segments only. You can use this algorithm individually (or with the *Outlines* algorithm) for vectorization of maps and other images consisting of arbitrary lines

Outlines

This algorithm is used to approximate outlines of flooded areas by polylines. This algorithm creates closed polylines, approximating the boundaries of raster objects. The boundary polylines consist only of straight segments.

The algorithm traces raster lines whose width is greater than the value of the *Min width* parameter. To obtain outlines of all raster objects, you only need to choose outlines with the *Max Width* parameter to 0.

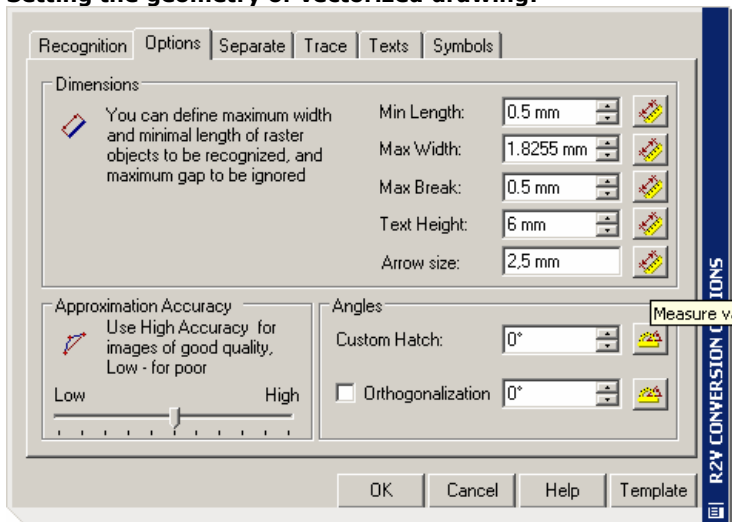
Hatches

Selects the algorithm for hatch recognition. WiseImage Pro recognizes simple raster hatches and creates AutoCAD blocks, consisting of segments. The *Hatches* algorithm searches for hatches only if the *Lines* algorithm is also on.

Symbols

Selects the algorithm for raster symbol recognition with specified samples.

Setting the geometry of vectorized drawing:



Min Length – minimum length of a raster object to be recognized.

Max Width – maximum width of raster lines. Set the value of this parameter to be slightly greater than the measured line width on your drawing.

Max Break – maximum accepted length of a break in a raster line to be ignored. Set the value of this parameter to be slightly greater than the distance between dashes in dash lines or the broken distance in poor quality lines.

Text Height – Set the value for this parameters equal to the maximum height of raster text symbols of upper case.

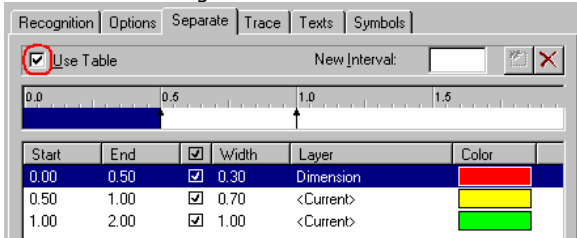
Accuracy – this parameter corresponds to the accuracy of your raster image. Use high Accuracy value for images of good quality, and low Accuracy value– for images of poor quality.

Custom Hatch – angle for recognition non-standard hatches.

Orthogonalization – Select this checkbox to obtain orthogonal vector lines as a result of vectorizing raster lines, which deviate from the orthogonal direction by not more than 2°. You can also align vector objects to a specified base angle.

Separating vector objects by layer and /or by color

The criterion for separating vector objects by layer and/or color is the width of the original raster lines.



In the **Separate** tab of the **R2V Conversion Options** dialog, you can specify for resulting vector objects:

- Width,
- Color
- Layer

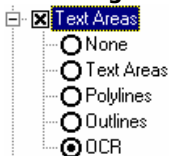
How to vectorize

- Set the vectorization parameters.
- If you have several images your document, then select the one(s) to vectorize. You can also vectorize a selected image.
- Choose **Raster2Vector** from the **rConversion** menu.

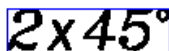
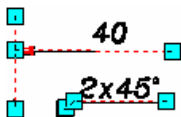
Text Recognition

This section provides information on various algorithms for recognizing raster text; the procedure and parameters of setting up raster text recognition.

Text Recognition Algorithms



You can use the following algorithms for working with the raster text. You can choose them using the **Recognition** tab of the **R2V Conversion Options** dialog.



None – this algorithm searches for raster text areas without vectorizing.

Text Areas – this algorithm recognizes and creates text areas. You can enter text information in these text areas using the procedure of editing recognized texts.

Polylines (Outlines) – approximating the raster text with vector polylines (outline).

OCR – recognizing the raster text and creating text objects.

Text Recognition

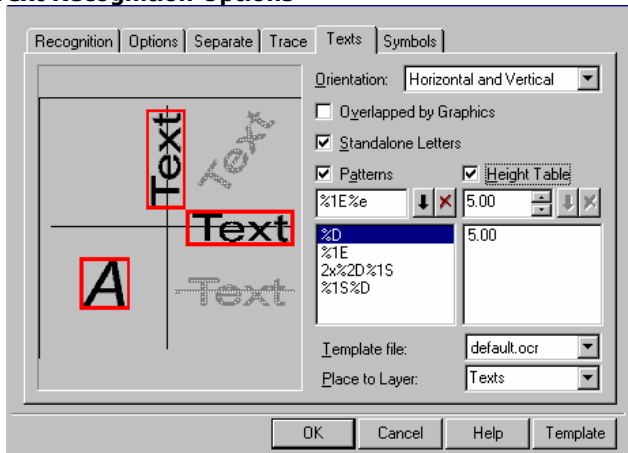
- Select the **Text Area** checkbox in the **Recognition** tab of the **R2V Conversion Options** dialog.
- Choose your required algorithm for working with the raster text.
- In the **Options** tab of the **R2V Conversion Options** dialog enter the **Text Height** value equal to the maximum height of raster text symbols of upper case.
- Tune the text recognition options in the **Texts** tab of the **R2V Conversion Option** dialog.
- **Editing recognized texts**
The procedure of editing recognized texts (text areas) is used after recognition with the OCR module or with Text Areas recognition.

After applying automatic vectorization choose the command **Edit OCR Texts** from the *rConvert* menu. The program displays the first recognized text fragment (area) in the **Text Correction** dialog.



You can edit the text area contents. To accept the text and move on to the next one press **Accept Recognized Text**. To delete the current text press **Delete OCR Text**.

Text Recognition Options



Orientation – choose the orientation for raster texts contained in the image.

Overlapped by Graphics – if this option is on, the program searches for raster texts, crossed with other raster objects.

Tip: It is not recommended to use this mode when working with complicated documents to avoid possible mistakes such as incorrect recognition of small graphic objects as text.

Standalone Letters – allows searching for standalone text characters.

Tip: If this option is off, then the program does not search for standalone text characters, but you can avoid incorrect recognition of small objects.

Patterns – If you use the OCR module, then you should set patterns for text inscriptions contained in the raster document to obtain better recognition results – select the *Word pattern* checkbox.

If **Patterns** are not specified, then the program uses a set of standard patterns.

Height Table – If after vectorizing you want to obtain texts of specific height(s), then enter the desired text height(s) in the table and select the **Height Table** checkbox. If you specify several height values, texts height will be rounded to the nearest value from the list.

Template file –file for storing topology models of text characters, which are used when performing OCR.

You can also train the program to recognize other text characters or different forms of characters contained in the standard template file.

Setting Text Pattern

Here is formal description of a word pattern definition:
“[% [length]character type] II [letter] ...”...

D	Digits
N	Capital letters of national alphabet
n	Small letters of national alphabet
E	Capital letters of Latin alphabet
e	Small letters of Latin alphabet
S	Special characters (signs of plus, minus, equality, degree, and others)

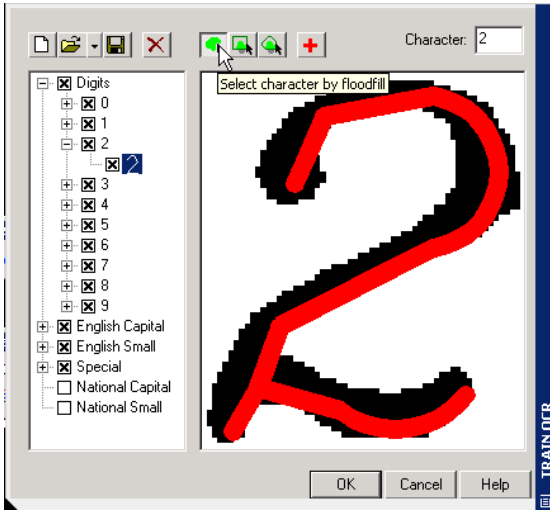
Examples:

Symbol sequence	Pattern
5 25 5559 22.9	%D
R25 R15 R13	R%2D
Moscow Hanover	%1E%e
project design	%n
5V 220V 13.8V	%DV
12 ⁰ 30 ⁰ 45 ⁰	%2D%1S

Training OCR

You can train the OCR module to recognize new characters. You can add a new character to one of the standard template libraries or create your own.

Tip: In some cases it is more convenient to use the standard library (e.g., DEFAULT.OCR) as basis, having saved it with a new name.



To train the program to recognize a new character or different forms of existing characters:

- Choose **Train OCR** from the **rConversion** menu
- Open (create) OCR-file
- Enter a character to recognize in the **Character** field
- Select the corresponding character on the raster image using selection buttons
- Press `+`: to add the new pattern to the OCR-file

Color Vectorization

Color vectorization is intended for recognition of linear objects on color schematic raster images (plans, schemes, maps) with their further vectorization by polylines. WiseImage defines the color table for an initial image automatically assigning the nearest color from this table to resulting vector objects.

Tuning color conversion options

Choose *Color Conversion options* from the *Convert* menu.

Set the following parameters in the R2V Color Conversion dialog:

- In the *Binarizing* section– *Radius* and *Threshold*. Starting from the minimum increase the values of these parameters gradually until you get the required quality of the monochrome raster image in the preview window

For convenience you can use the *Show/Hide* buttons in the Preview window:



– Hide Source Raster;



– Hide Raster (binarization result);



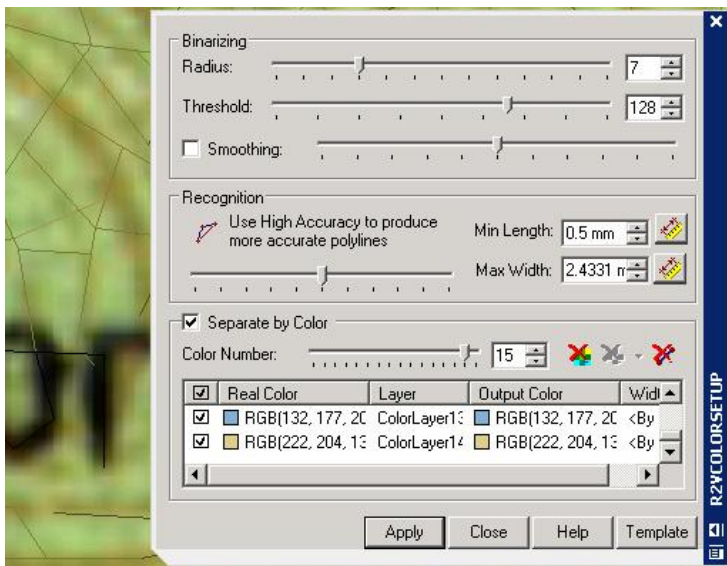
– Hide Vectors.

Use the *Smoothing* slider to smooth raster lines, if necessary.

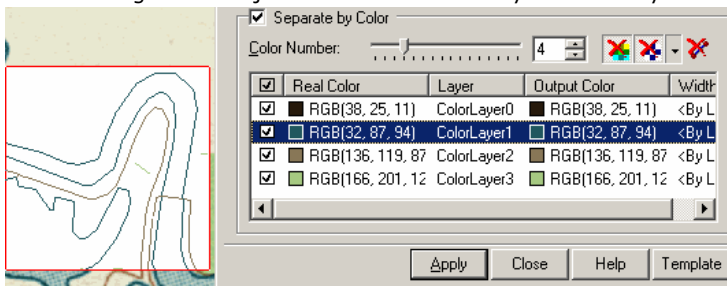
- In the *Recognition* section – *Min. length* and *Max. width* and *Accuracy*.

The *Min. length* and *Max. width* are set in the same way as in the Automatic vectorization procedure.


Use the *Accuracy* slider to get a raster object in the preview window approximated by a vector object in the best way.



- Select the *Separate by Color* checkbox to distribute the resulting vector objects of different color by different layers.



Set a layer, output color and width for the resulting vector objects in the appropriate columns of the table.

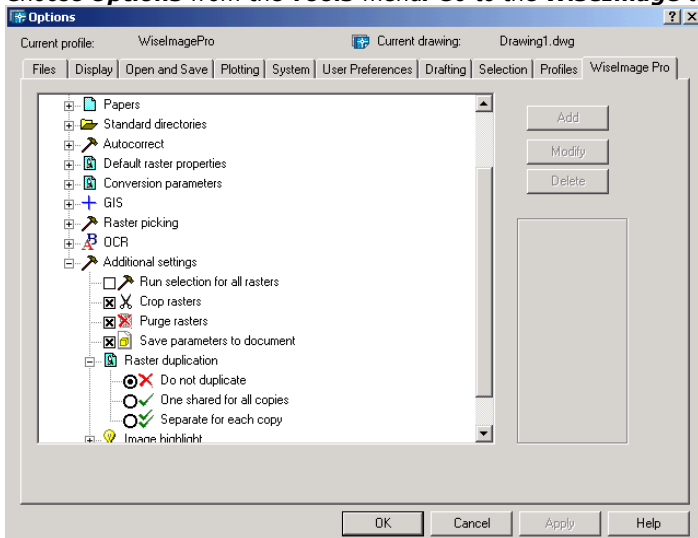
- To vectorize lines of a specific color you should clear the *Export to layer* checkbox  for the colors you want to exclude from the recognition process.
- The polylines resulting from vectorization will be broken at the crossing points with other objects. The *Collect Polyline* command is intended for correction.

Lesson 12: Customizing WiseImage

Brief description: In this lesson you will learn how to customize WiseImage settings.

Customizing Program Parameters

Choose **Options** from the **Tools** menu. Go to the **WiseImage** tab.



In this dialog you can customize the following WiseImage parameters:

- Color of selected raster object, color of the program window background, etc.
- Preview window style for Binarization.
- Modifying the existing standard paper formats and adding new ones.
- Defining the path to OCR template files, symbols to external filters folders.
- List of operations for autocorrect.
- Default properties for new raster images.
- Calibration Entity properties

For more detailed information see corresponding sections of User's Guide and Help.