

**USER'S GUIDE**

# **RasterID v. 3.5**

**Consistent Software**

2005

**Copyright Ó Consistent Software, 2005**

Consistent Software Ltd. — All rights reserved.

None of this documentation can be altered, adapted, or translated into any other languages without the prior written permission of the Consistent Software Company. It is prohibited to create any documents, based on the present original materials.

RasterID and its logotype, Consistent Software and its logotype are the trademarks of Consistent Software ©.

Microsoft Windows, Microsoft Windows NT, Microsoft Windows 95/98, Microsoft Excel, Microsoft Access are the registered trademarks of the Microsoft Corporation. MS-DOS is the registered trademark of the Microsoft Corporation. Pentium and Pentium Pro are the registered trademarks of the Intel Company.

Other program and equipment names are the registered trademarks of the corresponding companies.

Software package RasterID, described in the present guide, shall be distributed in accordance with the terms of the License Agreement and can not be used, transferred or sold under any other conditions, but these of the clearly specified in the following Agreement.

**License Agreement**

Object: Software package RasterID, comprising programs and documentation (hereafter package).

Consistent Software (hereafter CS) from one party and the Principal from the other party agreed as the follows:

CS transfers the Principal a non-exclusive License to use the Package (hereafter License), supplied under this Agreement according to the conditions specified bellow. Should the Principal is not contented with the terms of the Agreement and/or the Package supplied, he can within 30 days return CS all the transferred programs and documentation under the Agreement, CS shall make 100% refund of the amount paid for the package.

**1. License**

- 1.1 Under this License the Principal may use the programs on one computer only. To use the programs on several working places, the Principal shall obtain a corresponding number of paid Licenses.
- 1.2 The Principal is entitled to make one archive copy of these programs, which automatically becomes CS property and falls under this Agreement.
- 1.3 The documentation is not subject to copy and distribution.
- 1.4 The Principal shall prevent the obtained CS Package from being used, copied or distributed without authorization.
- 1.5 This License is valid from the date of the Principal's obtaining CS Package to its termination. Should The Principal breaks any terms of the License, the latter is automatically no longer valid without CS's notice.
- 1.6 All the rights for the name, contents, and appearance of the package shall be the exclusive property of CS.
- 1.7 The present version and all the following Software versions shall fall under this License.

**2. Warranty**

- 2.1 CS warrants that the Software will be free from defects at delivery and for a period of ninety (90) days of normal use from the date of the original purchase. Should any defects arisen through the Principal fault are detected CS shall replace the defected materials.
- 2.2 CS has no warrant responsibility for application and application results of this Package and other materials, linked with it, in terms of accuracy, correctness, reliability, etc.
- 2.3 CS is not responsible for any damage, directly or indirectly linked with the use of, misuse of, or impossibility to apply this Software.
- 2.4 No other information, except for the present License, obtained by the Principal shall cause any CS warrant responsibility.

**3. Modifications in the programs and new versions**

- 3.5 The Principal can fill out and forward to CS the User's Registration Card in order to have a possibility of getting the entire supplement, the software new copies on preferential terms and notice of errors correction.

# CONTENTS

---

<b>Chapter 1 INTRODUCTION</b> .....	<b>1</b>
Welcome to RasterID v. 3.5! .....	1
Scope of Application .....	1
Supported Formats .....	1
Features .....	1
Equipment Required.....	2
Typeface Conventions.....	2
Software Protection.....	2
RasterID Installation.....	3
Uninstalling RasterID .....	4
Installed RasterID 3.5 Folder Contents .....	5
<b>Chapter 2 RasterID BASICS</b> .....	<b>6</b>
Running RasterID.....	6
RasterID Window.....	6
Menu Bar.....	6
Toolbars .....	6
Preview Window .....	10
RasterID Preferences .....	10
Using Dialog Boxes .....	12
<b>Chapter 3 MANUAL IMAGE PROCESSING</b> .....	<b>13</b>
Opening and Scanning Image Files.....	13
WiseScan module.....	13
Virtual Scanner .....	14
Controlling the Display .....	16
Scrolling .....	16
Zooming.....	16
Image Manager.....	17
To open the Image Manager .....	17
Multipage TIFF support.....	18
Basic Manipulations .....	18
Rotating Images .....	18
Mirroring Images .....	18
Deskewing Images.....	19
Cropping Images .....	19
Despeckling Images.....	21
Speckle Remover.....	21
Hole Remover.....	22
Inversion.....	22
Smoothing.....	23
Thickening.....	24
Thinning .....	26
Four-Point Correction .....	26
Fit Image to Closest Paper.....	28

Image Scaling.....	28
Separating Objects by Size.....	29
Processing Image Parts.....	30
Undoing and Redoing Changes.....	31
Interrupting an Action.....	31
Saving Images.....	31
Setting Custom Formats for Saving.....	32
Printing Images.....	34
Installing a Printer.....	34
Settings Print Options.....	34
The Nesting Options.....	37
Printing Color Images.....	39
Built-in Color Correction.....	40
Printing Images.....	42
<b>Chapter 4 COLOR FILTERS AND TOOLS.....</b>	<b>45</b>
Brightness/Contrast.....	45
Equalize.....	46
Binarization and Color Separation.....	48
Binarization Basics.....	49
Threshold by Gray.....	49
Threshold by RGB.....	49
Range by Gray.....	50
Range by RGB.....	50
Range by HSV.....	50
Binarization Dialog Box.....	50
Tuning Binarization.....	54
Adaptive Binarization.....	56
Color Separation Procedure.....	57
Tuning Color Separation.....	59
Color Reduction.....	60
Conversion to RGB, Grayscale and Indexed Colors.....	61
Blur.....	61
Adaptive Blur.....	62
Unsharp Mask.....	62
Median.....	63
Gamma Correction.....	64
Image Classifier.....	66
Drawing on a Raster Image.....	69
<b>Chapter 5 BATCH PROCESSING AND INDEXING.....</b>	<b>73</b>
Creating Title Block Templates.....	73
Other Options of Train Title Block dialog.....	78
Using an External OCR Engine.....	78
Non-Rectangular Topology Options.....	79
Right Button Menu.....	79
Set Title Block Position Option.....	80
Training OCR Templates.....	81
To create a new character template.....	82

Recognizing and Previewing Title Blocks .....	84
Recognizing Text to File .....	86
Recognizing Text to File in Batch.....	87
Batch Processing .....	88
To create a processing scenario (script file) .....	88
To Create Batch Job .....	98
To Run Indexing .....	101

**Appendix INDEXING OUTPUT.....107**

Output to MS Access .....	107
Output to MS Excel .....	109
Output to Text File .....	110
ODBC Output.....	111
Exporting to EDART Application.....	113



# Chapter 1

## INTRODUCTION

---

### Welcome to RasterID v. 3.5!

RasterID is designed for enhancing scanned raster images as well as manual and batch processing and indexing of scanned images.

Indexing procedure stands for searching a title block in a document, recognizing the text fields in this title block with further exporting the recognized data to external databases.

### Scope of Application

Architecture, construction, engineering, EDM, TDM and facilities management.

### Supported Formats

RasterID allows for work with monochrome and color raster images in the following formats: TIFF (including multipage), BMP, RLC, CAL, C4, TG4, PCX, JPG, JPEG, PNG, ECW, PDF.

RasterID provides the ability to tune saving settings for several formats as well as to create a custom format based on the existing ones properties of some set a custom format.

### Features

- Scanning using TWAIN-scanners
- Direct support for wide scanners
- A wide range of tools:
  - Mirroring
  - Rotating at 90,180 and 270 degrees
  - Resizing
  - Cropping
  - Automatic deskewing
  - Four-point correction (Rubber sheeting)
  - Fitting image to closest paper
  - Speckle and Hole Remover
  - Separation by size
  - Smoothing

➤ Inversion

- Wide range of color filters and processing tools
- Batch processing
- User defined Title Blocks search and field contents recognition
- Export recognized Title Blocks to MS Excel or other database
- Internal OCR with character training capability
- External OCR option
- Friendly interface

## Equipment Required

- OS: Windows 98/ 2000/Me XP.
- Free disk space: 30 Mb
- Memory: 64 Mb
- Processor: Pentium
- Hardware lock (optional)

## Typeface Conventions

This manual uses the following typeface conventions:

Convention	Use
UPPERCASE	Keys on the keyboard: ENTER, ESC, ALT, etc. File name extensions such as: .TIF, .PCX, .RLC Names of files, disks and folders: B:, \FILTERS, ESL.EXE
<i>Initial Caps Italic</i>	Names of menu items and dialog box options: <i>Inversion, Train OCR</i>
<i>Lowercase italic</i>	RasterID terms: <i>indexing, image correction</i>

## Software Protection

RasterID can use a software or hardware protection system. It offers the flexibility to use the program in either a single user or network environment. Before you can use RasterID you need to set up the license for the program. You should install RasterID and setup the license (run the

*Registration Wizard*) for the computer on which you intend to use RasterID.

## **RasterID Installation**

Before the installation procedure make sure that the hard disk in your system has at least 30 MB of free space.

To install RasterID:

- Insert the hardware lock (if you have one) in the printer's or USB-port of your computer.
- Insert a CD-ROM containing RasterID into the CD-ROM drive.
- Run the SETUP.EXE file from the CD-ROM root folder.
- If you select a commercial version, enter the serial number of your product (see your CD or Packaging) in the *Serial Number* entry.
- Enter the *User's name* and *Company* fields.
- Check that this information is correct before continuing, as this information cannot be changed once installation is complete. Click on the *Next* button.
- The *Choose destination location* dialog appears, which specifies the folder name and the disk where RasterID will be installed. You can accept the default path or specify another location for the installation with the *Browse* button. Click on the *Next* button to continue.
- Select the type of installation you require in the *Installation Type* dialog; click on the *Next* button.
- The *Select Program Folder* dialog appears prompting you to specify the folder name of the system menu where will be a shortcut to launch RasterID. The Program Folder already has a name, which you can accept by clicking on the *Next* button. If you want to change this, enter a new name and click on the *Next* button.
- The installation procedure creates a folder on the hard for RasterID disk where all the necessary files will be copied, and a shortcut for RasterID in the Windows system menu.

## To setup the license

- To setup the license for the first time you have to use the *Registration Wizard*.
  - The installation procedure prompts you to start the *Registration Wizard* after RasterID installation has been complete.
  - You can start the *Registration Wizard* from the folder where RasterID is installed: select it and start the REGWIZARD.EXE file.
  - You can start the *Registration Wizard* from the *RasterID* folder in the Windows system menu.
- The program defines the serial numbers of your product, and also the hardware lock (if any) and places them in the appropriate fields.
- If you have the hardware lock you should select the *Use Hardware Lock* option.
- Please be attentive when entering your registration data in the two following dialog boxes. Should those fields are filled incorrectly Consistent Software has the right to refuse licensing.
- Send your registration data via e-mail at: **getlicense@csoft.com**.

## License Registration

- Start the *Registration Wizard*.
- Select *Specify path to License file* or enter *the License Server address*.
- In the *License file* or *Server* dialog press the *Browse* button and specify the location of the License file on your hard disk.

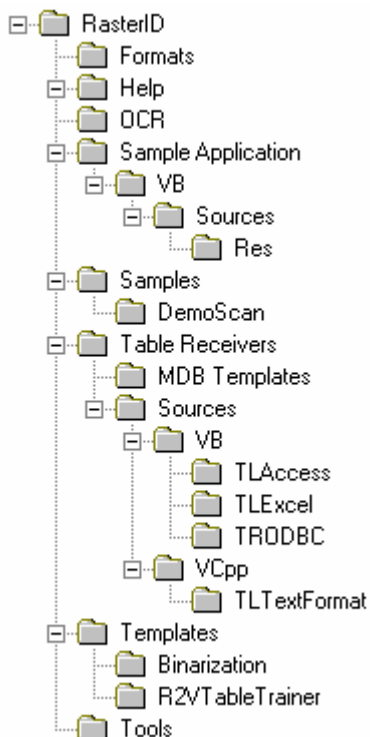
Press the *Send E-Mail...* or *Print...* button.

## Uninstalling RasterID

To uninstall RasterID you should use the standard procedure for uninstalling all Microsoft Windows applications. RasterID will be completely removed from the computer. Any files or templates created by the user will not be removed.

1. Click *Start, Settings* and open the *Control panel*.
2. Choose *Add/Remove Programs*.
3. Choose RasterID from the list.
4. Click on the *Remove* button.
5. Follow instructions on the screen.

## Installed RasterID 3.5 Folder Contents



*RasterID, Formats, Tools* – application binary files

*Help* – doc and help files

*Sample Application, Table Receivers* – application source files

*OCR, Templates* – OCR and title block template files

*Samples* – image files

# Chapter 2

## RasterID BASICS

---

This chapter helps you to familiarize yourself with the main screen components of RasterID and teaches you a few basic skills you will use each time you work with the program.

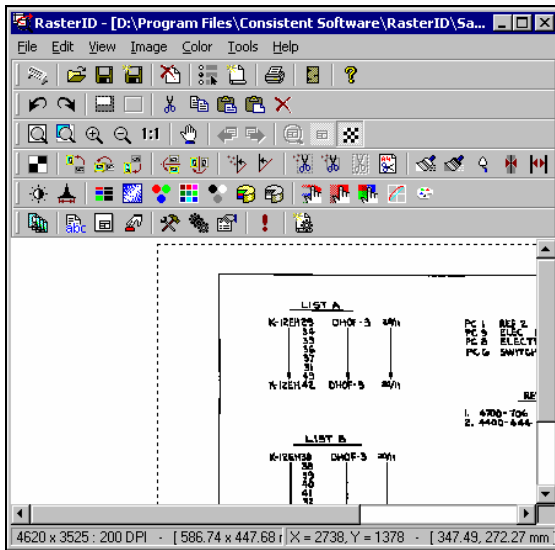
### Running RasterID

Before you run RasterID for the first time, install it on your hard disk.

#### To start RasterID

1. On the taskbar, choose *Start*, and then click on *Programs*.
2. Click on RasterID, then from the displayed folder click RasterID.

### RasterID Window



This is a screenshot of RasterID. Each of the toolbars and window elements are described in the following paragraphs.

### Menu Bar

The Menu bar contains a set of pull-down menu headings.

### Toolbars

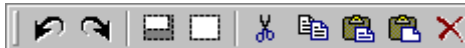
There are the six RasterID toolbars: *File*, *Edit*, *View*, *Image*, *Color* and *Tools*. Each of the RasterID toolbar buttons is briefly described below.

## File toolbar



- Opens WiseScan in *Scan to View* mode
- Opens WiseScan in *Scan to File* mode
- Opens WiseScan in *Scan to Print* mode
- Opens WiseScan in *Scan to Net* mode
- Opens an existing image
- Saves the current image
- Saves the current image to another file
- Closes the current image file
- Selects a scanner source
- Acquires an image from scanner
- Prints a color table
- Creates a color profile
- Setting print options
- Prints the current image
- Exits RasterID
- Help system

## Edit toolbar



- Reverses the last action
- Returns the changes reversed with Undo
- Sets Work Area to process a part of the image
- Resets Work Area to process the entire image
- Cuts Work Area contents to clipboard
- Copies Work Area contents to clipboard
- Pastes the clipboard contents to the image
- Pastes the clipboard contents to the selected position
- Erases the Work Area contents from the image

## View toolbar



- Displays a view of the entire raster image
- Zooms to a rectangular image area

- Increases the display magnification x 2
- Reduces the display magnification by half
- Sets zoom level so 1 screen pixel corresponds to 1 image dot
- Scrolls the image by dragging with the mouse
- Previous page for loaded multipage images
- Next page for loaded multipage images
- Zooms to recognized *title block*
- Shows or hides recognized *title block*
- Shows or hides loaded image

## Image toolbar



- Inverts image
- Rotates image by 90 degrees
- Rotates image by 180 degrees
- Rotates image by 270 degrees
- Mirrors by horizontal axis
- Mirrors by vertical axis
- Deskews image automatically
- Deskews image manually
- Crops image by black pixels
- Crops image to a bounding frame
- Crops image to the work area boundary
- Crops image by a rectangle
- Crops image by a standard paper format
- Removes raster spots of the specified size
- Fills raster holes of the specified size
- Smoothes raster lines
- Fits image to the closest paper size
- Resizes image to the closest paper size
- Scales image proportionally
- Corrects image by four points
- Separation by size

## Color toolbar



- Brightness/Contrast tuning
- Equalizer
- Binarization
- Adaptive binarization
- Convert to RGB
- Convert to 8-bit indexed
- Convert to grayscale
- Color reduction tool
- Color separation tool
- Blur filter
- Unsharp Mask filter
- Median filter
- Gamma Correction
- Image Classifier

## Tools toolbar



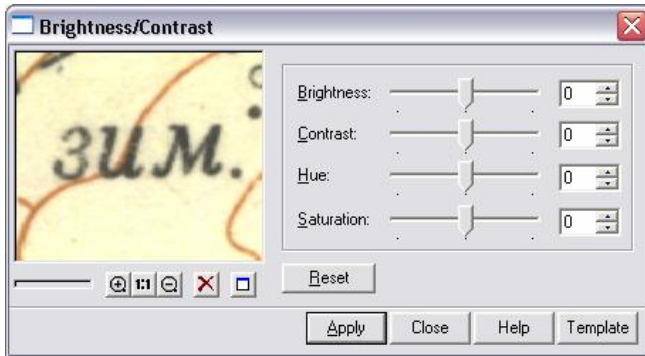
- Image manager – controls multi-paging
- Trains OCR on current image
- Trains Title block on current image
- Runs Title block recognition to preview results
- Opens the *Recognize Text to File* dialog box
- Opens the *Script Studio* dialog box
- Runs Batch processing
- Sets output logger for indexing
- Opens *Preferences* dialog box
- Opens Virtual Scanner facility.

## Status bar






Displays information about the cursor position and the resolution and size of the current image. The Status bar can be switched on/off in the *View* menu.

## Preview Window

In some RasterID dialog boxes there is a preview window, where you can observe the result of an operation on a selected image part while tuning its parameters.



The image part displayed in the left pane of the dialog is called a preview area. Also, there are the following controls:

-  – Turns on/off the viewing of results in the preview window. You can change the position of a preview area using the mouse.
-  – *Zoom in*. Doubles a preview scale in the preview window.
-  – *Zoom 1:1*. Displays an image in the preview window 1:1 so that 1 dot in the preview window corresponds to 1 dot of an image.
-  – *Zoom out*. Reduces a preview scale by half in the preview window.
-  – Opens/closes a detached preview window. Pressing this button repeatedly allows you to create several preview windows for different parts of your image. The right pane of the dialog becomes a separate window. To reset the dialog box to the original view you should close all the detached windows one by one.

## RasterID Preferences

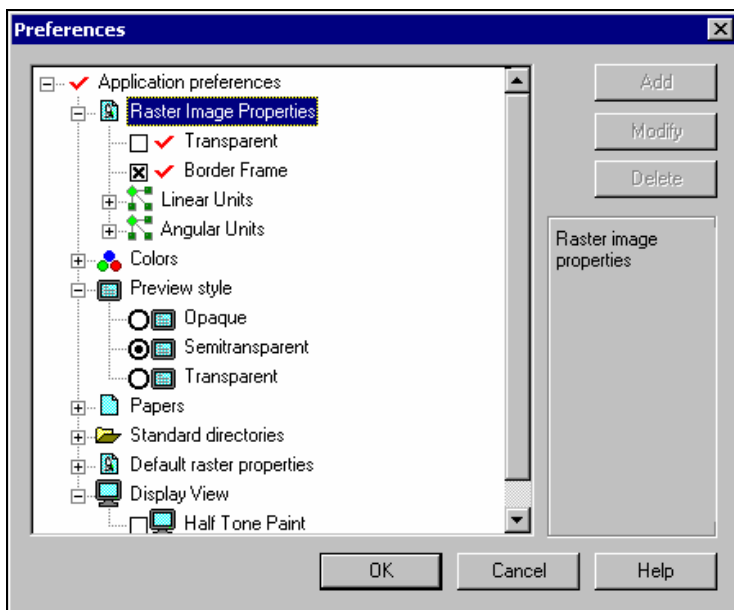
You can customize RasterID to suit the way you work. For example, you can choose whether or not to display the rulers and the frame bordering the image. You can set your preferences so that RasterID uses only those paper formats that you specify. You can also define the color of screen elements, such as the image color.

To set your preferences:

1. From the *Tools* menu, choose *Preferences*.
2. Select the tab and the options that you want to modify.

3. Modify the selected option.
4. Choose *OK*.

The following sections describe the tabs of the *Preferences* dialog box.



The *Raster Image properties* section allows you to control the image display and the current units used.

The *Colors* section contains options to change the colors used for displaying the image.

The *Papers* section contains a list of standard paper sizes.

The *Standard directories* section contains the location of files used by RasterID.

The *External OCR* section contains one or several OCR engines that can be used to recognize texts.

In the *Default raster properties* section you can set the standard image resolution value. This is used to set a resolution for images that do not contain a resolution value (such as BMP).

In the *Display View* section the *Half Tone Paint* check box controls the visual effect which makes zoomed out images appear a little blurred as if they are seen at a distance.

## Using Dialog Boxes

Some RasterID commands invoke dialog boxes. Dialog boxes contain a number of standard controls. The following sections briefly describe these controls.

### **Apply button**

Performs the current operation using the parameters you've specified, without closing the dialog box.

### **OK button**

Performs the current operation with the parameters you've specified, and closes the dialog box.

### **Close button**

Closes the dialog box and stores the parameters you've specified. The next time the dialog box is opened, the last specified parameters will be remembered.

### **Cancel button**

Closes the dialog without saving any changes.

## Chapter 3

# MANUAL IMAGE PROCESSING

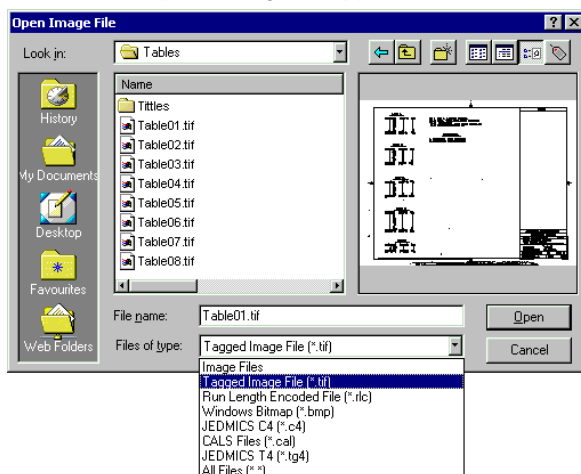
---

### Opening and Scanning Image Files

You use the *Open* command to load existing images of all file types in RasterID.

#### To open a file

1. Choose *Open* from the *File* menu or choose button from the File toolbar. The *Open* dialog box appears.



All the files recognized by RasterID are listed. If the desired file does not appear, choose *Image Files* from the *Files of type* list. RasterID then displays all the files in the folder in the file listing. To locate files in other folders, use the *Look in* list.

Use the buttons at the top of the *Open* dialog to display information about image files before opening them.

2. Select the name of the file you want to open.
3. Choose *Open* and the selected file will be loaded.

#### To scan a raster image

#### WiseScan module

RasterID has internal support for wide-format scanners and supports the TWAIN standard for image acquisition.

See “WiseScan” manual shipped with RasterID 3.5 for information on scanning modes and WiseScan controls.

## Virtual Scanner

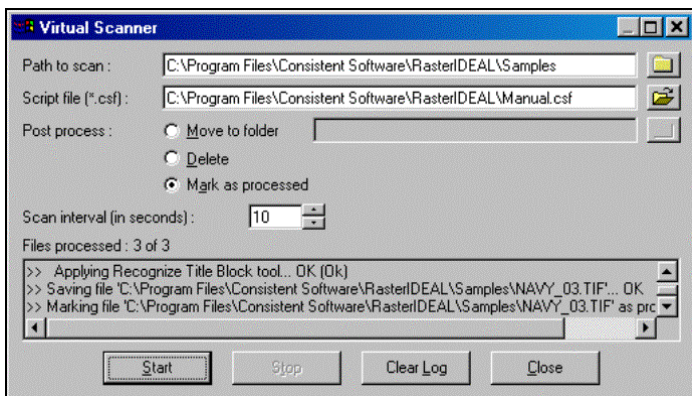
Using Virtual Scanner you can process images obtained from sources other than scanners, for example from video cameras or engineering systems that use scanner-like devices for batch input, but do not provide a scanner interface.

Processing involves applying commands from script files and post processing to distinguish processed files from new ones. The path to the folder containing the image files can be rescanned at set intervals to retrieve any new files.

Using this option means that scanning can be performed in the background in a continuous loop.

### To activate Virtual Scanner

1. Choose *Virtual Scanner* from the *Tools* menu.
2. In the *Path to Scan* entry select the folder where the source image files reside, and in the *Script file* entry, select the script file containing the required batch of processing commands.
3. Select the *Post Process* option – this is the action to be applied to each source image after the batch has been processed.
4. Select *Scan interval*.
5. Press *Start*.



Virtual Scanner revisits the *Path to Scan* at each *Scan interval* and applies the *Script file* to every new source image found that has not previously been marked as processed. Processed files can be moved, deleted or marked as processed.

The lower part of the Virtual Scanner dialog box reflects the progress of the processing operation.



6. Press *Stop* to terminate the scanning loop.
7. Press *Clear Log* to begin a new log.
8. Press *Start* to activate Virtual Scanner again or *Close* to stop all activities.

## Controlling the Display

### Scrolling

The program window contains horizontal and vertical scrollbars. You can scroll up and down, left and right across the whole screen by pressing the scrollbar arrows.



### Panning


You can use the *Pan* command from the *View* menu to move the image in the application window without changing the view magnification. To pan the image, choose *Pan* or click . Move the mouse cursor over the image and press the left mouse button. Drag the mouse while holding down the left mouse button. The image will move in the same direction as the cursor. Release the mouse button to stop panning. To exit panning choose *Pan* or click  again.


If you have a mouse with a wheel, pressing and holding a mouse wheel is equal to activate a *Pan* command.


### Zooming

The most common way to change views is to use one of the many zoom commands, which will either increase or decrease the size of the image displayed in the graphics area. Zooming does not change the absolute size of the image. It changes the view size within the graphic area. RasterID offers several ways to change the view, including drawing a zoom window, zooming in and out, and displaying the entire image.

To zoom in or out incrementally choose *Zoom In* or *Zoom Out* from the *View* menu, or click  or , or use a mouse wheel.

To zoom to a window choose *Zoom Window* or click . Specify one corner of the area to view and then click the opposite corner of the area to view.

To zoom to the image extents choose *Zoom All* or click .


The *Zoom 1:1* command displays an image so 1 screen pixel reflects 1 image dot. To zoom 1:1 choose *Zoom 1:1* from the *View* menu or click  from the *View* toolbar.

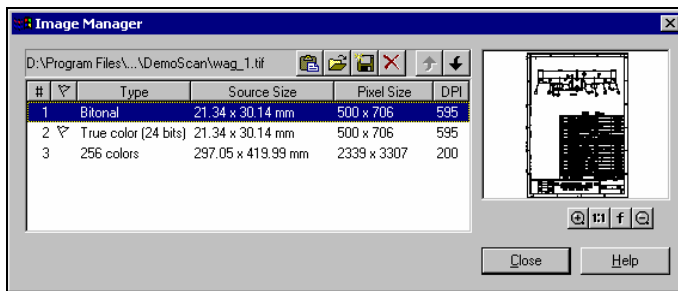
## Image Manager

*Image Manager* is a tool to control pages in multipage TIFF files and images that become separated into layers as a result of a RasterID operation such as color separation or separation by size.

Through the *Image Manager* dialog you can add, rearrange or delete layers, control visibility of layers and save selected layers to a separate image file. Only one of the layers is visible at any one time.







### To open the Image Manager


Choose *Image Manager* from the *Tools* menu or click the  button on the *Tools* toolbar.





The left pane displays information about the layers (pages), their type, size and resolution. The preview pane on the right is equipped with zoom buttons described in the previous section, and the *Fit to Window* ("f") button.

The *Image Manager* also has the following buttons:


	Add from Clipboard	Creates a new layer and places the contents of the Clipboard on it.
	Add from file	Creates a layer from an existing file (through the <i>Open File</i> dialog box).
	Save page As	Saves the selected layer to a separate file.
	Delete	Deletes the selected layer.
	Up	Moves the selected layer or page up a level. This allows you to rearrange the pages in a multipage TIFF prior to saving.
	Down	Moves the selected layer or page down a level. This allows you to rearrange the pages in a multipage TIFF prior to saving.

The  icon denotes which layer is currently visible. To make another layer visible, click on its visibility field in the *Image Manager* dialog.

To browse through the pages of a layered or multipage file you can also use the  and  buttons from the *View* toolbar.

## Multipage TIFF support

RasterID can open and save several images in a single file using the Multipage TIFF format. When opening a multipage TIFF file RasterID automatically converts pages into layers that can be changed or rearranged with the *Image Manager* dialog. The current page number is always shown in the title bar of the RasterID window.

When you save an image that was separated to pages to a standard (non-multipage) file, all layers except the first one are lost. To save all information from such an image you must either save each layer to a separate file using the  button in the *Image Manager* dialog or save an image in a multipage format (TIFF or PDF), that automatically preserves layers as pages.

## Basic Manipulations

The following section describes those commands that can be applied to improve the quality of an image.

### Rotating Images

The *Rotate* command rotates the image contents around its centre point by the angle you choose.

To rotate an image using a preset rotation angle choose *Rotate* from the *Image* menu then choose a preset angle from the submenu: 90 ccw (to rotate by 90 counter clockwise), 180, or 90 cw (to rotate by 90 clockwise).

### Mirroring Images

The *Mirror* command under the *Image* menu flips the image contents horizontally or vertically.

To mirror an image contents choose *Mirror* from the *Image* menu then choose by axis X (Horizontally) or by axis Y (Vertically).

## Deskewing Images

This function lets you correct small skew errors that frequently occur during scanning. Deskewing rotates the whole image around its centre point to align it vertically or horizontally.

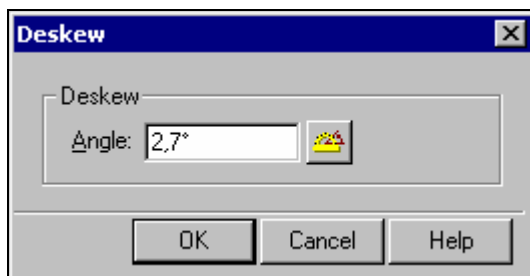
To deskew an image choose *Deskew* from the *Image* menu.


You have two options under the *Deskew* menu: *Auto* and *Manual*.

### To deskew raster images manually

1. Run the operation by choosing *Deskew > Manual* from the *Image* menu.

The following dialog box is displayed:



2. Type the skew angle value in *Angle* or click the angle-measuring button  and specify the start and end points of the line that defines the rotation angle – the *deskew line*. The measured value is automatically entered in the *Angle* box.
3. Click OK.

### To deskew raster images automatically

Run the operation by choosing *Deskew > Auto* from the *Image* menu.






If RasterID is able to estimate the rotation angle, the raster image will be deskewed. Otherwise, use the manual deskewing procedure.

## Cropping Images

You can crop an image using either a manual procedure (specify a work area), or an automatic procedure that detects the image margins by a first black pixel or by a bounding frame.

To achieve the best cropping results you should deskew the image before you apply the crop command.


From the *Image* menu choose *Crop* and then a specific command you want to apply (see below). Alternatively you can press the appropriate button on the *Image* toolbar:

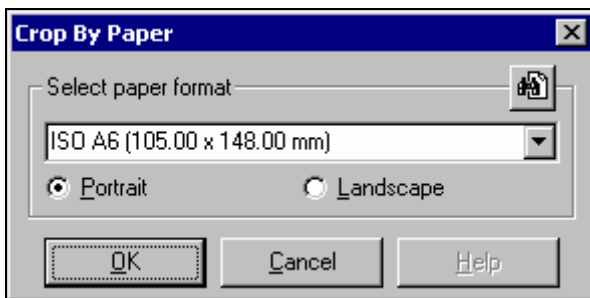
Command	Function
 <i>Auto by black</i>	Crops the blank margins of the image by a first black pixel.
 <i>Auto by frame</i>	Crops an image by a bounding frame.
 <i>by Work Area</i>	Crops an image by the work area specified in the <i>Edit</i> menu.
 <i>by Rectangle</i>	Crops an image by the rectangle specified manually by the user on the image.
 <i>by Paper</i>	Crops an image to a standard paper format, specified or defined automatically.


### To crop paper to a standard size

The *Crop by Paper* command allows you to fit an image on to the closest paper format. If the chosen paper format is smaller than the image, the part of the image outside the edge of the paper will be lost.

All of the *Crop* buttons are located on the *Image* toolbar.

1. Choose *Image > Crop > By Paper Size* or press  on the *Image* toolbar. The following dialog box appears.



2. Select a paper format from the list (press the  button to automatically find the closest paper format to your image) and set the image orientation.
3. Press OK. A dashed frame representing the specified paper size appears over your image. Drag the frame to the desired position and click (or press ENTER) to confirm. Pressing ESC cancels the operation; you can also *Undo* it.

## Despeckling Images

These filters are applied to the entire image. If you wish to apply filtration to only a part of the image use the *Set Work Area command* from the *Edit* menu.

### Speckle Remover

The Speckle Remover filter removes raster objects (isolated clusters of pixels) whose size is smaller than the specified value. This filter can automatically estimate the size of the spots in the image.



Original image fragment



After speckle removing

### To use the Speckle Remover filter

4. Choose *Speckle Remover* from the *Image* menu. The Speckle Remover dialog box appears.



5. Specify the maximum size of raster objects to be removed, either in the current units (left box) or in dots (right box). Alternatively you can set the *Auto Estimating* option so that the filter automatically estimates the raster speckle size before filtration.



To specify the raster object size on the screen, click this button and pick a point inside the object, or

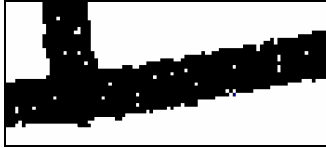


Click this button and indicate two points on the screen. The program will specify a speckle size equal to the distance between the indicated points.

6. Click Apply.

## Hole Remover

The Hole Remover filter fills holes in raster objects. The filter removes holes that have a size smaller than the specified value. This filter can automatically estimate the size of the holes.



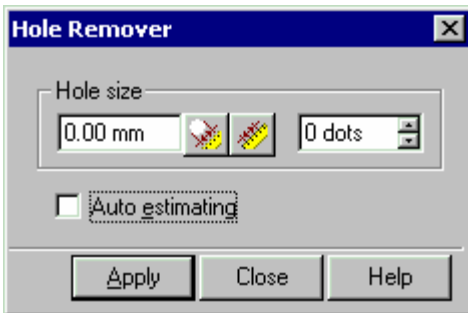
Original image



After hole removing

### To use the Hole Remover filter

1. Choose *Hole Remover* from the *Image* menu. The *Hole Remover* dialog box appears.



Hole Remover dialog box

2. Specify the maximum size of raster holes to be removed in the current units (left box) or in dots (right box) or alternatively set the *Auto Estimating* option so that the filter automatically estimates the raster hole size before filtration.



To modify the raster hole size on screen, click this button and pick a point inside the hole, or

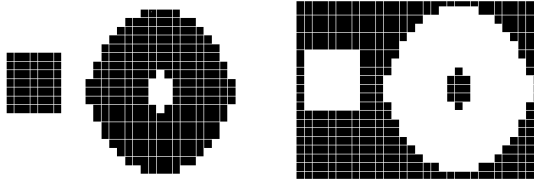


click this button and indicate two points on the screen. The program will specify a hole size equal to the distance between the indicated points.

3. Click *Apply*.

## Inversion

The Inversion filter inverts raster dots so that black dots become white and white dots, black. The following illustration shows the results of inversion filtration.



Inversion filtration

To use the Inversion filter choose *Inversion* from the *Image* menu.

## Smoothing

The Smoothing filter smooths the contours of raster objects.



Original image fragment

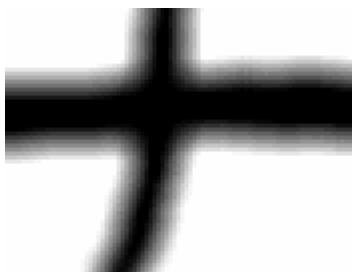
After Smoothing

This filter works in two steps. During the first step, the Smoothing filter converts the monochrome image to grayscale and applies a medianing operation to it. This operation searches the radius of a selection of pixels and replaces the centre pixel with the median brightness value of those pixels. This produces the effect that may be described as blurring of the contours of raster objects. Increasing the *Medianing* value makes the blurring wider.

During the second step, the filter converts those pixels that have a brightness values less than the *Threshold* parameter value to black. The wide black lines on the next picture show the resulting boundaries. Pixels inside those boundaries become black, the outer pixels become white. Increasing the *Threshold* value thickens objects, while decreasing the value makes them thinner.



The first stage – medianing

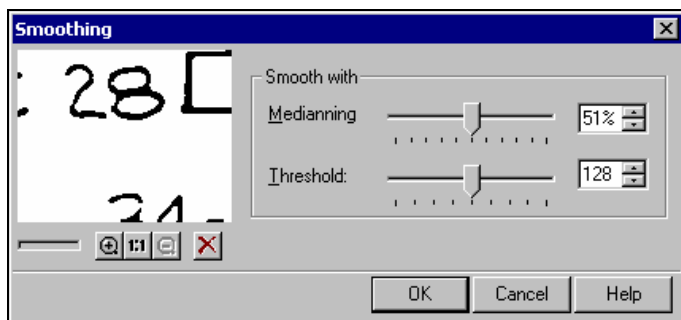


The second stage - binarization

After these two operations are performed the image is converted back to monochrome.

### To use the Smoothing filter

1. Choose *Smoothing* from the *Image* menu. The Smoothing dialog box appears.



Smoothing dialog box

2. Specify the *Medianning* value. This value determines the degree of medianing of the contour pixels.

Specify the *Threshold* value. This value determines the degree to which raster objects thickening. A higher value increases the degree of smoothing but raster lines will also become thicker.

3. Choose *OK*.

### Thickening

The Thickening filter makes raster objects thicker by the specified number of pixels. You can choose a combination of thickening directions.

The following figure below shows the Thickening filtration effect if all directions are chosen. The left picture shows the original raster image, and the picture on the right shows the result of Thickening filtration after three passes.



Thickening filtration in all directions

The figure below shows the Thickening filtration effect if only *Vertical* thickening direction is chosen. The picture on the left shows the original raster image, and the picture on the right shows the result of Thickening filtration after three passes.

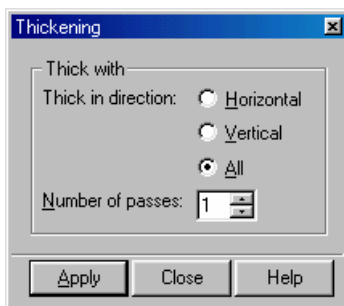


Thickening filtration in vertical direction

### To thicken an object



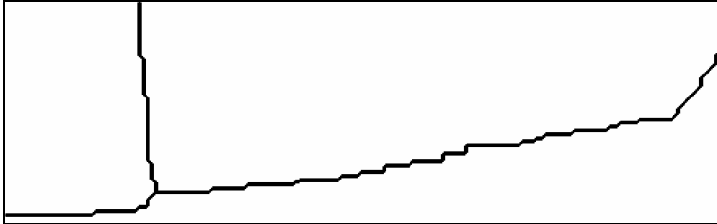
1. Choose *Thickening* from the *Image* menu or press this button on the *Image* toolbar.



2. Select the desired thickening direction: *Horizontal* – by horizontal, *Vertical* – by vertical, *All* – horizontal, vertical and diagonal.
3. Choose *Apply*.

## Thinning

The Thinning filter makes raster fragments thinner by the specified number of pixels in the specified directions – horizontal, vertical, and diagonal. This filter has a supplementary parameter that allows you to thin raster objects to their skeleton (only the pixels in the middle are left).

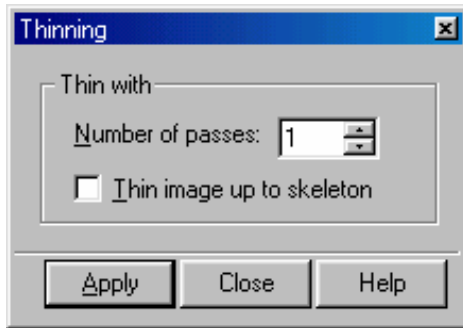


After thinning up to skeleton

## To thin an image



1. Choose *Thinning* from the *Image* menu or press this button on the *Image* toolbar.



2. Specify the desired number of thinning filtration passes.

- or -

Select *Thin image up to skeleton* to convert all the objects to one-pixel lines.

3. Choose *Apply*.

## Four-Point Correction

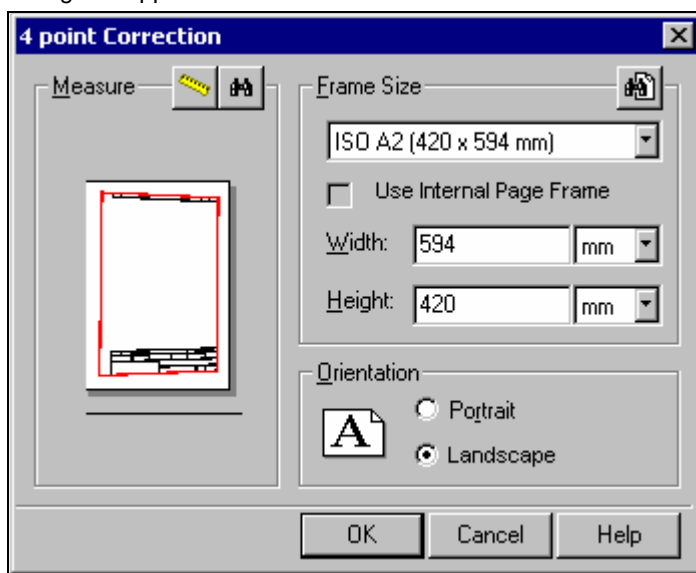
This basic kind of image four-point correction (rubber-sheeting) is a quick and simple way of aligning mainly technical drawings. This procedure is based upon the assumption that both the outside image frame and the image contents are distorted in the same way.

To perform this procedure, you need to specify the current locations of the frame corner points on the image and the frame size – its width and height. If the image contains a drawing frame, RasterID can estimate this frame location and corner positions automatically. You can check the specified frames visually. The red polyline is the source area on the image and the blue rectangle is the destination area. RasterID will then try to find the nearest paper size from the *Standard Papers* list and if required, correct the image by the found paper size. You can also choose the paper size manually.

As a result of correction, the image part enclosed by the specified frame is transformed so that the frame corner points match the corners of the rectangular frame specified, with its sides parallel to the X and Y axes.

### To correct an image by 4 points

1. From the *Tools* menu, choose *4-point Correction*. The following dialog box appears.



2. In the dialog, press the *Find frame* button. If RasterID is able to find the drawing frame you will see a color polygon overlaid on the drawing frame. If the polygon is incorrectly positioned you should specify these points manually.
3. To specify the frame corners manually you should press the *Measure* button and click the frame corners on the image. You can specify these points in an arbitrary order because the program always sorts them so they form a frame without any intersections. If you make a mistake, repeat this step.

4. Enter the correct frame dimensions in the *Width* and *Height* fields. This can be done manually, or you can apply the *Find Closest Paper* command. If you want to use the internal drawing frame size, you have to turn on this checkbox. The internal page frame for a particular page format is set in the *Preferences* dialog.
5. Click *OK* to run four-point correction.

## Fit Image to Closest Paper

To fit an image to the closest paper size RasterID offers two different commands in *Image* menu:

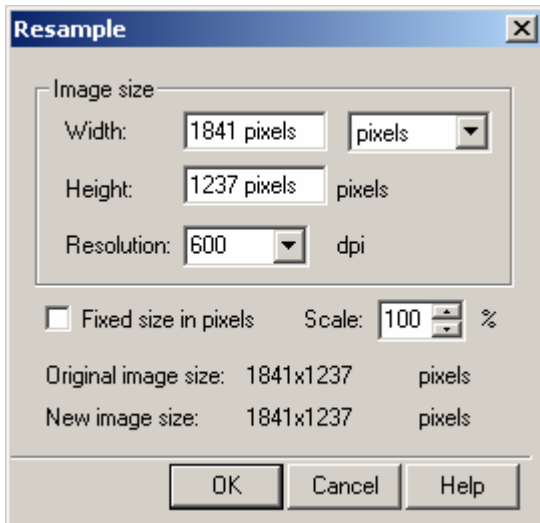
*Fit to Closest Paper* – RasterID will automatically select the nearest paper size from the *Papers list*, thus enlarging the image. To modify the contents of the *Papers* list choose *Preferences* from the *Tools* menu.

*Resize to Closest Paper* – RasterID will adjust the nearest paper size in the best possible way. In some cases it may entail cropping a bit of the image margins.

## Image Scaling

The *Resample* command proportionally scales an image or changes the resolution of an image. You can either change DPI with the image size in pixels fixed or change the image size in pixels.

Start the *Resample* command from the *Image* menu or the toolbar. The *Resample* dialog box appears.



2. Choose measurement units from the combo-box: pixels, centimeters,

inches, millimeters, or points.

3. If you only wish to change the original image size, select the *Fixed Size in Pixels* checkbox. In this case the image dimensions in pixels will not be changed, and you can only change image dimensions in millimeters, inches, etc. by changing the resolution value.

Clear the *Fixed Size in Pixels* checkbox to change the image dimensions by adding or subtracting pixels.

4. Change the image dimensions. Enter values in *Width* and *Height* or change the scale in *Scale*.

5. Enter a resolution value in dots per inch (dpi).

Note: If the measurement units are set in pixels and *Fixed Size in Pixels* checkbox is on, entering a new resolution does not affect the height or width values.

6. Click OK.

### Separating Objects by Size

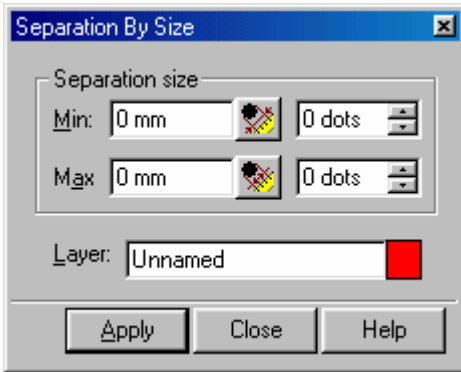
When this procedure is running, the program searches in each selected image for those objects (isolated groups of image dots) with a size within a specified range and moves the areas found to a new raster image. The image created as a result of this operation has the same parameters (size, insertion point, resolution, scale) as the original image but it is placed on a new layer specified by you. This image only contains the objects of the value specified by you.

This operation allows you to extract raster objects of various sizes onto separate raster layers (pages). It can be used instead of a speckle remover filter. There is no loss of data, since objects only move to a different layer, and you can always control the operation performance. If you do not need the objects transferred from the original image, you can erase the entire raster layer obtained. If any important objects are transferred to this layer, you can select them and transfer them back to the original image, and then remove the unnecessary raster layer.

### To separate raster objects by size



1. Define the selection set you want to process and choose *Separation by Size* from the *Image* menu or press the button on the *Image* toolbar.



2. Specify the minimum and maximum object size in the *Min* and *Max* boxes.



To measure the size of a raster object on the image, click this button and then click on the object. The measured value is displayed in the corresponding box.

3. Enter the layer name in *Layer*, where the created image is to be placed.
4. Specify the color of the created layer. Click the color sample next to *Layer* and select a color from the resulting dialog box.
5. Click *Apply*.

## Processing Image Parts

To work only with a part of the currently loaded image you have to set a rectangular *work area* by using the *Set Work Area* command from the *Edit* menu. You can apply the following operations to an image part:

- *Copy* image part to clipboard
- *Cut* image part to clipboard
- *Pastes* image part from clipboard
- *Erase* image part contents
- *Rotate by 90/180/270*
- *Mirror by X/ by Y*
- *Crop by Work Area*
- *Deskew*
- *4-point correction*
- *Inversion*
- *Speckle / Hole Remover*
- *Smoothing*

- *Print*

To work with an entire image choose *Reset Work Area* from the *Edit* menu.

To paste the clipboard contents to the image origin choose the *Paste* command from the *Edit* menu. To paste the clipboard contents to a specified position choose the *Paste To Position* command and specify the position on the image.

## Undoing and Redoing Changes

RasterID always remembers the previous state of your image. If you make a mistake or do not like the effect you have created, the *Undo* command can reverse the last action.

### To cancel the most recent action

- From the *Edit* menu, choose *Undo*.

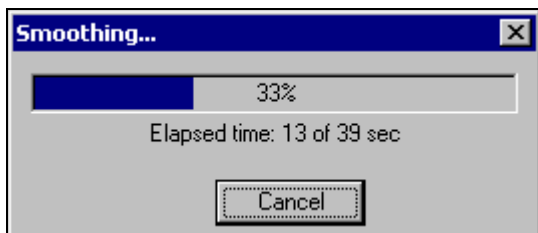
Cancelling the last action with the *Undo* command can be redone with the *Redo* command (must be done immediately after undoing).

### To return the image changes cancelled with *Undo*

- From the *Edit* menu, choose *Redo*.

## Interrupting an Action

When performing a lengthy operation, RasterID displays the following *Processing* dialog box.




Processing dialog box

You can use the *Cancel* button on the *Processing* dialog box to terminate a time-consuming operation - for example, to interrupt loading, saving, or de-speckling.

## Saving Images

RasterID may save images to files using a wide range of raster file formats. The *Save* command saves the image in the current file format.

To save an image choose *Save* from the *File* menu or choose .

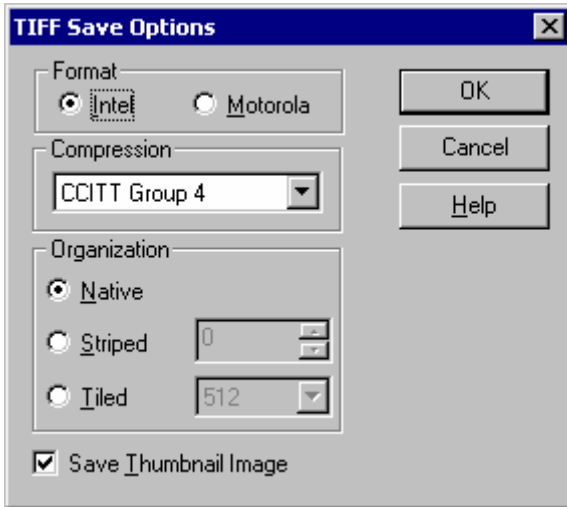
The *Save As* command displays a dialog box that allows you to specify a new filename, file type and location.

### To save an image to a new file

1. From the *File* menu, choose *Save As*.
2. Select the required raster file format in the *Save as Type* list box.

When the *Options* button is enabled, you can choose optional features for the selected file format.

For example, if you select TIFF file format and then choose *Options*, the following dialog box appears.



3. Select the type of compression. Select the *Organization* of file data: *Native*, *Striped* or *Tiled*, and also, if needed, set *Save Thumbnail Image* to store the quick preview bitmap to the TIFF file header, then click *OK*.
4. Select the drive, folder and name for the saved file.
5. Click *OK*.

### Setting Custom Formats for Saving

You can set the format options and make up a list of formats applied in the *Save as* command.

- Choose *Preferences* from the *Tools* menu.
- Go to the *Raster file formats* section and select the formats you intend to use.

You can create a custom format based on an existing one (for which the *Add* button is active).

## Creation of a custom format based on an existing one

1. Select a base format in the *Preferences* dialog, the *Raster file formats* section.



2. Press the *Add* button. Set the name and description for a new format. Press the *Options* button.



3. Set necessary options in the displayed dialog. The dialog is different depending on the base format you select.
4. Press *OK*.

The format you have created will appear in the *Files of type* list of the *Save* and *Open* commands.

## Printing Images

For any given image view, you can print the entire image or a selected rectangular area. You can scale your print output and specify the number of copies to print. The print area can be positioned on the paper by defining print margins and alignment. While printing is being prepared, the current print area and its location on the paper are displayed on the screen. For the multipage type of output, you are shown how the image parts are distributed across the individual pages.

When printing images of different sizes in batch, RasterID offers the *Nesting* option. It provides the optimal images arrangement, thus saving paper.


To print images you need to:

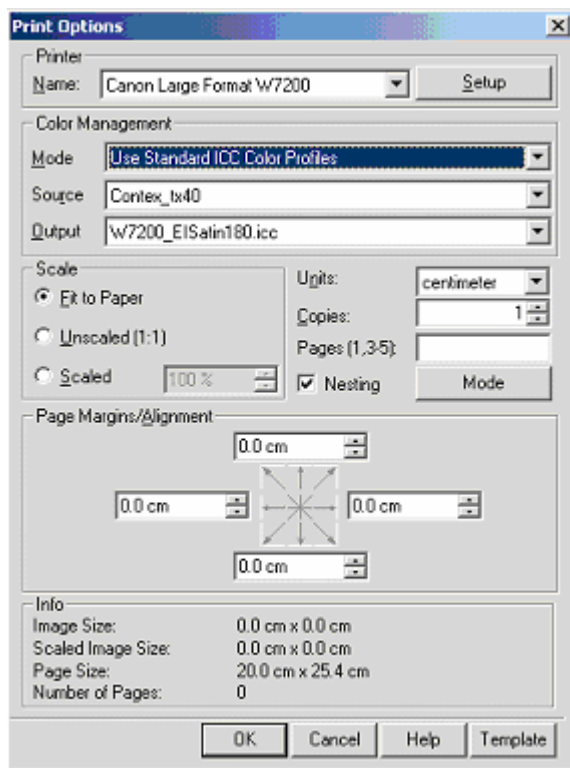
- Install a printer;
- Set the print options;
- Run printing.

## Installing a Printer

A printer must be installed before it can be used to print from RasterID. Printers can be installed using *Printers* from the Microsoft Windows Control Panel. To start the *Printers* dialog you should press the Start button on the taskbar and choose *Settings/Printers* or open *Printers* from the Control Panel. For more information on installing printers, see the Windows documentation. With several printers installed, you can print RasterID images to any Windows printer device.

## Settings Print Options

From the *File* menu choose *Print Options* or press the  on the toolbar.



In the *Print Options* dialog:

1. Select the printer device from the *Printer* section.
2. Press the *Setup* button to change the current printer properties. Set new values for margins and alignment in the appropriate fields.
3. Set scale in the *Scale* field.  
Choose *Fit to paper* to scale the print area as large as possible for the specified paper size.  
To specify an exact scale for the print, select *Scaled* and type the scale (in percent) into the edit box.  
Select *Unscaled (1:1)* to print so that 1 millimetre (or inch) on the paper will represent 1 millimetre (or inch) on the image.
4. Specify the page margins in the *Page Margins/Alignment* fields.  
To specify margins, enter their values in the *Page Margins* edit boxes. The upper left edit box contains the value of the left margin, the upper right box – the top margin, the lower left box – the right margin, and the lower right box – the bottom margin. Margin values are positive.

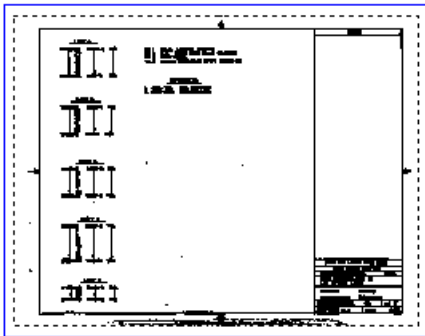
5. If the print output is smaller than the current paper size (one page printing), you can specify the print area alignment in relation to the paper margins.

To specify the type of alignment, press the appropriate button in the *Alignment* field.

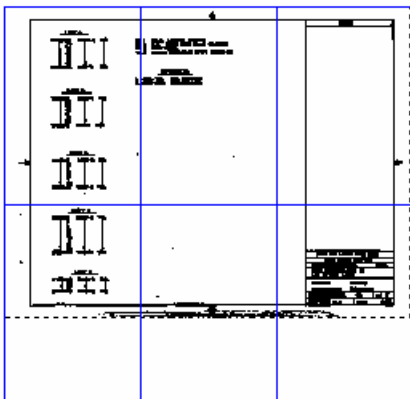
If the print output is larger than the current paper size (multipage printing), the *Alignment* field is disabled.

6. Enter a number of copies in the *Copies* field and measurement units in the *Units* field. You can choose the pages to print in the *Pages* field.

While setting up the print parameters you can use the on-screen print preview feature to observe how the print is positioned on the paper. The figure below shows an example of the on-screen preview for one-page printing. The outer frame shows the paper boundaries.



For multipage printing, the program splits the print output onto several parts. In this case the figure below shows how the on-screen preview may look.



In this case the six frames represent the six pages. They show the pages without the specified page margins.

## To save print options to the template file

To use the print options in batch and *Scan to Print* mode it is necessary that they be saved to the template file.

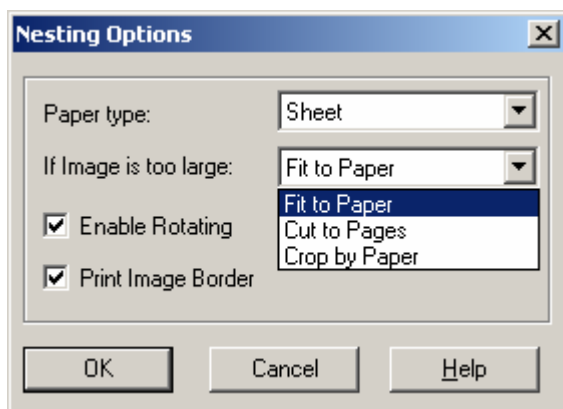
For this press the *Template* button, chose *Save* and set the file name. By default all template files are saved in the *PrintOptions* subfolder.

## The Nesting Options

If you need to print images of different size in batch you can take the advantage of the *Nesting* option for paper saving.

Select the *Nesting* option and press the *Mode* button.

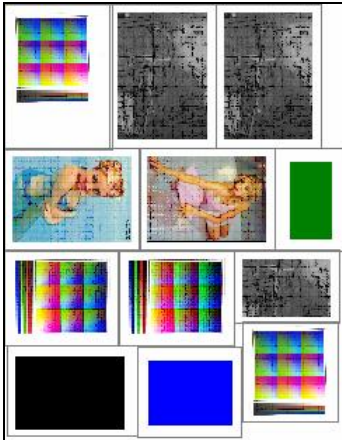
The *Nesting Options* dialog will be displayed.



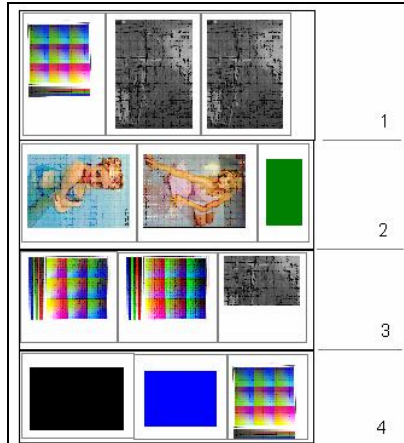
Select the media type: either *Roll* or *Sheet*.

In case you select 'Roll', RasterID will consider the media length unlimited and arrange nesting within the given width. Each time after a strip is filled, it will be printed.

In case you select 'Sheet', RasterID will try to fill up the whole sheet before printing.

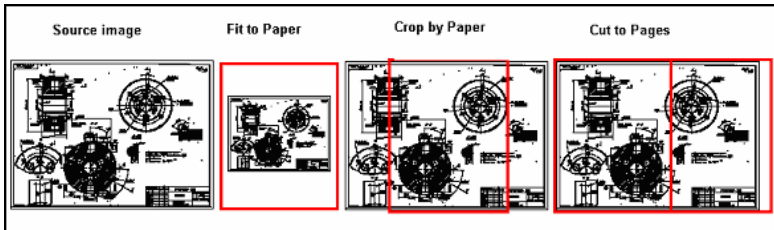


Images layout (**Sheet**).



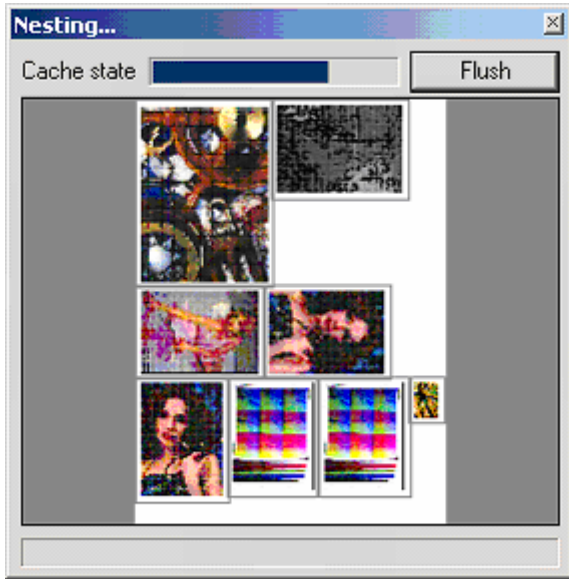
Images layout (**Roll**). Figures 1, 2, 3, 4 refer to the paper crop line'.

- If your image size exceeds the current paper size you may select one of the following options: *Fit to Paper*, *Crop by Paper* or *Cut to Pages*.



- The *Enable Rotating* option allows your image to be fit within paper width and to optimise nesting of smaller images.
- In case you select the *Print Image Border* option, RasterID will print a dash-dot line of your image border. Further it may help you cut the sheet into individual images.
- Press *OK*.
- After the printing and nesting options are set you should save them to the template file for future use in batch printing.

If the *Nesting* option is set to on, RasterID will display the *Nesting...* dialog box after plotting a first image. You can visually control the nesting and filling procedures with the capability of interrupting and printing the current sheet content before the sheet is filled up.



## Printing Color Images

When installing the printer driver most manufacturers supply a set of ICC-profiles that is also available at the manufacturer's web-site. They contain typical color transformation tables recommended by the manufacturer for the specific printer and media. Scanners and other image input-output devices also have their profiles included in the supply package. They can be also obtained through specialized software as a result of your scanner/printer color calibration.

In the *Color Management* section set the mode of using color profiles for the 'scanner-printer' color correction:

If your printer has a built-in color calibration mechanism, choose *Use Printer Color Settings*.

To use the standard ICC profiles:

- Select the *Use Standard ICC Color Profiles* from the Mode combo-box;
- In the *Source* field specify the scanner profile;
- In the *Output* field specify the printer profile.




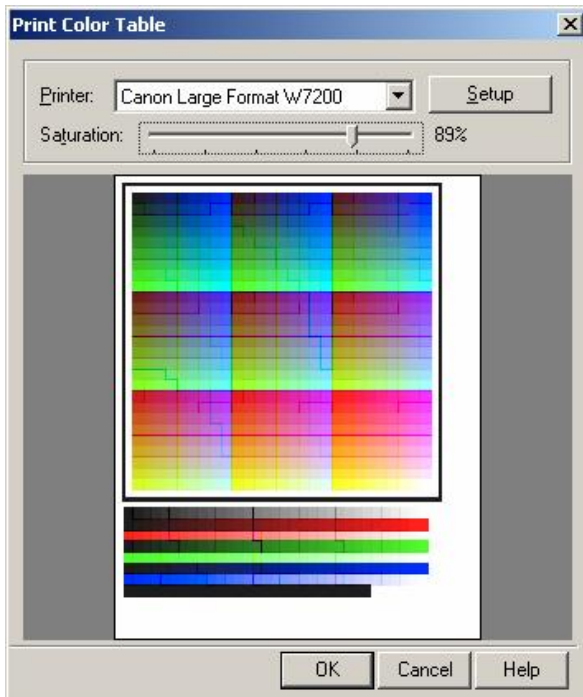
The *Use Standard ICC Color Profiles* mode allows for connection of a ICC-profile, created with RasterID through 'scanner-printer' color correction (see «Built-in color correction»).


## Built-in Color Correction

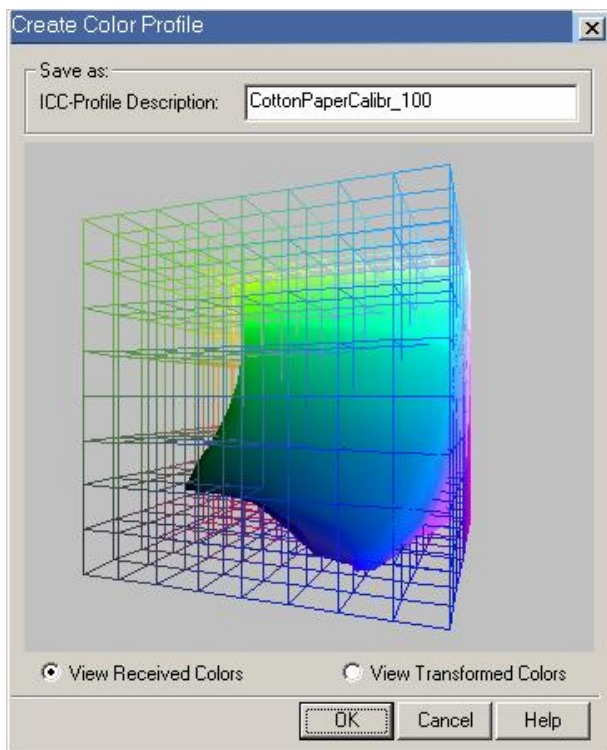
You can perform the «scanner – printer» color correction (create a table of matching colors) with RasterID, save it as a standard ICC-profile version 4.0 class *Device Link* and use it when printing color images.

To perform the «scanner – printer» color correction considering the printer properties and media type:

- From the *File* menu choose *Print Color Table*; alternatively press the  button on the toolbar. The *Print Color Table* dialog will be displayed:



- Select the printer device you require from the *Printer* field, then press the *Setup* button and set the printer properties.
- Set the saturation value (in percent). This parameter depends on the media type used and allows you to control ink consumption when printing an image. For regular thin paper the saturation value may range from 60-80%, while glossy thick paper allows for saturation values up to 90-100%.
- Press *OK* to print a Color table; the image size doesn't exceed ISO A4 format.
- After your print is dry (it takes a few minutes) scan it in color mode – True Color or RGB, using your scanner. The recommended scanning resolution equals half that of your printer. For example, if the color table is printed with 600 dpi, it should be scanned with 300 dpi.
- Choose *Create Color Profile* from the *File* menu or press the  button on the toolbar.



RasterID will find its color table on the image and create the table of matching colors.

The cube framework corresponds to the standard colors of the printed table. The rendered figure displays the colors obtained through scanning.

Based on this information, RasterID will create the table of matching colors for the 'scanner – printer' color transfer correction.

To save the created table of matching colors in the color profile file:

- Set the name for the created profile in the *Save as type* field.
- Press *OK* and set the file name.


The created color table will be saved to file as a standard ICC-profile version 4.0 class Device Link (connective devices). This class is used for direct 'scanner-printer' color correction. Generally, these files are located in *c:\WinXX\system32\spool\drivers\color* with *\*.icm* (*\*.icc*) extension *c:\WinXX\system32\spool\drivers\color* with extension *.ICM* (*.ICC*). These profiles are called *general* inside RasterID.

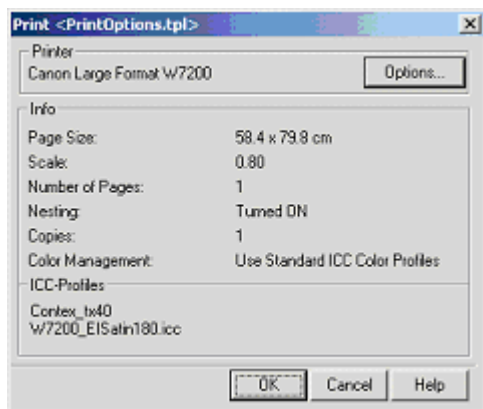
The name of the created color profile will appear in the combo-box when selecting the *Use Device Link ICC profiles* mode.



## Printing Images

After you have set the required print parameters, press *OK*. The created settings are saved as default values unless they are changed.

- From the *File* menu choose *Print* or press the  button on the toolbar.
- If you are satisfied with the current printing options displayed in the *Print* dialog, press *OK*.



To change the current values press the *Options* button. Then the *Print Option* dialog will be displayed, so you can make necessary alterations.



## Chapter 4

# COLOR FILTERS AND TOOLS

---

### Brightness/Contrast


Brightness sets relative color lightness or darkness. It is usually measured as a percentage ranging from 0% (black) to 100% (white).

Modifying contrast enables you to increase or reduce the image brightness range. An image with the same brightness value has zero contrast value. If the contrast value increases, it causes an increase of the brightness range, i.e. darkening dark colors and lightening light ones. Image contrast is measured in percent ranging from 0% (pure gray) to 100%. Color hue usually means a color, and saturation means color purity. You have the ability to completely modify an image color.

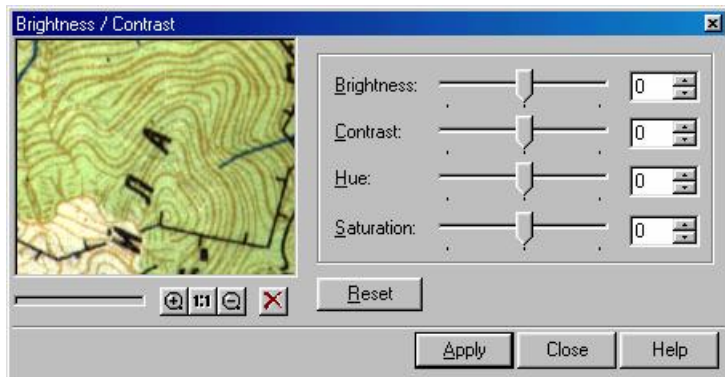
*Hue* is a light wavelength reflected from or transmitted through an object. Usually hue is identified by the name of a color, such as red, orange, or green. Each hue has a specific position in the standard color wheel and is characterized by a specific angle between  $-180^\circ$  and  $+180^\circ$ .

*Saturation* is the degree of color purity. Saturation defines the ratio of gray and the specific hue and is measured as a percentage from 0 percent (gray) to 100 percent (fully saturated).

### To modify an image brightness, contrast, hue and saturation

1. Click the  button on the *Color* toolbar or choose *Brightness/Contrast* from the *Color* menu.

The following dialog box is displayed:



2. Use the appropriate boxes or sliders to modify the value of the following parameters: *Brightness*, *Contrast*, *Hue*, and *Saturation*.  
The preview window displays the effect of modifying the parameters. You can zoom in and out and show actual image pixels (pressing “1:1” button). You can also switch the preview pane off.
3. Click *Apply* to run the operation.

## Equalize


This operation is used for precise adjustment of image brightness, hue, and contrast. The algorithm of correction by histogram requires two threshold brightness levels to be specified – the brightest and darkest pixels, and image gamma that defines the position of the middle brightness value relative to the current threshold values.

The gamma defines a ratio of the brightness range length between the average and the brightest value to the length of brightness range between the dark threshold and the average value. As a result, the pixels with a brightness value below the dark threshold gain a brightness value of zero; the pixels with a brightness value above the brightest one gain the maximum brightness value (255), and the brightness values of the pixels in between are relocated evenly in conformance with their range lengths determined by the image gamma.

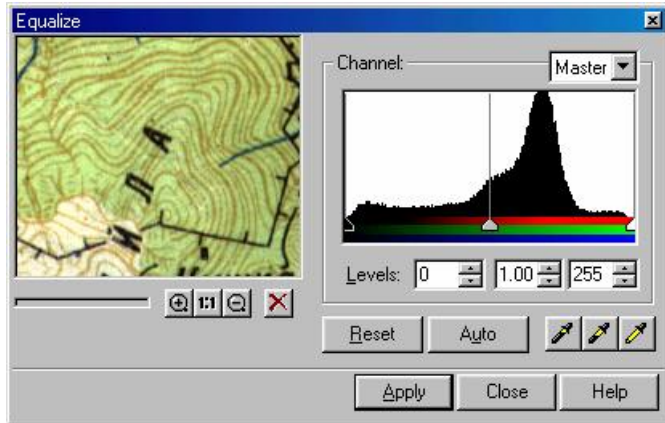
The increase of gamma value causes the range for brightness value in the dark range to reduce, and therefore it increases the contrast, at the same time reducing the contrast in the light hue area, and vice versa.

The command enables you to redistribute both image pixels average brightness and brightness by separate color pixel components (Red, Green, and Blue). It enables you to correct image pixel color, for example, to turn a pink background to pure white.

## To correct an image by histogram




1. Click  on the *Image* toolbar or choose *Equalize* from the *Color* menu.

The following dialog box appears:



This dialog box represents the image histogram, displaying the averaged number of pixels corresponding to each brightness value. The left part of the histogram corresponds to low brightness value, and the right one corresponds to high brightness value (the lightest tones). The sliders in the bottom part of the histogram indicate threshold values: the left one is for the darkest value, the middle one is for the middle value, and the right one is for the brightest pixel.

The *Levels* box provides the numerical expression of the current threshold values. You can select one of the four histograms: *Master* displays summary pixel brightness distribution, Red, Green, and Blue displays distribution of the corresponding pixels color components. Using the *Master* histogram slides, you can proportionally modify the threshold value for all components at once. The Red, Green, and Blue histogram sliders modify brightness threshold values separately for the corresponding color component.

The eyedroppers are used to select threshold values and gamma for an image. If you select a color sample with the  (or ) eyedropper, it defines the threshold value for the darkest (or the lightest) for all components equal to the corresponding components values of the selected color. If you select a color sample with the  eyedropper, it defines the position of the middle tone, and hence defines the image gamma.

2. Select a histogram corresponding to the color component to be corrected.
3. Specify the brightness value for the darkest and the brightest pixels, and for the image gamma. Use *Levels* or eyedroppers to do this. Use the histogram sliders for precise adjustment.

The preview window displays part of the image. Using the preview management tools, you can adjust optimal correction parameters.

Using the *Auto* button you can automatically specify the light and dark threshold values so that the brightness values of each color component not found in the image are cut off. In this way automatic correction tries to increase the image contrast as much as possible, slightly modifying brightness values.

Suppose you want to make the background tone of a map image pure white. To do so, you should select a background sample with the white eyedropper. The white triangle in the *Master* histogram moves to the position corresponding to the selected color brightness. All the pixels with a brightness value above the defined one become white. Then suppose you want to turn outlines, which are not pure black after scanning, to black. If you select a color outline sample with the black eyedropper, all pixels with brightness value below the defined one become black.

The brightness value of the remaining pixels will be proportionally redistributed within the new tone range. As a result, the image contrast increases. By moving the gray slider (modifying gamma value) you can redistribute the contrast between the light and dark image parts.

4. Click *Apply* to run the operation.

You can apply this operation several times, consistently modifying an image pixel brightness distribution.

## **Binarization and Color Separation**

Binarization and Color Separation are the procedures that extract areas of the same color (or falling within the specified color range) to a separate monochrome layer.


Binarization creates monochrome raster images, containing a black-and-white representation of color objects. For example, from one image of a scanned map you can extract and place to separate monochrome layers objects of different colors: isolines, roads, rivers, and other objects. This method provides you with the means to place objects that have one or several different colors on the original image, to a separate monochrome layer.

With Color Separation you can convert a color image to a set of monochrome raster layers. This method guarantees that the black-and-white (or monochrome) representation of each pixel of the original image will be placed on a certain layer.

## Binarization Basics

Binarization creates a new monochrome image of a specified color, which is placed on a specified layer. Using specific criterion the program defines which pixels of the original (color or grayscale) image should become black (foreground pixels), and which ones should become white (background pixels), and then generates a monochrome image and places it on a new raster layer. The criterion for division of pixels into two sets is defined by the selected binarization method and its parameters (threshold values or a color range), specified in the *Binarization* dialog box.

### To binarize an image

1. Click the  button on the *Color* toolbar or choose *Binarization* from the *Color* menu.
2. In the dialog window select a method and adjust its parameters.
  1. Click *Apply*.

Binarization applies various conversion algorithms, which are called binarization methods. The chosen conversion method should be appropriate to the image type.

### Threshold by Gray

*Threshold by Gray* converts color pixels with brightness values above the specified level to background dots, and pixels below this level to image dots.

This method may be used for converting both color and grayscale images. When converting a grayscale image, RasterID uses its gray levels. When converting a color image, the gray levels are defined by the brightness value of color dots.

### Threshold by RGB

When using *Threshold by RGB*, you should define three threshold levels for the Red, Green, and Blue components. RasterID converts color dots with Red, Green and Blue values below the appropriate threshold levels to black dots (image dots).

## Range by Gray

*Range by Gray* allows you to convert color pixels with any brightness value to image dots. Using this method, you first specify a number of basic levels of gray. These levels are used as midpoints for *ranges*. For each of the specified levels, you can define a *range half-length*. A range half-length is the number of gray levels below and above the specified gray level.

*Range by Gray* converts pixels that have gray values within all specified ranges to foreground dots. The other pixels are converted to background dots.

This method may also be used for converting color and grayscale images. Gray levels for color dots are calculated as described in *Threshold by Gray*.

## Range by RGB

With this method you can convert color pixels of the specified *RGB ranges* to image dots.

To specify an RGB range you should first select a *central range color*. The Red, Green, and Blue components of this color define the position of the RGB range central point. For each of the color components (R, G, and B) you should specify the appropriate *range half-lengths*. The range half-length for R, G, or B component is a number of R, G, or B levels below and above the selected R, G, or B level. For example, if the R level of the selected color is equal to 50 and its range half-length for R component is equal to 10, then the RGB range includes colors with the R components from 40 to 60.


## Range by HSV

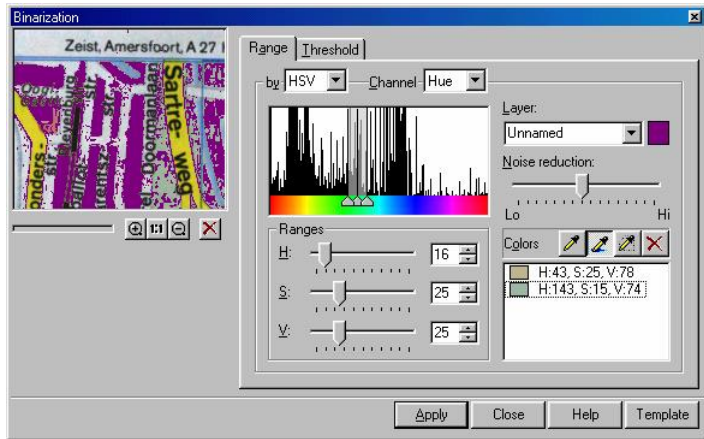
This method allows you to convert pixels of analogous colors to image dots. Analogous colors are closely related colors in the human perception of color, e.g. red - orange, dark green - light green, etc.

To convert an image using *Range by HSV*, you should specify one or more HSV ranges. The HSV range is defined by a selected color and H, S, V *range half-lengths*. The HSV range is similar in design to the RGB range described above. Note that *Hue* is expressed as an angle between 0° and 360°, *Saturation* and *Value* are measured as a percentage from 0 to 100.

## Binarization Dialog Box

### To open the Binarization dialog box

Choose *Binarization* from the *Color* menu or click the  button on the *Color* toolbar.



The controls and buttons described below are the same as the *Threshold* and *Range* tabs of the *Binarization* dialog box.

### Preview window

This window dynamically displays the results of binarization on an image part. Note that if you choose a color sample in the preview area with an eyedropper, the preview window marks the position of the selected pixel with a cross. The current position of the preview window is shown as a red frame on the image.

### Noise Reduction

This slide sets the sensitivity of the binarization algorithm to small details in the image. If the level of noise reduction is set to maximum, the quantity of raster noise and holes in the obtained monochrome raster image is reduced. However, the high level of noise reduction decreases the binarization quality of small and thin details, such as texts, thin lines, etc, since small details can be mistaken for noise.

### By

Depending on the chosen tab, this list allows you to select a binarization method. For example, if the *Range* tab is chosen, you can choose *Range by Gray*, *Range by RGB* or *Range by HSV*.

### Channel

You can choose a *color information channel* type from this list. The term *color information channels* stands for the information on the color components of image pixels by a certain color representation model.

The number of available channels depends on the image type. Every color image has five channels: *Red*, *Green*, *Blue*, *Hue* and *Gray*. For grayscale images only the *Gray* channel is used.

## Channel histogram window

The histogram of the selected channel is displayed in the *Channel* list. A histogram is a graphic representation of a color component value distribution by image pixels, defined by a selected channel. A component value is measured along the horizontal axis of the histogram. Along the vertical axis a normalized number of pixels with the specified color component value are placed. Thus, histogram extremes correspond to the most frequent component values, and the minimums correspond to the least frequent values.

Depending on the selected binarization method, either one or three triangular sliders may appear in the bottom part of the histogram. These sliders allow you to adjust parameters of the current binarization method, i.e. to specify range parameters and a threshold level.

### Layer

This allows you to specify the name and color of the layer, on which a monochrome image will be placed after binarization.

### Apply

Starts the binarization procedure.

### Template

This is used to store and load all the parameters for all the binarization methods.

### Dialog box tabs

There are two tabs in the *Binarization* dialog box: *Range* and *Threshold*. The first one is used to specify parameters for the binarization range methods; the second is used to specify parameters for threshold methods.

### Range tab

This is used to tune the following range methods: *Range by Gray*, *Range by RGB* or *Range by HSV*.

### Colors

This list shows information about the *central colors* of a specified range and allows you to select a range for correction and deletion. The left part of the list shows a sample of the selected color (or gray tone), and the right part shows the color component values in the current color model (gray level for grayscale images). To select a range, specify its appropriate color in the *Colors* list.

Above this list there are three eyedropper buttons, these allow you to create new ranges.



*Color selection* allows the creation of a new range by selecting a color in the image.

RasterID creates a new range, using the color of the specified pixel as the central range color.



*Averaged color selection* allows you to create a new range by choosing an average color in the area around the selected pixel.

RasterID calculates the average color value in the area of the specified pixel and creates a new range, using the calculated color as the *central range color*. The half-lengths of the created range are automatically adjusted to take the close colors, found in the specified pixel area.



*Area averaged color selection* allows the creation of a new image by calculating the average color of an arbitrary area in the image.

Click this button and specify the boundary of a polygonal area. Complete the area selection with a double-click. RasterID calculates the average color value in the specified area and creates a new range, using the calculated color as the *central range color*. The half-lengths of the created range are automatically adjusted to close colors, found in the specified pixel area.

## Ranges

Using this box you can change the half-lengths of a range, selected from the *Colors* list. The type, name and number of sliders and boxes depend on the current conversion method. For example, if you choose *Range by HSV*, the following sliders and boxes are displayed: hue – H, saturation – S and brightness – V.

If you choose *Range by Gray*, there is only one slider and one box to enter the half-length of the brightness range.

## Sliders of channel histograms

This tab has three triangular sliders on the histogram channels corresponding to the selected binarization method. These sliders allow you to change the central color components (gray central level) and the half-length of the range selected from the *Colors* list.

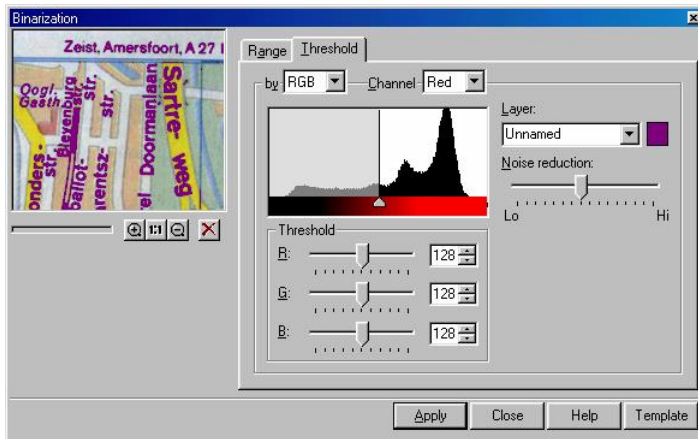
If you choose *Range by HSV*, the sliders on the channel *Hue* histogram appear, the selection of *Range by RGB* causes the appearance of sliders on the *Red*, *Green* and *Blue* histograms. If you choose *Range by Gray*, the sliders appear on the histogram of the *Gray* channel.

## Threshold tab

This is used for binarization with *Threshold by Gray* or *Threshold by RGB*.

## Threshold

This tab displays the specified threshold values of the current method of threshold binarization. To modify a value, move the corresponding slider.



## Sliders of channel histograms

One triangular slide appears on the channel histogram corresponding to a certain binarization method. This slider allows you to modify the threshold value of a color component or gray level.

If you choose *Threshold by HSV*, the sliders appear at the *Red*, *Green* and *Blue* histograms. If you choose *Range by Gray*, the slider only appears at the histogram of the *Gray* channel.

## Tuning Binarization

To fine-tune the binarization procedure you should choose an appropriate method. The selected method type defines a customizing method. For each of two threshold methods you should specify one or three threshold values at the histogram. You should also specify a set of ranges of the corresponding types that contain the extracted colors.

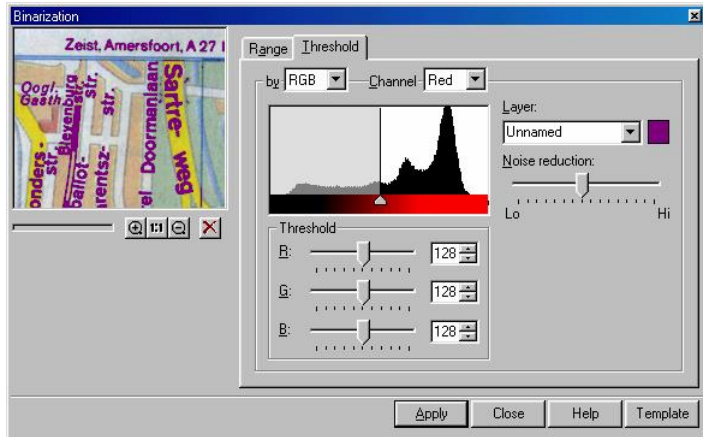
Besides, for any method you should also specify a layer to place an image, obtained after binarization.

## To tune threshold binarization

1. Choose the *Threshold* tab from the *Binarization* dialog box.

2. From the *By* list choose an appropriate method.
3. Tune the threshold values for the selected method.

When tuning, use the preview window of the *Binarization* dialog box to observe the results of parameters modification. Note that an image preview in scale 1:1 provides the most reliable results.



If you selected the *Threshold by Gray* method, choose *Gray* in the *Channel* list to see the gray level histogram. Specify a threshold value with triangular or G sliders.

If you selected the *Threshold by RGB* method adjust the R, G, B threshold values. For this purpose you can also use the triangular sliders on histograms of *Red*, *Green*, and *Blue* channels.

4. Use the *Noise Reduction* slider to adjust noise reduction and improve binarization quality.

By default this parameter is specified as an average value. If you binarize large filled areas, decrease this parameter value (close to *Lo* mark) to reduce the quantity of raster speckles and non-filled holes when binarizing objects.

If you try to get a monochrome layer, containing images of small or thin objects – texts, characters, isolines, or a grid, increase this parameter value to prevent these small objects, caused by noise reduction, from being thinned and distorted. In this case, the noise level of the obtained image increases.

5. Select a name and monochrome image color for the layer on which the binarization results will be placed.

Enter a name in *Layer*. To define a color, click on the color pattern and choose a color from the box, click *OK*.

## To tune binarization using the range method

1. From the *Binarization* dialog box, choose *Range*.
2. From the *By* list, choose the required type of range method.



Set the parameters of the chosen method.

When tuning, use the preview window of the *Binarization* dialog box to observe the effect of changing the parameters. Note that you obtain the most reliable results on viewing the image at a scale of 1:1.


3. Specify a set of ranges capturing the colors (gray levels) of the color image objects that you want to move to a separate monochrome level.

To do this, create the required number of ranges, using the eyedropper buttons and watch the result of adding each range in the preview window. If the range addition results in unwanted image pixels being captured, try to modify the range parameters using the *Ranges* box or the channel histogram sliders. If you cannot obtain acceptable results, delete the range using the *Remove Colors* button.

### To add a range

Click the  or  button and point to a pixel you want to binarize.

- or -


Click the  button and choose an area on the image that you want to binarize.

An element related to the created range appears in the *Colors* list.

### To change the created range parameters

Use the sliders and boxes of *Ranges*, or channel histogram sliders.

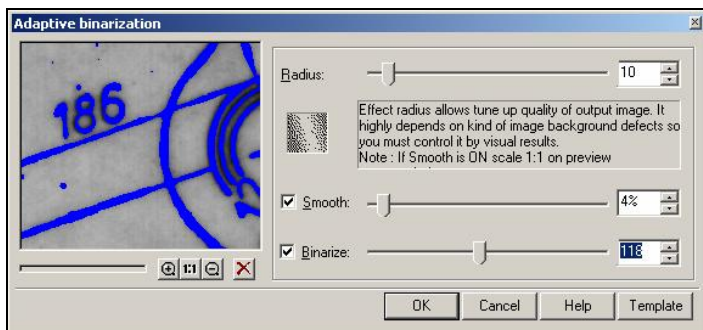
### To delete a range

Click on an element corresponding to the range you want to delete in the *Colors* list and press the *Remove Color*  button.

## Adaptive Binarization

Binarizing images on which the noise and speckles are spread unevenly, such as on aged or dirty blueprints, produces poor results. The *Adaptive Binarization* tool from the *Color* menu combines binarization with smoothing. The program analyses the level of noise in the processed area and does its best to extract the useful data.

This command is only applicable to grayscale images.



This tool only has three controls:

1. *Radius* – sets the radius in which the program analyses the level of noise to be cleaned. Generally the best results can be attained by setting the *Radius* value approximately two times thicker than the thickest linear object on the image.
2. *Binarize* – binarization using *Threshold* value. The method used – Threshold by gray – is described in the previous section.
3. *Smooth* – the smoothing process is described in the “Smoothing” section (see page 49). Using smoothing with the *Binarize* checkbox set to off produces a cleaner image with the background evened and line objects revealed.

There is no general rule for obtaining the best results. It is recommended that several combinations of these controls be explored on each image.

## Color Separation Procedure

This procedure is used to separate color image dots in non-overlapping sets. The objects of one sort are usually marked with the same color; therefore we are able to separate image objects using their color properties.

The first step of specifying separation parameters is to define a set of object categories in the original image. Each category is based on a set of basic colors. The dots that have these colors or colors close to these, fall in the same category (at least one basic color for each category must be specified). For example, a category set may be the following: background, isolines, roads, railways, buildings, vegetation, rivers, etc. You can specify up to 255 categories. Each category has two properties: name and symbolic color.

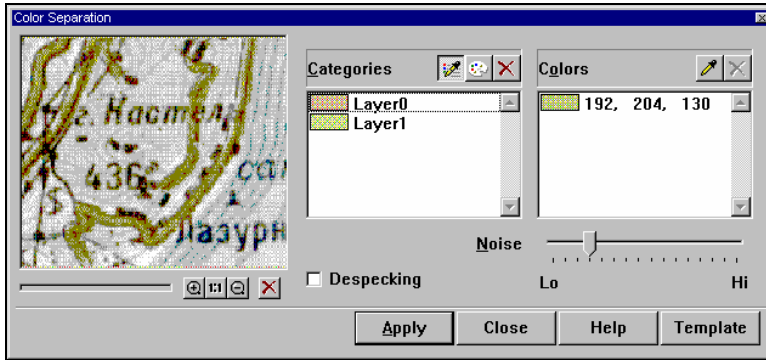
A symbolic color is used to display dots, belonging to a certain category. This color is shown in the preview window during the adjustment of separation parameters. It is also assigned to the monochrome layer to which

the dots of this category are transferred. A symbolic color does not need to correlate with the color of extracted objects.

On layering, the program places the dots of each category in a separate monochrome image. The program assigns the specified new color to all dots belonging to the same category. The original color image is left unchanged on its own layer.

## To perform Color Separation

1. Click the  button on the *Color* toolbar or choose *Color Separation* from the *Color* menu.



2. Create a category set, using the *Create Category* button as described below in this section.



If you want to modify a category definition or delete a category created by mistake use the *Delete* or *Modify* buttons.

- Use the preview tools to view the effects of changing the parameters. Note that an image preview at a scale of 1:1 provides the most reliable results.
3. If you are not satisfied with the separation results, try one of the following suggestions:

Modify the basic colors in each category. Note that you should specify a sufficient number of base colors, describing each category. You should select color samples both from the middle and the boundary of the object.

- or -


Use the *Noise Reduction* slider and *De-speckle* option to redistribute dots by categories.

4. When you are satisfied with the quality of separation, click the *Apply* button.

## Tuning Color Separation

Category attributes and basic colors are specified in the *Color Separation* dialog box. The *Categories* section contains a list of specified categories, and buttons that allow you to create, modify, and delete category definitions. The *Colors* section displays a list of the basic colors within a category and buttons that allow you to add or delete the basic colors of a selected category.

### To add a new category

1. Click the  – *Create category* button in *Categories*.
2. Specify with the eyedropper tool the object in the image, the dots of which should fall within the new category.

The *Layer Name* and *Color* dialog box will be displayed.

Here you can specify the name & symbolic color for the category.

3. Click OK.

In the *Categories* list a new category appears, and in the *Colors* list the color selected from the image is shown.

If you make a mistake when specifying a category, delete its definition or modify its symbolic color and name.

### To delete a category definition



1. Select a category from the list of *Categories*.
2. Click *Delete*.

### To modify the name and symbolic color of a category



1. Select a category from the *Categories* list.
2. Click the *Edit Category* button.  
The *Layer Name and Color* dialog box will be displayed.
3. Enter a new category name in *Name* and/or select a symbolic color from the palette.
4. Click OK.

Note that when a category definition is modified, its set of basic colors does not change.

### To add a basic color to a category

1. Select the required category from the *Categories* list.  
The current set of basic colors for the selected category will appear in *Colors*.



2. Click the eyedropper button in *Colors* and specify a point on the image.

The selected color will be added to *Colors*.

If you make a mistake when selecting a basic color, it can be deleted. A mistake in color selection is detected by examining the separation results shown in the preview window.

### To delete a basic color from a category

1. Select the required category from the list of *Categories*.
2. Select the required base color from the list of *Colors*.



3. Click *Delete*.

### To adjust separation sensitivity to small objects

Use the *Noise Reduction* slider and *De-speckle* option.


By setting the *De-speckle* option to on, you can eliminate the influence of noise and small objects during the color analysis procedure.

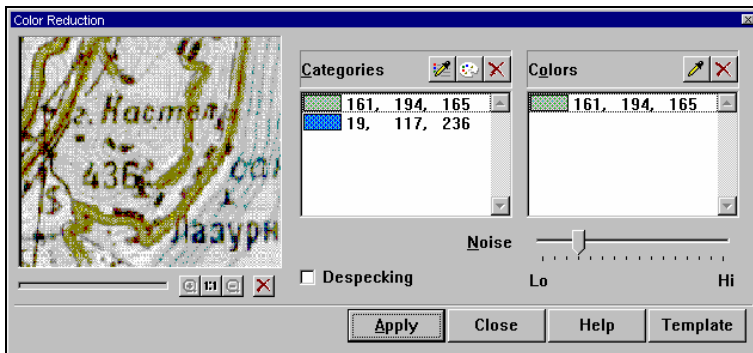
## Color Reduction

This procedure is similar to that of color separation, described on page 50. The only difference is that you do not have to specify category names, since color reduction does not cause the creation of additional layers.

### To open the Color Reduction dialog box



Click the  button on the *Color* toolbar or choose *Color Reduction* from the *Color* menu.



This procedure is performed in the same way as the color separation procedure. The functions of this dialog box are the same as those of the *Color Separation* dialog box.

## Conversion to RGB, Grayscale and Indexed Colors

Converting an image from monochrome to color or grayscale allows you to apply color filters such as Blur to the image or the selected layer. It also allows you to prepare an image (or selected layer) for further processing in other applications.


### Blur

This filter produces a blur effect on the image, giving the impression that it is slightly “out of focus”. Blur filtration reduces image clearness, but makes image areas with texture fills more even. This procedure can have a positive effect on further binarization or image color separation.

To calculate pixel color the program replaces its color value by the averaged value of the area. Area pixels color characteristics are considered with weight function; two-dimensional Gaussian distribution with the centre located in the current pixel is used for this purpose.

Radius is the only filter parameter. The increase of its value produces a stronger blur effect.

#### To blur an image

1. Click  on the *Color* toolbar or choose *Blur* from the *Color* menu.

The following dialog box is displayed:

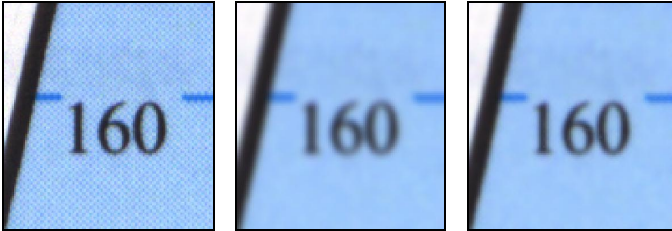


2. Type values from 0.1 to 10.0 in the *Radius* box to specify the blur level. The increase of its value produces stronger blur effect.
3. Choose *Apply* to run filtration.


Blurring with a large *Radius* coarsens the image and removes details. The blur effect is reduced as the *Radius* setting is reduced. For more control when using the blur filter, you should run the filter several times with a small *Radius* value, using the *Apply* button.

## Adaptive Blur

1. The *Adaptive Blur* command is used for intelligently “de-screening” images. This filter tries to keep sharpen borders between different colors while smoothing similar color areas. See pictures (Original, Blur R3.5, Adaptive Blur R3.5).



### To adaptively blur an image


1. Choose *Adaptive Blur* from the *Color* menu or click the  button on the *Color* toolbar.
2. In the *Adaptive Blur* dialog box type values from 0.1 to 10.0 in the *Radius* box to specify the blur level or use the slider.
3. Observe the effect of the command in the Preview window.
4. Choose *Apply* to run filtration.

## Unsharp Mask

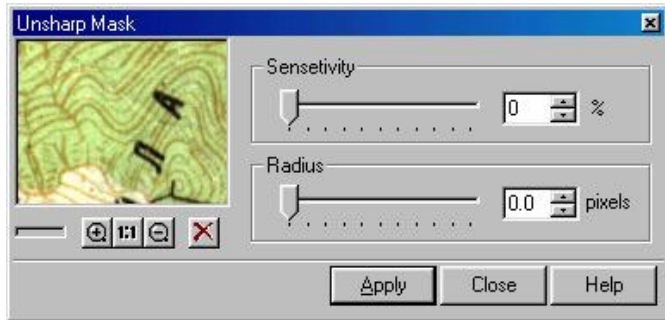
This filter seeks color transition boundaries in the image and improves their sharpness.

The filter modifies pixel contrast on color transition boundaries, producing an overall increase in image sharpness. This filter can be used for correction of images that became blurred after interpolation, for example, after such operations as scale, resolution modification or calibration.

### To increase outline sharpness

1. Click the  button on the *Color* toolbar or choose *Unsharp Mask* from the *Color* menu.

The following dialog box is displayed:




2. Enter a value in the *Sensitivity* box or use the appropriate slider to specify the desired effect of the filter application in percent from 0 to 100. The effect of the filter application becomes stronger as this value is increased.
3. Enter the *Radius* value.  
The higher the *Radius* value you specify, the more pixels surrounding the color transition boundary will be processed. Low radius values only increase the sharpness on the boundaries.  
Viewing the results in the preview window should allow you achieve the optimum parameter value for the entire image.
4. Choose *Apply* to run filtration.

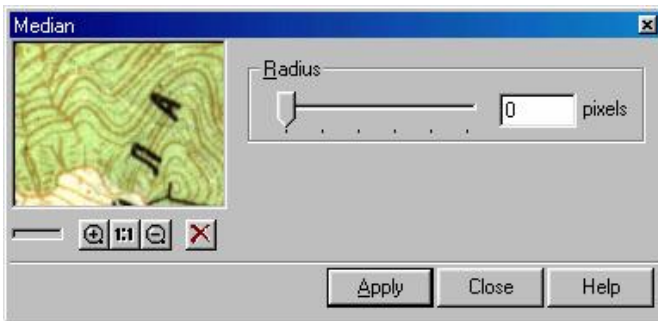
## Median

Median filtration reduces an image noise, by analyzing all pixels within the specified radius and giving the central pixel the averaged value of the reviewed pixel characteristics. As a result, the extremes of pixel color and brightness are depressed and the image looks slightly blurred.

### To use median filtration

1. Click the  button on the *Color* toolbar or choose *Median* from the *Color* menu

The following dialog box is displayed:




2. Specify a *Radius* value from 1 to 5. This value determines the area (in pixels) within which the filter is to review color values.
3. Choose *Apply* to run filtration.

## Gamma Correction

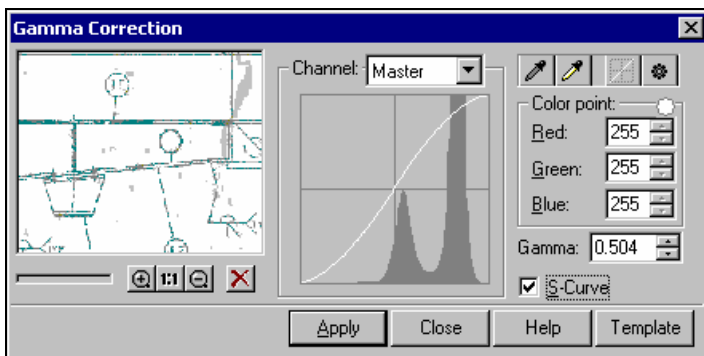
This tool is used to enhance the overall quality of an image by changing its so-called “color profile” - i.e. it applies an algorithm that changes the distribution of brightness.

Every image has a brightest point (“white” point) and a darkest point (“black” point). The points that have intermediate values of color intensity are usually distributed unevenly, forming a curve of arbitrary shape. Gamma value defines the slope of the curve halfway between black and white. Using the Gamma Correction tool you can make points that fall in the specified range of brightness brighter or darker. You can also influence the brightness of Red, Blue or Green colors.

### To change color profile



1. Click the  button on the *Color* toolbar or choose *Gamma Correction* from the *Color* menu.


The following dialog box is displayed:




2. Specify white and black points using the relevant eyedropper tools.
3. Choose *Master* or specify a color in the *Channel* list.
4. Create Gamma curve automatically or adjust it manually (see details below). Watch the results in the preview window.
5. Click *Apply*.

## Specifying black and white points

Use the  or  buttons to pick black or white point values directly from the image. The *Color point* section of the *Gamma Correction* dialog allows you to adjust color values precisely.

The *Autoset* button  calculates the black and white point values automatically for every color channel. The histogram in the middle of the dialog window reflects color brightness distribution. You can change the curve for every channel separately.

Click  to reset the gamma curve.

## Changing gamma curve

There are three methods of changing the shape of the Master gamma curve and curves for individual channels. These methods are interrelated.

1. Check or uncheck the *S-Curve* box. S-curve is a form of gamma curve that is always symmetrical around the central point of distribution range. This implies that when adding brightness to dark areas we automatically darken bright areas to the same extent, creating a more balanced brightness for the human eye. If *S-Curve* is unchecked you can create a gamma curve, shifting the overall balance of brightness in the resulting image.
2. Enter a value in the *Gamma* box. This changes the curves' slope.
3. Drag the Master curve or curves for individual channels in the histogram window.

When *Master* is selected in the *Channel* list, all curves are shown (at first you see them as a single white curve since curves for color channels overlay).

When you place the mouse pointer over the curve you will see a bold point that you can drag to change the shape of the curve. While keeping the mouse pointer over the curve, you can also see the real distribution of color brightness on the image.


To change the shape of curves for the Red, Blue or Green channels, select the corresponding color name from the *Channel* list.

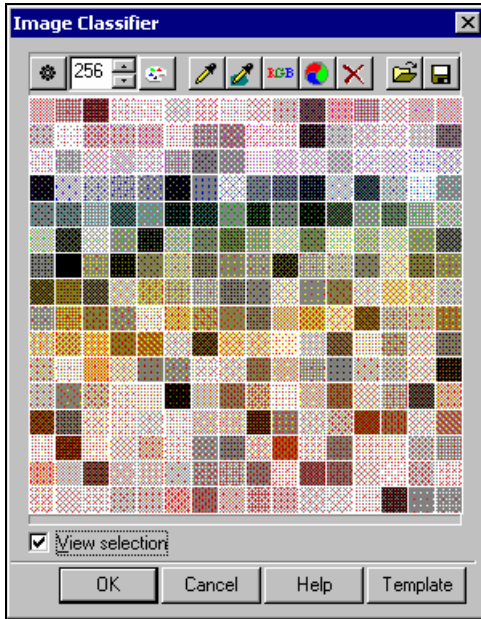
## Image Classifier

This versatile tool allows you to manage the colors within the image. It is not applicable to monochrome images. You can reduce the palette by deleting the selected color or colors or by merging several colors into one.

You can also replace selected colors and add them to the palette.

### To open Image Classifier dialog

1. Click the  button on the *Color* toolbar or choose *image Classifier* from the *Color* menu.











### The buttons and controls in the *Image Classifier* dialog window




---

Color samples table

This contains color samples of the current palette. Select a color by clicking on its sample. Clicking while holding down SHIFT selects multiple colors. In the bottom of the table there is a progress bar.

---


	Color counter	This control is used to show the number of colors in the current palette. You can increase or reduce this number.
	Set auto palette button	By pressing this button you force RasterID to reset the palette. RasterID automatically determines the set of colors that most truly represents the image and places them into the color samples table. Their number is reflected in the color counter.
	<i>Recalculate palette</i> button	Restores the native palette of the image.
	View Selection	When this box is checked, the points of selected colors are shown on the image.
	<i>Choose a color from the image</i>	This tool is used to obtain a color by clicking on a pixel in the <i>Preview</i> window or the document window. The color of the selected pixel will be highlighted in the Color samples table.
	<i>Select colors from the image</i>	This tool is used to obtain colors by drawing a polygon around an area in the <i>Preview</i> window or the document window. Double-click to finish the polygon. The colors contained within the polygon will be selected in the Color samples table.
	RGB button	Opens the color selection dialog, which lets you replace the currently selected color with a new one. The image is regenerated with the new palette.
	<i>Merger</i> button	Merges the colors selected in the color samples table to the mean color. The image is regenerated with the new palette.

	<i>Delete button</i>	Deletes the colors selected in the color samples table from the palette. The image is regenerated with the new palette.
	Save LUT	Saves the current palette in a Look-Up Table (LUT) file.
	Load LUT	Loads the current palette from a Look-Up Table (LUT) file.
	<i>Template</i>	You can save and load color palette information to and from a template file using this button.

### To create a palette automatically


Press *Set auto palette* button .

- or -

Reduce the number of colors in the *Color counter* and press the *Recalculate palette* button .


The palette will automatically be recalculated and the image will be regenerated to reflect the changes.

### To recalculate the palette


Press the *Recalculate palette* button .

The palette will be recalculated to fit the number of colors set in the *Color counter* spin-box in the best way.

### To select a color from the image


1. Click the  button to select a color.
2. Click on a point in the image. The color of this point will be highlighted in the Color samples table.


### To select several colors within an area

1. Click the  button to select an area in the image.
2. Draw a polygon around the desired area in the image. Double-click to close the polygon. The colors within the polygon will be selected in the Color samples table.


### To delete a color from palette

1. Select the color(s) to be deleted in the color samples table clicking on them with SHIFT pressed.


2. Press the *Delete* button . As each color is deleted the image is automatically regenerated.

You can also reduce the number of colors by setting the number of colors in the *Color counter* and pressing the  button.


### To add or replace a color in the palette

1. To replace a color, click on the color sample to replace, or to add a color select an unoccupied space in the color table.
2. Press the RGB button  and choose a new color from the color selection dialog.

- or -

Pick the color from the image with the eyedropper tool .

### To merge colors

1. Select the colors to be merged in the color samples table by clicking on them with the SHIFT key pressed.
3. Press the *Merge Colors* button . As the colors are merged the image is automatically regenerated.

## Drawing on a Raster Image

RasterID has special drawing tools that enable you to make minor changes to the graphics on a raster image. These tools are applicable to both monochrome and color images.

Choose the *Draw* command from the *Tools* menu.

The buttons and controls of the *Draw* toolbar:

Using the *Fonts* dialog you should specify the text parameters for entering text. This dialog is displayed automatically after selecting the text tool.

Using the *Line Widths* dialog you should specify the line width for drawing. This dialog is displayed automatically after selecting the drawing tools.



To draw an arbitrary line with the pencil tool:

- Specify the line width.
- Press the mouse button (left or right – see below), specify the first endpoint and keep it pressed while drawing a line; release the button at the other endpoint of the line. Using the left mouse button causes your line to be drawn with the foreground color, while the right mouse button produces the background color.



Erasing with the current background or foreground color.



To floodfill with the current foreground or background color:

- You should specify a closed area to floodfill.




To select colors on the image:

- Specify a point with the required color on the image.
- Press the left mouse button to select the foreground color; or the right button – to select the background color.



Drawing a line by two points.



Drawing an arc by two points. With the orthogonalization mode  turned on your arc will be half a circle.



Drawing a rectangle by two points.



Drawing a rectangle with the foreground color floodfill.



Drawing a circle by two points.



Drawing a circle with the foreground color floodfill.



The orthogonalization mode.




To enter a text:

- Press this button and set the text parameters in the displayed *Fonts* dialog;
- Specify the text position on the image – an insertion point and a rotation angle with the mouse button pressed.
- Type a text from the keyboard.
- Press *Enter*.



To set the text size on the image:

- Specify the text size with a rectangle area on the image;
- Press the  button.
- Set the text position (insertion point and rotation angle).
- Type a text from the keyboard.
- Press *Enter*.



Setting the line width on the image.

Press this button and specify a point with desired size on the image with the mouse button pressed; then RasterID

will be drawing with the size you have specified.

A foreground color is displayed in the front square; a background color is displayed in the back square.



The Color palette for selection.

To select a foreground color you should pick a required color and press the left mouse button.

To select a background color you should pick a required color and press the right mouse button.



## Chapter 5

# BATCH PROCESSING AND INDEXING

---

*Batch image processing* makes it possible to apply a sequence of operations to a number of images unattended. RasterID can automatically process a group of images and then re-save them to the same file or to separate files. All you have to do is create a batch job and then run it.

The purpose of *indexing* is to obtain unique information about each image to enable automatic identification of them, and to add this information to your database.

*Indexing* is a two-step process of searching and recognizing *title blocks* on raster images and transferring this recognized data to an external database, EDM-system or user defined file. For example, if you have MS Excel on your computer RasterID can transfer the title block contents to an Excel table.


A *title block* is a set of fields that contain text strings and is usually located at one of the corners of the raster image. RasterID can find title blocks and recognize texts in the fields through the internal OCR engine. RasterID also has the capability of connecting to an external OCR-Engine (see “Programming guide”).

Before running *indexing* you have to create a *title block template*. If your images contain different types of *title blocks* you will have to create a unique template for each one. Every *title block* must be saved as a named template for further use when *indexing*.



### Creating Title Block Templates

#### To create a new title block

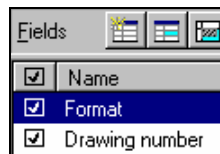
1. Open an image file containing the *title block* you want to train.
2. The image must be oriented correctly. Use the *Rotate* command to change the image orientation.
3. Check that orthogonal lines are parallel with the image margins. If necessary apply the *Deskew* command.
4. If the image is “dirty” you need to apply the *Speckle/Hole remover*.
5. Set the zoom level so that all fields of the *title block* are visible on the image.
6. Choose the *Train Title Block* command from the *Tools* menu. The *Train Title Block* dialog box appears (see next page).

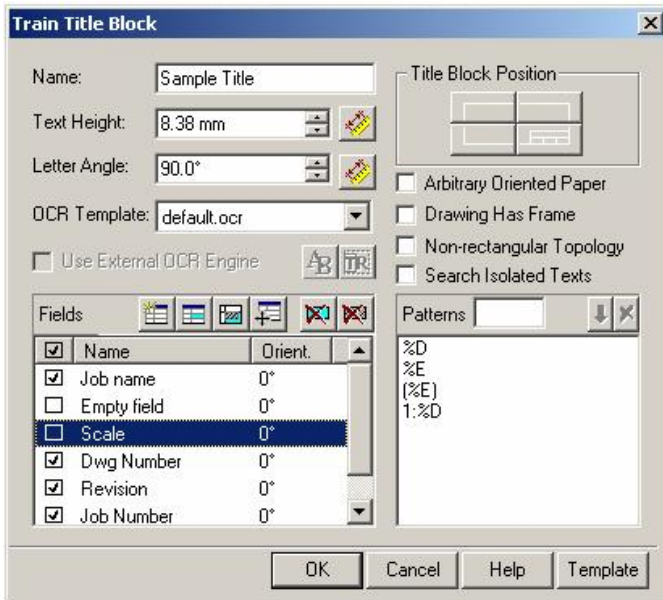
- Click the  button and draw a rectangular area on the image containing the entire *title block*. If RasterID is able to recognize the *title block topology* it creates a list of fields and defines its location and geometrical parameters. RasterID detects the corner position of the *title block* automatically. To change the *title block* position you should click on one of the corner buttons. The fields are automatically named as “Field+Number” and sorted into order, starting with the top left corner. Title block fields are highlighted by colors specified in the *Preferences* dialog.




Recognizable fields are highlighted in color; unrecognizable fields are filled with a cross hatch. You can toggle recognizable/ unrecognizable field status by clicking directly on the field.

- To correct the *title block topology* you may delete the selected field or draw a new one. You should first delete all incorrectly recognized fields, then draw in any unrecognized ones.
- To delete a field, select it and click the  button. Repeat this operation for each incorrectly recognized field.
- To draw a new field click the  button, click on the top left corner of the field and then the bottom right corner. RasterID tries to snap to the intersections and nearest points of the neighbouring fields. When such a point is found the cursor changes type and becomes U-shaped.
- When you have created the correct *title block topology* you have to fill in the *title block* name field in the dialog box. This name will be used for identification of the recognized *title block* during the indexing process.

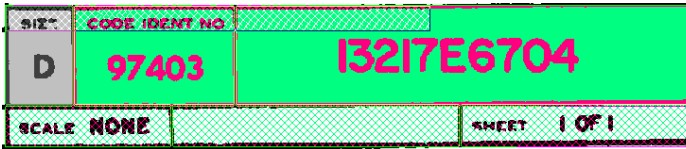
- The checkbox in the header row of the *Fields* list is used to select or unselect all fields with one click. If the title block has a lot of recognizable fields, you should check this box and then exclude unrecognizable ones. If the title block has a lot of unrecognizable fields, you should uncheck this box and then add recognizable ones.





13. Measure or input manually the maximum *Text Height* into the field. This parameter is equal to the largest upper case letter in the title block and will be used for text recognition. To measure the Text Height click the  button and then draw a line through the largest raster character on the image. The *Text Height* value will be equal to the distance between the first and the last points of the image within the drawn line. This value should not be more than the maximum vertical size of the title block fields. Set the *Letter Angle* or measure it with the  tool. Use this option when recognizing italic or skewed text, if the chosen OCR engine cannot parse such text. A *Letter Angle* of 90 degrees corresponds to text rotated to a vertical position.
14. You can mask out areas of the title block, which contain text that you do not want RasterID to recognize. Press the *Set Text Mask* button  and draw a rectangle around the unwanted texts in the title block. Each field can contain several text masks.
15. Commands *Draw Field* and *Set Text Mask* are cycled to draw a few of rectangles. When *Draw Field* command is running you can turn on/off snapping using CTRL button and mouse.

For example, if your title block contains standard fields named "DwgNo", "Sheet" and "Data" and you do not want to recognize and export these texts, you should set masks for these areas (see the hatched areas in picture below).

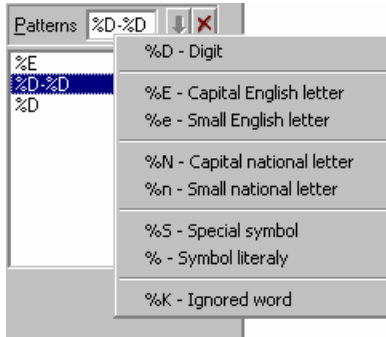


The recognition results will be as follows:



Use the  button to delete unnecessary text masks.

16. Select the OCR template. This is a file of *character template libraries*, which is used when recognizing text. Character templates are topological models of text characters (letters, special symbols etc.), with which raster text characters are recognized. The list contains the DEFAULT.OCR file, included in the standard RasterID package. Using the "default" file, the OCR module can recognize characters of the English alphabet, digits, signs, punctuation marks and special symbols (the first half of ASCII table). You can also create your own OCR template file (see OCR training).
17. Each field of the title block can be renamed. (This name may be used as the heading of a column in a MS Excel spreadsheet or the name of a database field). You can change the field orientation if it contains non-horizontal text.
18. To recognize the text in the field you should turn on the checkbox for this field and specify a set of *word patterns*. If you turn off this checkbox, any text in the field will not be recognized. Word patterns must be specified if you want to use the built-in OCR engine. A word pattern is a rule specifying the allowed sequence of characters within one recognized word. If you do not specify any *word patterns* for the field but turn on its checkbox, the OCR engine will apply default patterns. This is "%D" – digits, "%E" - English capital letters and "%1E%e" – names. Use *Add* and *Delete* to edit the list of *word patterns* definitions. To add a new pattern you need to fill in the *Patterns* field in the Dialog box or right click the mouse button while over the *Patterns* field. The Right-button menu appears and you can select the required patterns from the list (see picture).



**Note** If you want to ignore some of the words when recognizing text, you should add the ignored word with the prefix %K (means *key-word*). For example, if a field contains the text: DWG NO 12345 but you only need to recognize the number you should add the following patterns: %D – to recognize numbers, %KDWG, %KN0 – to ignore these keywords. RasterID will try to recognize these words but it will not export them to your database.

Here is a formal description of word pattern definitions:  
 "[% [length] character type] || [letter] ... "

[%]	Beginning of character sequence definition
[length]	Any decimal number; absent if length is variable
[type]	Character type (D,E,e,N,n,S,K)
[letter]	Standalone letter

**Symbol type is specified in the following way:**

D	Digits
E	Upper case letters of the English Alphabet
e	Lower case letters of the English Alphabet
N	Capital letters of national alphabets, for example Russian
n	Small letters of national alphabets, for example Russian
S	Special characters (signs plus and minus, sign of equality and etc.)
<b>Kword</b>	Ignored word.
%%	Standalone characters "%"
[characters]	Standalone characters

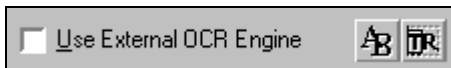
For example:



- The template "DWG%D" allows generation of words that start with "DWG", followed by any sequence of digits, for example, "DWG400", "DWG22", "DWG7000023".
  - The template "%1N%n" allows generation of words of the national alphabet with a capital first letter.
  - The template "%E%D" allows generation of words containing any sequence and number of English capital letters, followed by any sequence of digits, for example, "R400", "C22", "NUMBER283".
19. If you are not sure whether all your images have the correct orientation, turn on the checkbox *Arbitrary Oriented Paper*. RasterID will search for your *title block* at each corner of the image.
  20. To save your *title block template* to file, choose *Template / Save* and specify the file name. This name will be used during the *indexing* process. To edit the existing template choose *Template / Load* and select the required template from the list. Repeat the required operations.

## Other Options of Train Title Block dialog

### Using an External OCR Engine

If you have a RasterID package containing a third-party OCR engine and you want to use it, turn on the checkbox *Use External OCR Engine*.

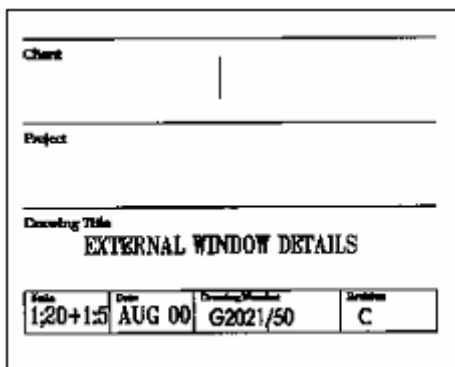


Press the  Setup OCR Pro button and the OCR Engine Setup dialog box will appear. Use of the external OCR engine is controlled in the Preferences dialog box. The  button opens the training dialog, if training is supported by the OCR module.

## Non-Rectangular Topology Options

<input type="checkbox"/>	Arbitrary Oriented Paper
<input type="checkbox"/>	Drawing Has Frame
<input type="checkbox"/>	Non-rectangular Topology
<input type="checkbox"/>	Search Isolated Texts

This is used for title blocks that have structures similar to those shown in the pictures below. For example, title blocks containing fields with rounded corners or title blocks consisting of horizontal lines only. Do not use this mode for title blocks that have a simple regular topology. If the title block is aligned to the corner of the drawing frame, checking the *Drawing has frame* checkbox will increase the quality and precision of the recognition process. If the *Arbitrary Oriented Paper* option is selected, RasterID checks if the title block is located in another corner as the sheet might have been incorrectly positioned in the scanner. *Search Isolated Texts* checkbox is useful if the drawing contains text areas outside the title block, and you want to recognize them in indexing process.

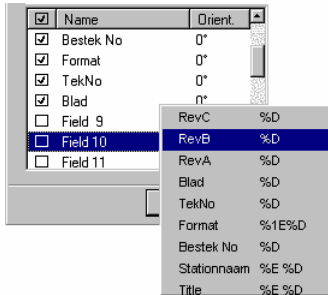


Examples of title blocks with non-rectangular topology

## Right Button Menu

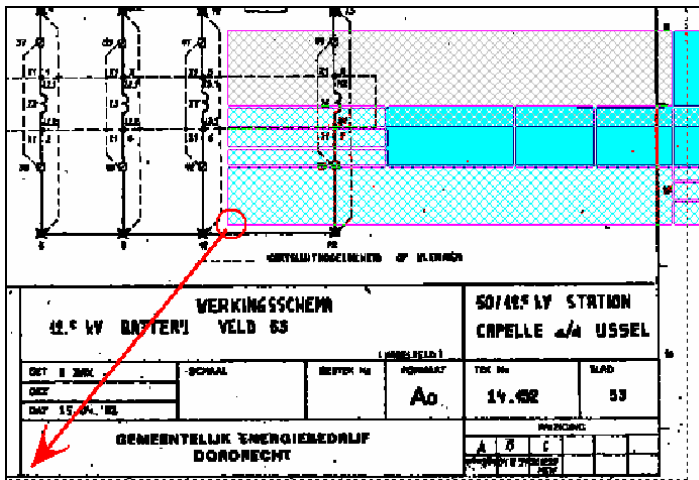
The context sensitive right button menu aids the input of field names and patterns. This menu contains the twenty most recently used names


and patterns. To display the field list, select a field and right-click. From this list you can select the required name (if shown), and the field name and pattern will be filled automatically.



### Set Title Block Position Option

Sometimes you may want to use an existing title block template as a basis for a new (but similar) title block. In this case you may have to reposition the existing title block to line up with the new one. This example shows an existing title block template overlaid on a new image, but incorrectly positioned.



Using the  button you can drag a title block template to a new position, as indicated with the arrow on the picture, so that it will overlap the title block on the image.

## Training OCR Templates

Using the standard RasterID OCR features, you can recognize the characters of the English alphabet, digits, punctuation marks and special symbols (first half of ASCII table). These character templates (topological models) are stored in special files called *character template libraries*. These files are by default allocated in the OCR folder of the RasterID root folder.

The internal OCR module within RasterID can be trained to recognize any character. This means you can add new character templates to one of the available libraries, or create your own library from scratch.

The training process creates templates (topological models) of text characters and places them in the open library of character templates.

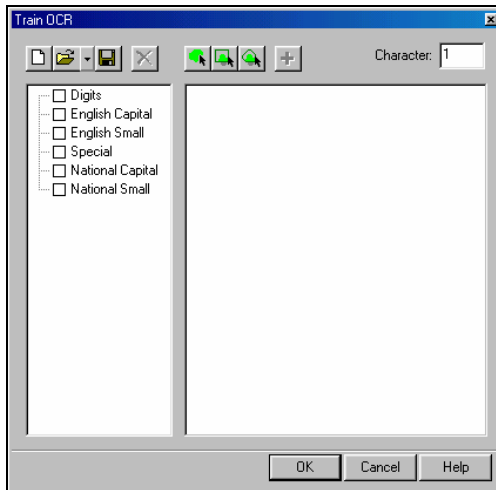
You can replace any template in the existing library by one of your own. Several templates can correspond to one text character.

### To create a new library or change the existing character template library



1. Choose *Train OCR* from the *Tools* menu or press the button on the *Tools* toolbar.

The following dialog box appears:



2. If you want to create a new library of characters, press the *New* button.

- or -



- If you want to add new templates to an existing library, press the *Open* button, select from the dialog box the de-

sired library file and press *OK*.

3. Create new, replace or delete character templates.



4. Save the library in its own file, or in a new one, using the *Save* button. Click *OK*.

The creation, replacement and deletion of library templates are made with the help of the buttons on the dialog box toolbar and the *Character* input box.



Raster character selection tools



*Add* and *Delete* buttons

Before beginning the training, open the *Train OCR* dialog box and load an existing library or create a new one.

### To create a new character template

1. Enter a character into the *Character* input box.
2. Select a raster symbol that represents the specified character with one of the selection tools.



Select by picking. Click on the standalone raster character.



Select by frame. Draw a frame around the raster character.



Select by polygon. Specify the vertices that encompass the raster character; press *ENTER* to complete the selection.

If you make a mistake, repeat the procedure.

3. Click the *Add* button.

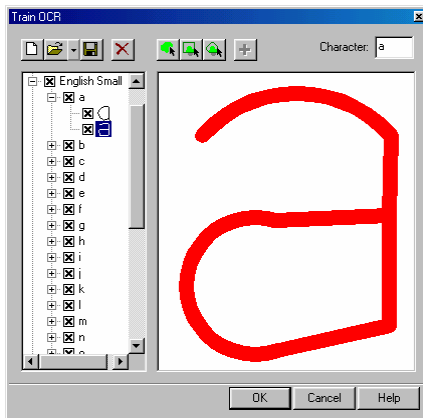
The program will create a topological template of the character and add it to the appropriate category of the template library.

The left part of the dialog box displays the contents of the current template library: digits, English capital letters, English small letters, special symbols, national capital letters, and national small letters. Closed and nonblank sections are marked with "+".

- Digits
- English Capital
- English Small
- Special
- National Capital
- National Small

If you put a checkmark to the left of the section name, all templates located in this section will be on-line. An unchecked box cancels the link to all templates of this section. You can open any section by clicking on "+" and turn on/off all necessary templates located in this subfolder, by setting / removing the checkmark located to the left of the template name.

You can set several templates for each character. The example for "a" is shown in the figure below. In this case the character is marked with "-". You open a set of templates relating to a character by clicking on "+". Then you can select a template by clicking on it. After you have chosen a template, its graphical representation is displayed in the right part of the dialog box.



Character templates can either be turned off – in this case they will not be used for recognition, or deleted altogether.


## To delete a character template

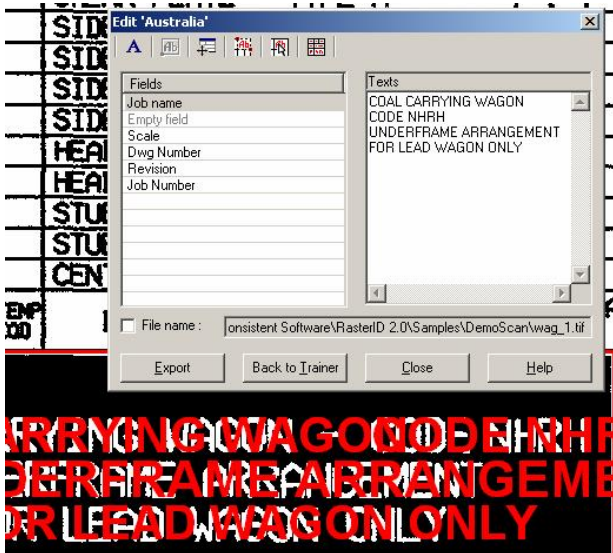
1. Select a template.
2. Click the *Delete* button.

Save the prepared template library back to the same file or use a different file name for further text recognition when indexing. To use a template you have to choose the appropriate template name in the *Train Title Block* dialog box. You may prepare some of the template libraries for different character styles.

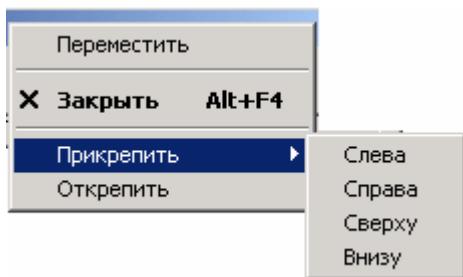
## Recognizing and Previewing Title Blocks


To check the quality of *title block* searching and text recognition you can apply the *Recognize Title Block* command. To do this you should load an image file, then load the title block template prepared for this file.


Choose this command from the *Tools* menu or click the  button. If RasterID recognizes the title block on the currently loaded image, you will see a colored title block and the recognized texts overlaid on the image, so you can check the recognition results. You may repeatedly apply this operation to a selection of images to check the recognition quality and to correct templates before running the indexing process automatically. If the *title block* is recognized RasterID will show the *Edit Title Block* dialog box:






Right-click on the dialog heading to change its position on screen.



You can check the contents of each field and if necessary correct the recognized text strings (the required field can be selected by clicking directly on the image). You can fill in each field manually. To correct the text string position, click button  and specify a new point in the title block. If you accept the recognition results you can click *Export* and transfer the *title block* contents to your indexing output destination (see *Indexing Output*). If you want to make alterations to the *title block template* you can click *Back to Trainer* button, and return to the *Train title block* dialog to make your changes. After that you may repeat the *Preview* operation until the results are acceptable. This sequence of operations is a manual *indexing* process to get the ID of each image.

You can choose the font used to preview recognized text strings by clicking the  button.




The  button allows you set the title block position manually for a better recognition precision.

The  and  buttons allow you to recognize information in areas defined by rectangle or by field.

Press the  button, to recognize all fields in a title block.

RasterID also supports a semi-automatic recognition procedure. When the output database is defined and the *Stop to check recognition results* option in the *Indexing Output* dialog box is checked, you can recognize fields in the title box manually. When you finish recognizing the fields (by pressing *Export* or *Skip*), the resulting record is added to database automatically.


If the *Stop to check recognition results* option is not selected, during the batch indexing or indexing through Virtual Scanner process, error messages in the log window will notify you of any faults during title box recognition, the process is not interrupted. By selecting this option you force RasterID to temporary switch to manual recognition mode for processing the erratic titles.

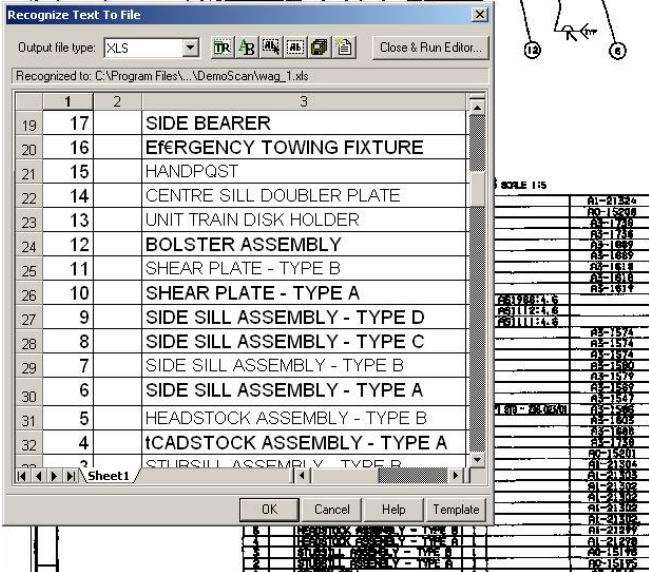
Use the *Zoom to Title Block* command or click the  button to display the *title block* area. To show / hide the image and title block preview use the buttons  and . You can use all zoom commands to control the required viewing area.

## Recognizing Text to File

This operation is only available for distributives supplied with ABBYY FineReader Engine 5.0 or other supported External OCR Engines.

The Recognize Text To File feature designed to extract text from the drawing and save it to a separate file. With FineReader 5.0 you can recognize text on monochrome raster images being saved to PDF, XLS, RTF, HTML and TXT files. With other supported External OCR Engines texts can be only saved to TXT files.

To use *Recognize Text To File* feature choose the appropriate command from *Tools* menu or press the  button on the toolbar.




The dialog box 'Recognize Text To File' has the following options:


- Output file type: XLS
- Recognized to: C:\Program Files\...DemoScan\wag\_1.xls
- Table with 3 columns: Item ID, Item Number, Item Description
- Buttons: OK, Cancel, Help, Template
- Preview pane showing a table of data:



Item ID	Item Number	Item Description
19	17	SIDE BEARER
20	16	EMERGENCY TOWING FIXTURE
21	15	HANDPOST
22	14	CENTRE SILL DOUBLER PLATE
23	13	UNIT TRAIN DISK HOLDER
24	12	BOLSTER ASSEMBLY
25	11	SHEAR PLATE - TYPE B
26	10	SHEAR PLATE - TYPE A
27	9	SIDE SILL ASSEMBLY - TYPE D
28	8	SIDE SILL ASSEMBLY - TYPE C
29	7	SIDE SILL ASSEMBLY - TYPE B
30	6	SIDE SILL ASSEMBLY - TYPE A
31	5	HEADSTOCK ASSEMBLY - TYPE B
32	4	HEADSTOCK ASSEMBLY - TYPE A
33	3	STURTSILL ASSEMBLY - TYPE B

The *Recognize to File* dialog has the following options:


The *Output File Type* option allows you to choose the file type to store the results of recognition procedure. Preview pane uses native layout for selected file type.

Press the  button and set the External OCR Options. The dialog depends on the engine currently used.

Using the  button you can add patterns to the OCR library for the used engine or create a new library having specified a rectangular area on the image.

Press the  button to select a rectangle area, containing text to be recognized immediately. Meanwhile, you may recognize all the text contained in a raster image, to do that press the  button.

The  button allows you to specify the output filename and location.

To create a new layout and clear existing window content use the  button. The recognized file is preserved.

Press the *OK* button to add pages to the current file. The dialog will be closed. To open a new page of the multipage TIFF file of a new raster image you should call the *Recognize Text to File* command again.

To preview the recognition results in the *Recognize Text to File* dialog RasterID uses a program registered in the system as an associative file editor of given extension.

**Important!** You cannot edit texts in the preview window.

Press the *Template* button and save the settings you made to the template file for use while batch processing.

To edit the recognize text you should press the *Chose & Ran Editor* button which starts an external engine corresponding to the selected file type (e.g, Microsoft Excel for XLS format). The *Recognize Text to File* dialog will be closed and you will not be able to add new pages to the current file.

## Recognizing Text to File in Batch

When including this *Recognize Text to File* in the script file you should set the following parameters:

In the *Template* field open the template file containing the recognition parameters created in the *Recognize Text to File* dialog.

The *Output File name* parameter defines the names of files to be saved in batch.

- If the *Output File name* parameter **is empty**, then the names of output files are generated using the current image name with the selected extension.

*Test.tif*

*Test.rtf*

The pages of multipage tif-files will be saved as separate pages to a file of specified format.

- If the *Output File name* is **specified**, then all processed files (multipage tif-file pages as well), will be saved as separate pages in a single format under a specified name.



*Test.tif* (page 1)

*TEXT.rtf* (1+n pages)

*Mpage.tif* (n pages)

**Important!** You should add new pages to the existing file within one work session. Otherwise RasterID will create a new file under the name *TEXT\_XXX.rtf*; XXX – index.

## Batch Processing

### To create a processing scenario (script file)

A *Processing scenario* is a sequence of operations for each image (for example, to increase the image quality). Before running batch processing or indexing you have to create one or more *processing scenarios* and save them to a *script* file. RasterID script files have the extension “.CSF”. To create a draft of the *processing scenario* you have to check the image quality visually. To do so you should load a selection of images and look at each of them. Try to estimate the image orientation, flip, contents and title blocks contained in them. Keep the required processing actions in your mind. The recommended sequence of operations is as follows:

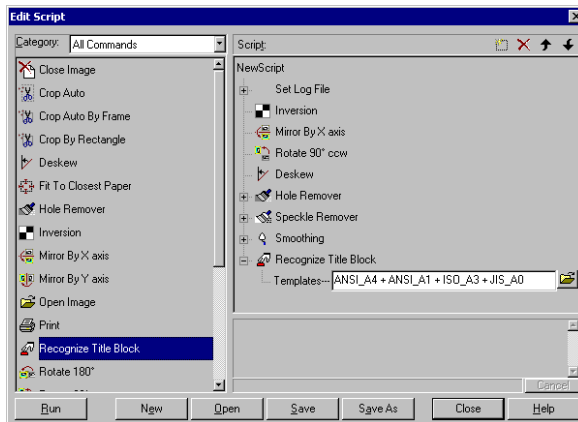
1. If all images have incorrect orientation or flip you should include the *Rotate* or *Mirror* command in the *processing scenario*.
2. If images are negative, include *Inversion* command.
3. The images contain a lot of vertical and horizontal lines (for example, in the case of mechanical and architectural drawings). If these lines are not parallel to the image margins, the *Deskew* command should be applied.
4. If the images have linear distortions and contain a bounding frame, you may include the *Four Point Correction* command. RasterID will try to find the frame and the closest paper size for it and will correct these distortions.

- If the images are “dirty” (meaning they contain a lot of small spots and holes), you should use the *Speckle / Hole Remover* and/or *Smoothing* commands. If you cannot estimate the speckle size yourself, *RasterID* will do it for you, just turn on the *AutoEstimate flag* parameter.





**Note** If the image does not contain small speckles, *Speckle Remover* may delete texts, dashes or any small symbols from the image when *AutoEstimating mode* is turned on. In this case it is better to use your own specified speckle size setting.

- If you intend to run the *indexing* process you should create a *Title Block* template (see *Train Title Block*). You have to run the *indexing* process before *cropping* to get the best results. Include the *Recognize Title Block* command in the *processing scenario* before *cropping*.
- To change the image size, include the *Crop by Frame* command if the image contains a *bounding frame*, if it does not contain one use the *Crop by Black* command. After cropping you can apply *Fit to Closest Paper* to resize the image to one of the standard paper sizes.
- To print the processed image include the *Print* command in the *processing scenario*.






To create the *processing scenario* and save it to a *script* file choose the *Script Studio* command from the *Tools* menu.

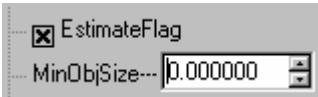


The left part of the dialog box contains the sorted list of commands that you can use in your *processing scenario*. The right part of the dialog box represents the *Script* window. It contains the sequence of required commands for each image and shows the contents of your *processing scenario*. Error messages are output in the lower-right field.

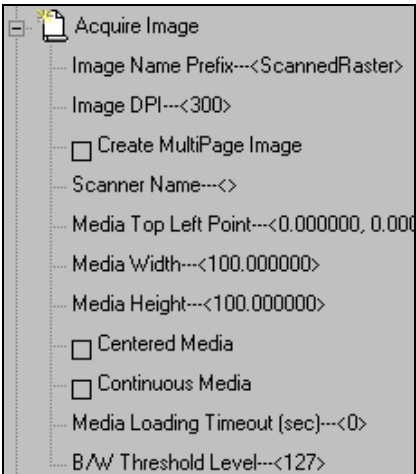
1. To add a required command to the *processing scenario* select this command item from the left part and move it to the *Script* window using standard mouse-dragging techniques. Alternatively you can click the  button to include a command in the script.
2. If the selected command contains parameters, you can specify its values. To do so click on the required command item in the right part and you will see the parameters list for this command. Click on the parameter item and specify its value. If you do not specified parameter values, RasterID uses default values.
3. Repeat these operations for each command of your *processing scenario*.
4. To change the order of commands you should select the command item in the right part and drag it to a new place. You can also use the buttons  or .
5. To remove a command item from the *processing scenario* you should select and drag it outside the right part of the dialog box or click the delete button .
6. Click the *Save* or *SaveAs* button to store the *processing scenario* to the named *script file* for use during *batch processing*.
7. To edit an existing *script file* click *Load* and select the required file name from the files list.
8. To apply the *processing scenario* to the currently loaded image click *Run*. This enables you to check the results of running the *processing scenario* for a selection of typical images prior to *batch processing* a complete group.

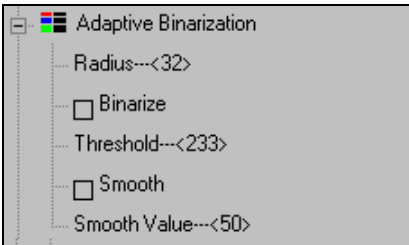
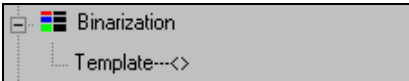

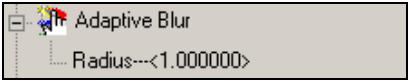



Edit the script using the following buttons and controls:











Button	Description
	Makes a copy of selected command.
	Deletes selected command.
	Moves selected command up in the script.
	Moves selected command down in the script.
	Clicking on the plus sign reveals command options.












Button	Description
	Clicking on “+” opens the command parameters tree. By clicking on command option values you can enter required values.
<i>Run</i>	Launches script. The error or progress messages are shown in the lower right section of the dialog and written to the log file. Press <i>Cancel</i> to stop script execution.
<i>New</i>	Clears the <i>Script</i> window and begins a new script.
<i>Open</i>	Opens a saved script.
<i>Save/Save As</i>	Saves the script.







Script commands and parameters:



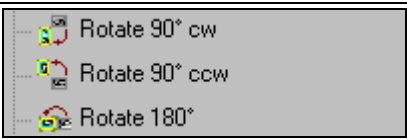
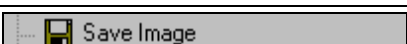
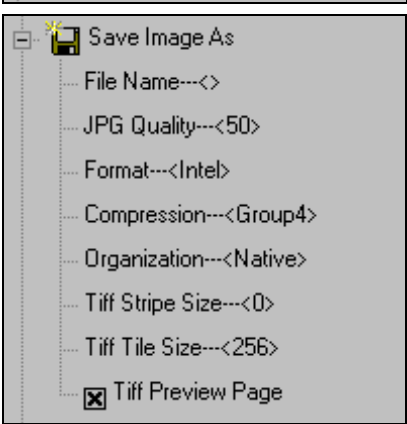
Command	Description
	Acquires images from a scanner specified in the <i>Scanner Name</i> parameter. With <i>Create Multipage Image</i> set to on, RasterID scans a group of images for saving to a single multipage tiff-file, otherwise RasterID generates an incremental name for each image. Use the <i>Image Name Prefix</i> parameter to specify the output file names. The other options are used to control scanning.

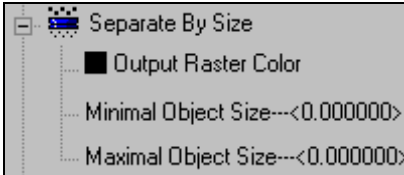

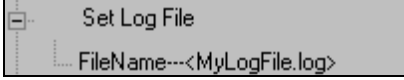
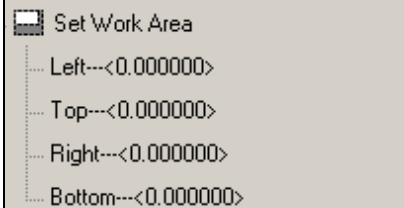
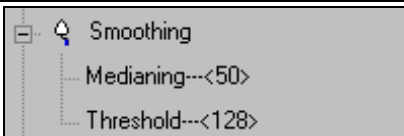
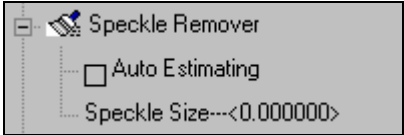
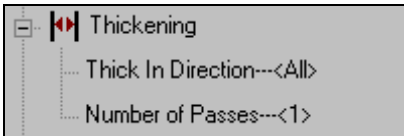
Command	Description
	<p>Applies the adaptive binarization procedure using <i>Radius</i> and <i>Threshold</i> values.</p> <p>If the <i>Binarize</i> box is not checked and <i>Smooth</i> is checked, the command produces a smoothing effect using the <i>Smooth Value</i>.</p>
	<p>Applies the binarization procedure using options from the Template file.</p>
	<p>Changes the image resolution to the specified DPI value by re-sampling the image. The image size will be changed.</p>
	<p>Used for intelligently “de-screening” images. Set the <i>Radius</i> value.</p>
	<p>Add a new page to a multipage file.</p>
	<p>Set <i>Brightness</i>, <i>Contrast</i>, <i>Hue</i> and <i>Saturation</i> values (in percent) for color and grayscale images.</p>
	<p>Changes the image size to the specified <i>Width</i> and <i>Height</i> (in pixels). The <i>AutoOrientation</i> box determines if the program will try to fit the image to the paper size in the best way.</p>

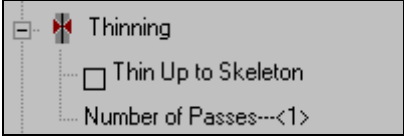
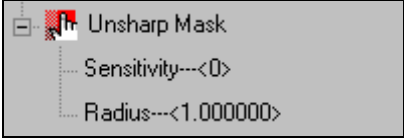
Command	Description
 Close Image <input type="checkbox"/> Do not Save Image	Closes the current image. There is also a <i>Do not save image</i> option.
 Color Reduction Template---<>	Erases the color ranges specified in the <i>Template</i> parameter.
 Color Separation Template---<>	Separates the image onto layers by the color ranges specified in <i>Template</i> .
<input type="radio"/> Convert to Grayscale <input checked="" type="checkbox"/> Convert To Indexed Colors Auto <input type="radio"/> Convert to True Color	Conversion options for the image.
 Convert To Indexed Colors Auto	Converts a color image to indexed colors automatically.
 Convert to True Color	Converts a color image to true color.
 Correct by Paper Frame Paper Name---<ANSI A4> <input checked="" type="radio"/> Portrait <input type="radio"/> Landscape <input checked="" type="checkbox"/> Use internal frame	Searches for a drawing frame, if it exists, and tries to find the nearest paper size then corrects image contents by this paper size automatically. The paper size can also be specified manually.
 Crop Auto by Black	Crops images to black pixels.
 Crop Auto By Frame	Crops images by a bounding frame.
 Crop By Rectangle Left---<0.000000> Right---<0.000000> Top---<0.000000> Bottom---<0.000000>	Crops an image by a specified rectangle, which is defined in the current units (mm or inch).
 Deskew	Applies the <i>AutoDeskew</i> command.

Command	Description
 Equalizer	Launches the automatic equalizing procedure.
 Fit To Closest Paper	Fits an image to the closest standard paper size.
 Fit To Paper Paper Name---<Custom> Orientation---<Portrait> Left Margin---<2.000000> Right Margin---<3.000000> Top Margin---<1.000000> Bottom Margin---<1.000000> Alignment---<Center>	Fits an image to the selected standard paper size.
 Gauss Blur Radius---<1.000000>	Applies the Blur filter with the specified <i>Radius</i> .
 Hole Remover <input type="checkbox"/> Auto Estimating Hole Size---<0.000000>	Removes the specified hole size (<10 mm). RasterID can also be set to automatically estimate the hole size.
 Image Classifier Template---<>	Manages the palette for color images (by deleting, merging or replacing colors).
 Invert	Inverts raster images.
 Medianer Radius---<1.000000>	Applies the Median filter with the specified <i>Radius</i> .
 Mirror By X axis  Mirror By Y axis	Applies horizontal or vertical mirroring to images.
 Open Image FileName---<D:\Images\*.tif>	Specifies the images for processing.

Command	Description
 Print <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> FitToPaper</li> <li>... Scale---&lt;1.000000&gt;</li> <li>... LeftMargin---&lt;0.000000&gt;</li> <li>... RightMargin---&lt;0.000000&gt;</li> <li>... TopMargin---&lt;0.000000&gt;</li> <li>... BottomMargin---&lt;0.000000&gt;</li> <li>... PrintCopies---&lt;1&gt;</li> <li>... PrinterName---&lt;HP4L Laser Jet &gt;</li> </ul>	<p>Prints images. If <i>FitToPaper</i> is checked the image will be scaled to printer paper size. If not <i>Scale</i> and <i>Margins</i> parameters will be used. <i>PrintCopies</i> defines the number of copies. <i>PrinterName</i> specifies the current printer to print images to. This is the system printer name specified in the Printers folder.</p>
 Process Script <ul style="list-style-type: none"> <li>... Script File Name---&lt;&gt;</li> </ul>	<p>Calls another script from within this script.</p>
 Recognize Title Block <ul style="list-style-type: none"> <li>... Templates---&lt;ANSI_4.tpl&gt;</li> </ul>	<p>Runs the <i>indexing</i> process with the defined <i>Title Block</i> templates.</p>
 Recognize Text To File <ul style="list-style-type: none"> <li>... Output File Name---&lt;Samples\Elec_03.rtf&gt;</li> <li>... Template---&lt;&gt;</li> </ul>	<p>Performs the <i>Recognize Text To File</i> operation. <i>Output File Name</i> – defines the name of file to be saved. If empty – the original filename will be used with alternative file extension. <i>Template</i> – Defines the template file containing recognition parameters.</p>
 ReOpen Image	<p>Reopens the open image from file.</p>
 Reset Work Area	<p>Resets work area on the image.</p>

Command	Description
	<p>Changes the image size to the specified <i>Width</i> and <i>Height</i> (in pixels). The <i>AutoOrientation</i> box setting determines if the program will try to fit the picture to the paper size in the best way. <i>Resample flag</i> defines whether the image dimensions (in pixels) will be changed.</p>
	<p>Resizes images to one of the standard paper sizes from the <i>Papers list</i>.</p>
	<p>Rotates images by 90cw/90ccw/180 degrees, allowing you to rotate images by 90cw/90ccw on specified conditions for <i>Paper name</i> and/or <i>Orientation</i>.</p>
	<p>Saves images.</p>
	<p>Saves images to other files and folders. <i>JPG Quality</i> sets size/quality balance with JPEQ file. Format values are <i>Intel</i> and <i>Motorola</i> providing you with the option of cross-platform export. Use the options <i>Compression</i>, <i>Organization</i>, <i>Tiff Stripe Size</i>, <i>Tiff Tile Size</i> and <i>Tile Preview Page</i> to optimise TIFF files.</p>

Command	Description
 <p>Separate By Size</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Output Raster Color</li> <li>Minimal Object Size---&lt;0.000000&gt;</li> <li>Maximal Object Size---&lt;0.000000&gt;</li> </ul>	<p>Removes all objects greater than the <i>Minimal Object Size</i> and smaller than the <i>Maximal Object Size</i> to a separate layer, which is displayed in the <i>Output Raster Color</i>.</p>
 <p>Set DPI</p> <ul style="list-style-type: none"> <li>Image DPI---&lt;300&gt;</li> </ul>	<p>Changes the image resolution to the specified DPI value without any processing. The image will remain unchanged.</p>
 <p>Set Log File</p> <ul style="list-style-type: none"> <li>FileName---&lt;MyLogFile.log&gt;</li> </ul>	<p>Specifies the file name of the log to output the batch report to.</p>
 <p>Set Work Area</p> <ul style="list-style-type: none"> <li>Left---&lt;0.000000&gt;</li> <li>Top---&lt;0.000000&gt;</li> <li>Right---&lt;0.000000&gt;</li> <li>Bottom---&lt;0.000000&gt;</li> </ul>	<p>Sets work area to process.</p>
 <p>Smoothing</p> <ul style="list-style-type: none"> <li>Medianing---&lt;50&gt;</li> <li>Threshold---&lt;128&gt;</li> </ul>	<p>Applies the smoothing filter with the specified <i>Medianing</i> (0-100) and <i>Threshold</i> (0-127) parameters.</p>
 <p>Speckle Remover</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Auto Estimating</li> <li>Speckle Size---&lt;0.000000&gt;</li> </ul>	<p>Removes black speckles from images. Use the <i>Auto Estimating</i> flag or set the maximum speckle size manually (&lt;10 mm).</p>
 <p>Thickening</p> <ul style="list-style-type: none"> <li>Thick In Direction---&lt;All&gt;</li> <li>Number of Passes---&lt;1&gt;</li> </ul>	<p>Applies the Thickening filter by the specified <i>Number of Passes</i>. The <i>Thick in direction</i> parameter can be Vertical, Horizontal or All (in vertical, horizontal and diagonal directions).</p>

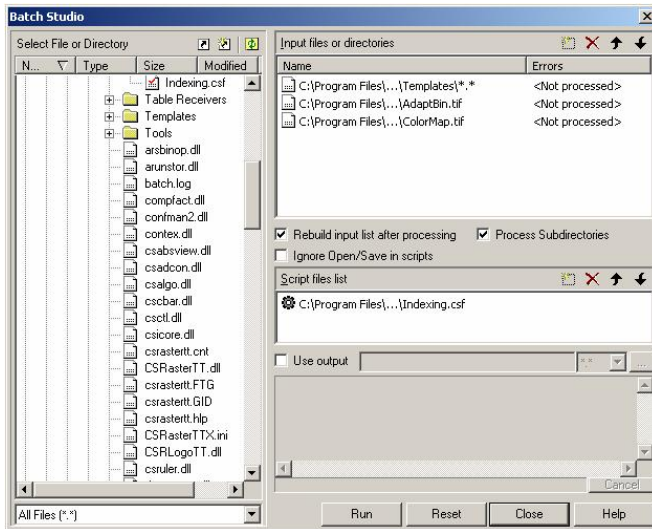
Command	Description
	Applies the Thinning filter by the specified <i>Number of Passes</i> . Checking <i>Thin up to skeleton</i> converts all objects to one-pixel lines.
	Applies the Unsharp Mask filter with the specified <i>Sensitivity</i> and <i>Radius</i> .

## To Create Batch Job

A *Batch job* is a sequence of operations for a group of images. To create a *batch job* you should specify the input images or set location of a folder or a set of folders to be processed, the *script file* (which contains the *processing scenario*), and output images. You can save processed images back to their original files or to new files; you can also select different file formats for the destination files.




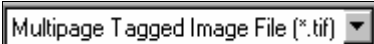
You may apply more than one *processing scenario* to the selected images in your *batch job*. To prepare a *batch job* and tune the input and output options choose *Batch Studio* from the *Tools* menu. The *Batch Studio* dialog box appears (see next page).





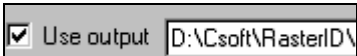
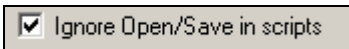
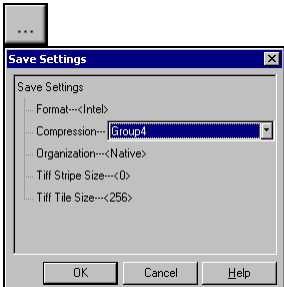


1. The *Select File or Directory* tree shows existing files and folders; you can use the *format list* option to show appropriate files.
2. To specify those images to process, select the input files (or an entire folder) and move them to the *Input files or directories* section using the standard drag-and-drop technique.
3. Select one or more *script files* and place them into the *Script Files list*. This specifies the *processing scenario* when running a batch. If you click on a script list item, the *Script Studio* dialog (described above) opens, and you can check or edit the *processing scenario* contents.



4. To save the images to new files you should select an output folder and file type. If you do not do this, the images will be saved back to the same files.
5. Press *Run* to launch the batch. The input files are processed with the selected scripts from *Script files list* and the results are put into the *Output* folder. The error or progress messages are shown in the lower right section of the dialog. Press *Cancel* to stop the script execution.

The buttons and controls in the *Batch Studio* dialog are as follows:

Button	Description
<i>Select File or Directory</i>	
	Opens the list of folder shortcuts (to see the list, place the mouse pointer on this item and wait a bit)
	Adds the selected folder to the folder shortcuts list
	Refreshes the folder tree
	Folder tree files filter

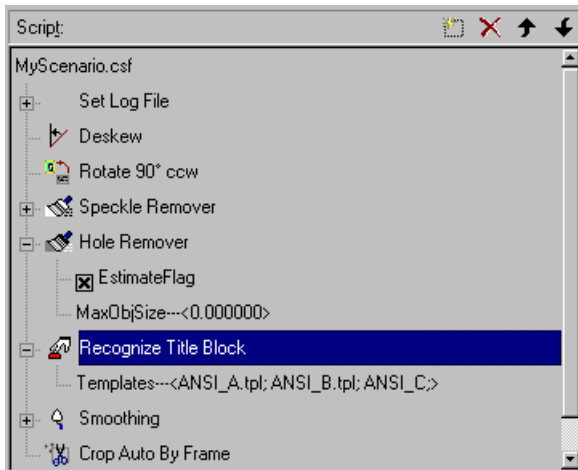
Button	Description
<i>Input files and Script files list</i>	
	Creates a new item manually
	Removes the selected item
	Moves the selected item up
	Moves the selected item down
	Check <i>Use output</i> to redirect output of processed files.
	Check Ignore Open/Save in scripts if the script file includes the Open and Save commands; otherwise they may be executed twice.
	<i>Use output Options</i> button. Opens a dialog that saves settings for the specified file format.
	For example, to change TIFF options for output files you should click this button and set the required options.
	Selects format of output files.  This control allows you to set not only single folder to be processed, but a complete list of files in all the subfolders from a designated path.

Button	Description
<input checked="" type="checkbox"/> Rebuild input list after processing and <i>Errors in Input files and directories</i>	<p>These controls enable batch cycling. When the <i>Rebuild</i> box is checked, the <i>Name</i> list obtains the files that were not processed by the batch and the <i>Errors</i> field shows which operations failed for each unprocessed file.</p> <p>This reduced list is preserved and after making the required amendments you can apply the same batch to the remaining files.</p> <p>If the <i>Rebuild</i> box is unchecked the <i>Names</i> list will remain unchanged.</p>
<i>Reset</i>	Cleans all batch content.
<i>Run</i>	<p>Launch the script and watch the output results in the lower right section of the dialog. This report will be written to the log file. Press <i>Cancel</i> to stop script execution.</p>

## To Run Indexing

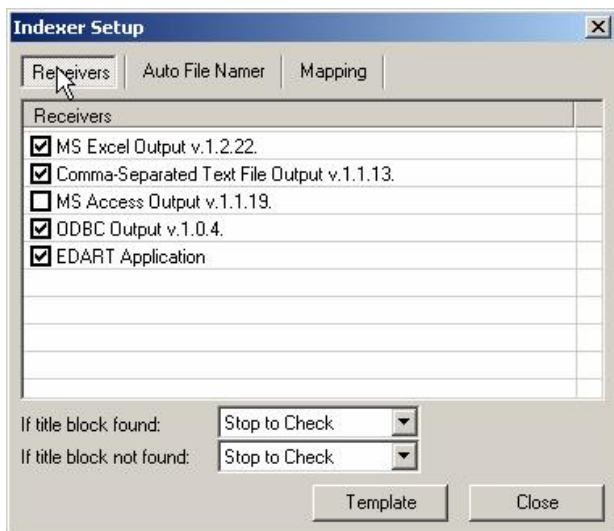
You should perform the following operations:

1. Create a *Title Block template* with the *Train Title Block* command described above, then save the created template to a template file. If you intend to use different templates for indexing you should create all of them before running the batch process.
2. Choose the *Script Studio* command from the *Tools* menu and create your *processing scenario*. Add the *Recognize Title Block* command to this scenario and choose a previously created title block template for the *Templates* parameter. Save the created scenario to a *script file*.



**Note:** You can use more than one *title block template* file when indexing. To do this, simply select all the required templates as the parameter. For example, in the script – MYSCENARIO.CSF (see the picture above) you can see a string of three templates: ANSI\_A; ANSI\_B; ANSI\_C; In this case RasterID will analyse the title block in each image and try to apply the most appropriate of the three templates for each one. This is a typical *processing scenario* that includes both image processing operations and the *indexing* command *Recognize Title Block*.

3. You can control the indexing output by choosing one or more destinations. RasterID has three standard options. These are *Comma-Separated Text file*, *MS Excel table* and *MS Access database*. RasterID has the capability of attaching an external destination but it requires programming (see *Programming guide*). Choose the *Indexing Output* command from the *Tools* menu. The *Indexing Output* dialog box appears:



You should place a check against each required destination. Output options such as the output file name or separator type are defined in *Setup*. To specify these options click the *Setup* button, then click OK. The selected destinations will be used when *indexing*.

Now you should select the following actions for RasterID in two cases:

*If the title block is found:*

*Stop to Check* – to interrupt the indexing process and open the *Check Recognition Results* dialog box (see more information on page 85), so you could check and edit the recognized field contents.

*Export Auto* – to export the indexing results to the selected destination without checking.

*If the title block is not found:*

*Skip* - don't export anything;


*Export Auto* – to add only the filename field to the database;

*Stop to Check* – to open the dialog for manual editing (see more information on page 85). Using this dialog you can recognize selected fields one by one and edit the contents. After you are finished, this information will be automatically exported to the selected databases.

- In the *Auto File Naming* tab you can set up a scheme for automatic naming of files. It is a useful feature to support batch scanning or scanning through the Virtual Scanner.

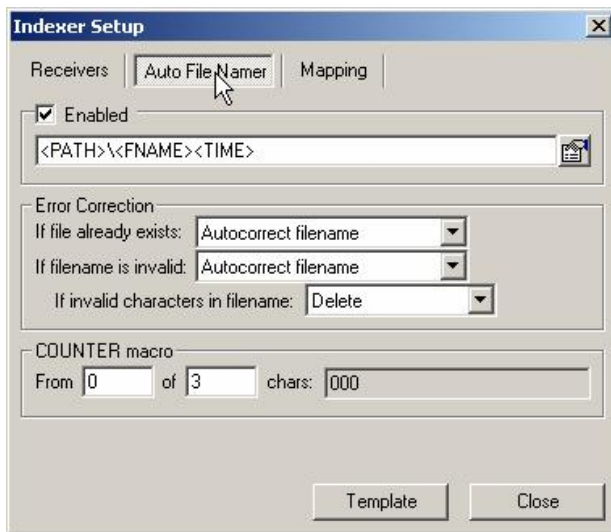
The auto-naming scheme is simple: you set the path and name of the file and a field name as the auto-numbering variable, such as <Drawing Number> in the example below.

The *Enabled* option should be checked.

The  button opens a dialog where you can set the <PATH> and <FNAME> values.

The next figure shows the auto-naming scheme in action. The bottom of the dialog shows that the <PATH> is represented by "Software\RasterID 3.5\Samples", and "Navy\_01" represents the <FNAME> variable. Then, following the underscore, the rest of the string is the contents of the "Drawing number" field of the title block and the ".tif" extension.

In the *Error Correction* section you must define how RasterID should handle problems with file names such as duplicate file names. Select the desired option from the *If file already exists* and *If filename is invalid* action combo-boxes:



*Autocorrect filename* - applies the auto-naming scheme and saves the file.

*Overwrite file* - ignores the auto-naming scheme and saves the file.

*Skip saving file* - proceeds to the next file without saving.

*Ask user* - opens the same dialog every time the conflict occurs and lets you set the filename manually.

Select one of the following options from the *If invalid characters in filename* action combo-box:

*Delete*

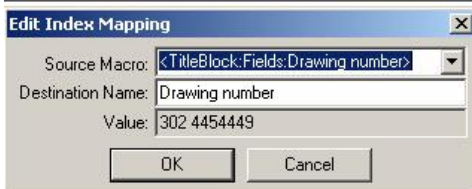
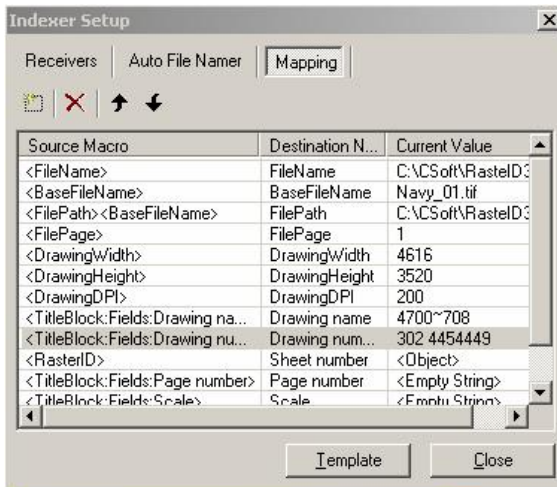
*Replace with dashes*

*Ignore*

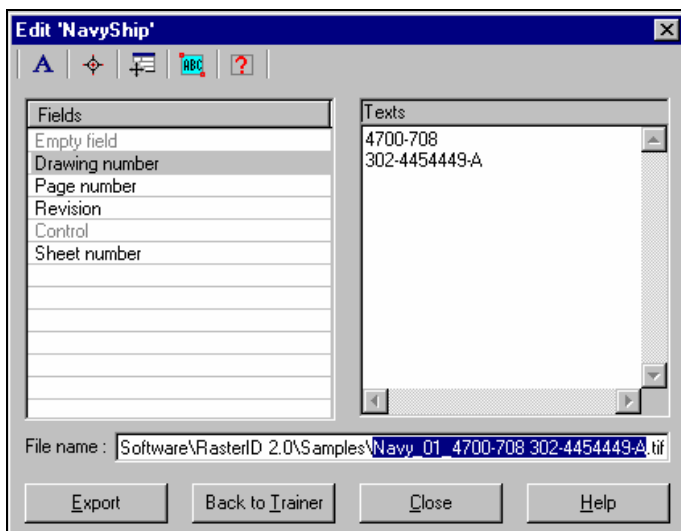
*Fail*

In the *COUNTER* macro section you can tune mask macros and indexes numbering.

5. In the Mapping tab you can specify a macro to make the required database field contents. It can be a sequence of predefined keywords (for ex. FileName, DrawingDPI), custom RasterID objects properties (for ex. Raster:ActiveRasterPage, TitleBlock:Fields:Sheet), or text symbols. As a result, you will get the specified value transferred to your database.



You can edit the string in the *File Name* box before exporting data to the selected databases.



6. Choose the *Batch Studio* command from the *Tools* menu. Select the input image files, the created *script file* and specify the output files or folder. Then click *Run* in the *Batch Studio* dialog box.

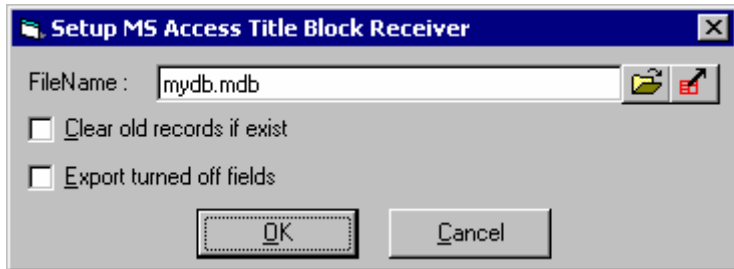
# Appendix

## INDEXING OUTPUT

---


### Output to MS Access

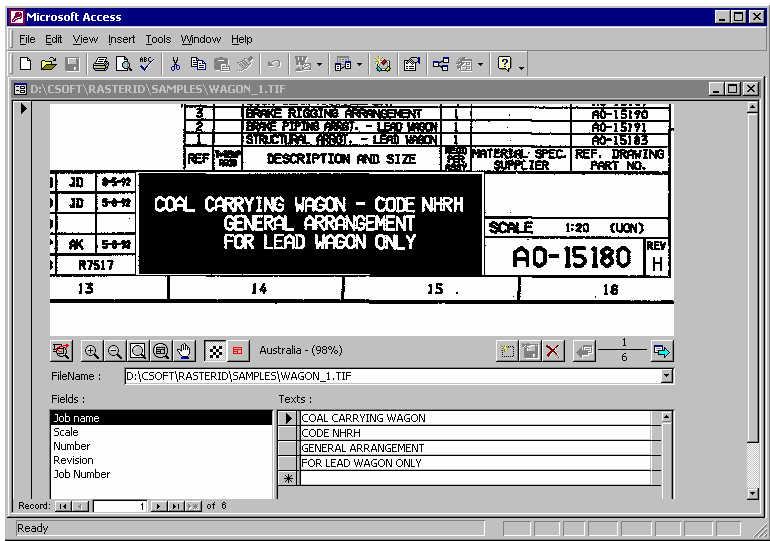
If you choose *MS Access Output* in the *Indexing Output* dialog box, RasterID launches MS Access or uses its DAO Engine. It loads the existing MDB-file or creates a new database file using the file name specified in the *Setup* dialog.



If you turn on *Clear old Records...* RasterID will delete all records in the specified database file before indexing. If you turn off the checkbox, RasterID adds new records to the existing database when indexing.

If you turn off the checkbox *Export turned off fields*, RasterID will not export the name and contents of unrecognizable fields.

Pressing the  button embeds a Quality Checker for Access into your MDB file. The Quality Checker is an add-on VB application that works in the Access environment and allows you to view the indexed images and edit the field contents.




MS Access with Quality Checker application

RasterID exports the extracted data to DAO database (usually version 35 for MS Office 97 or version 36 for MS Office 2000). The information on DAO version can be found in Windows register as the key value HKEY\_CLASSES\_ROOT \ DAO.DBEngine.version.

*MS Access dialog with indexing results*

The Quality Checker toolbar contains the following functions:

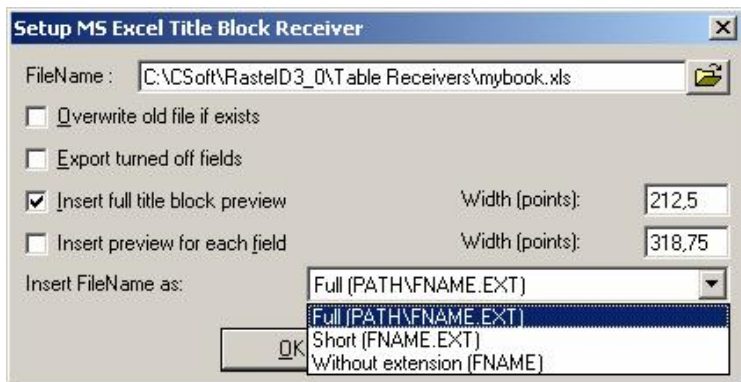
Button	Description
	Launch RasterID to edit current image file.
	View controlling toolbar.
	Show/Hide Raster/Vector buttons.
	Add/ Rename/Delete record.
	Previous/Next record.
	Checked/Unchecked state.

If the  button is not pressed, RasterID uses the DAO Engine version (usually it is 35 for MS Office 97 or 36 for MS Office 2000) to transfer the indexing results to your database file. You can look this up in the Registry: HKEY\_CLASSES\_ROOT \ DAO.DBEngine . version).

MS Access output results

## Output to MS Excel

If you choose the *MS Excel Output* option in the *Indexing Output* dialog box, RasterID launches MS Excel. It loads the existing *xls*-file or creates a new table using the file name specified in the *Setup* dialog.



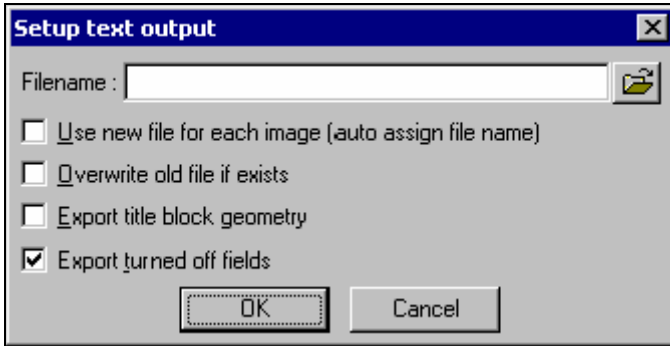
RasterID will create a new sheet for each different *title block* type. This sheet has field names corresponding to those specified in the *Train Title Block* dialog. RasterID will add a new record for each processed image. The first field - *Image* contains the full path to the processed image file. The second field *Preview* contains a cropped area of the image that contains the recognized *title block*. Any other fields contain the recognized text strings. If you turn off the checkbox *Export turned off fields*, RasterID will not export the name and contents of unrecognizable fields. *Insert full title block preview* checkbox allows you to implement a complete title block preview into your Excel worksheet. *Insert preview for each field* will implement the preview of each field into your worksheet to ease the manual checking of recognition procedure. In the *Width* field you should set the preview width of the image fragments. The format of the *FileName* field is set in the *Insert FileName as* field.

	D	E	F
	Drawing number	Page number	Revision
1	NN. DWG NO 4700-708 INTERNAL DWG NO 302-4454449	MICROFILM PAGE NO. 48	REV K
2	4700-708 302-4454449	48	K
3	NN. DWG NO 4700-708 INTERNAL DWG NO 302-4454449	MICROFILM PAGE NO. 37	REV H
4	4700-708 302-4454449	37	H
5	NN. DWG NO 4700-708 INTERNAL DWG NO 302-4454449	MICROFILM PAGE NO. 16	REV L
6	4700-708 302-4454449	16	L
7	NN. DWG NO 4700-708 INTERNAL DWG NO 302-4454449	MICROFILM PAGE NO. 3A	REV L

Results of indexing output to MS Excel file.

## Output to Text File

If you choose the *Comma-separated Text Output* option in the *Indexing Output* dialog box, RasterID loads the existing txt-file or creates a new one using the file name specified in the *Setup* dialog. If you choose *Use new file*, RasterID will create a new text file for each processed image, which is named as the image file name with a *txt*-extension. If you turn off this checkbox, RasterID will add a new record for each processed image.



The created comma-separated text file has the structure:

**File Name** – image file name (string)

**Table Name** – title block name (string)

**Frame Left, Frame Top, Frame Right, Frame Bottom** – recognized title block bounding frame (real)

**Origin X, Origin Y, Angle** – title block origin and skew angle (real)

**Probability** – title block recognition quality (real 0.0 – 1.0)

**Graphs** – fields start

**Graph Name** – field name (string)

**ID** – field number (integer)

**Frame Left, Frame Top, Frame Right, Frame Bottom** – recognized field bounding frame (real)

**Texts** – texts start for each field

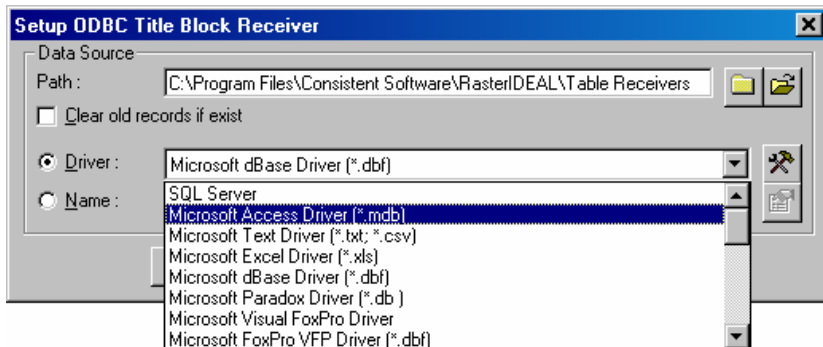
**Text** – recognized text (string)

**Base X, Base Y, Height, Angle** – recognized text base point, height and skew angle (real)


You can import this file to any database that supports text files.


## ODBC Output


There is a set of ODBC drivers that provide you with the means to save indexing results in a variety of database formats. You can find a description of formats and ODBC usage in the documentation for the corresponding drivers or databases.



In the *Path* box you should enter the destination folder for the indexing results.

The *Driver* list contains the available ODBC drivers. The  button opens the *Driver Setup* dialog box for the selected driver.

The *Name* field contains the name of the data source. The  button opens the *Select Data Source* dialog box.

The  button opens the *Details* window, which contains the connection string that is used to activate the ODBC driver. You can edit this string, to add your login and password for example.

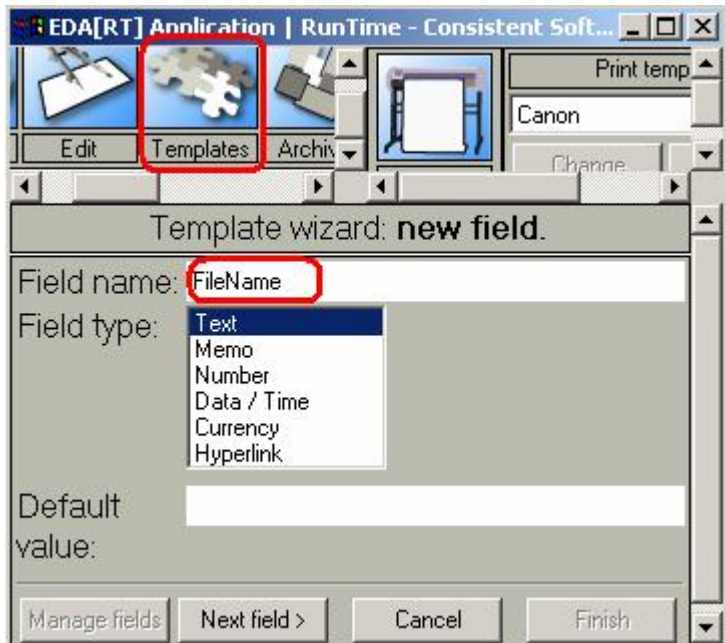
Pressing the *Test* button lets you test the validity of all settings before starting the transaction of indexed information to the database.

## Exporting to EDART Application

EDA[RT] has seven buttons on its toolbar. They are “Drawings”, “Templates”, “Archives”, “Search”, “Import”, “New Printing Template” and “About”. By clicking the first four of them you jump to one of four EDA[RT]’s views developed for drawings management, templates management, archives management and search wizard respectively. The fifth button activates the file import dialog.

First, you need to run and set up EDART to be able to import data from RasterID.

1. Run EDART, press the *Template* button and then choose *Create*. Create fields to import the information (which should be defined in the *Mapping* tab of the *Indexing Output* dialog of RasterID). Press the *Finish* button.



2. Type a name for *Template*; then fill in the *Author* and *Purpose* fields.
3. Press the *Archives* button, and then choose *Create*. Type a name for a new Archive in the *Name* field; then fill in the *Author* and *Purpose* fields. Select the created Template in the *Template* field. Press the *Create* button.

New archive info

Name:	<input type="text" value="RasterID"/>	Templates:	
Author:	<input type="text" value="roman"/>		Photo album template
Purpose:	General purpose		Drawings
<input type="button" value="Create"/> <input type="button" value="Cancel"/>			

Template view

Name:	Drawings	Drawing path	<input type="text"/>
Author:	roman	FileName	<input type="text"/>
Purpose:	RasterID export	Drawing name	<input type="text"/>
		Drawing number	<input type="text"/>
		Sheet number	<input type="text"/>
		Page number	<input type="text"/>
		Scale	<input type="text"/>
		Revision	<input type="text"/>

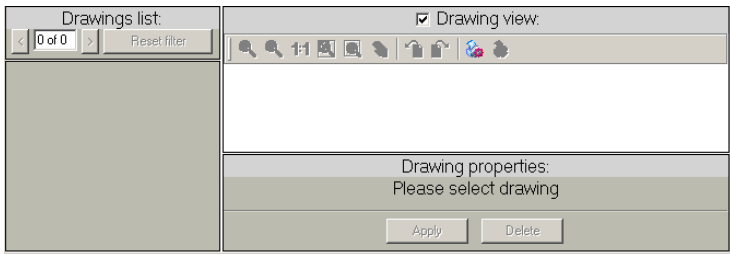
The archive with the name you've specified will appear in the *Archives manager* list.

Select the archive by double-clicking on its name.

Archives manager

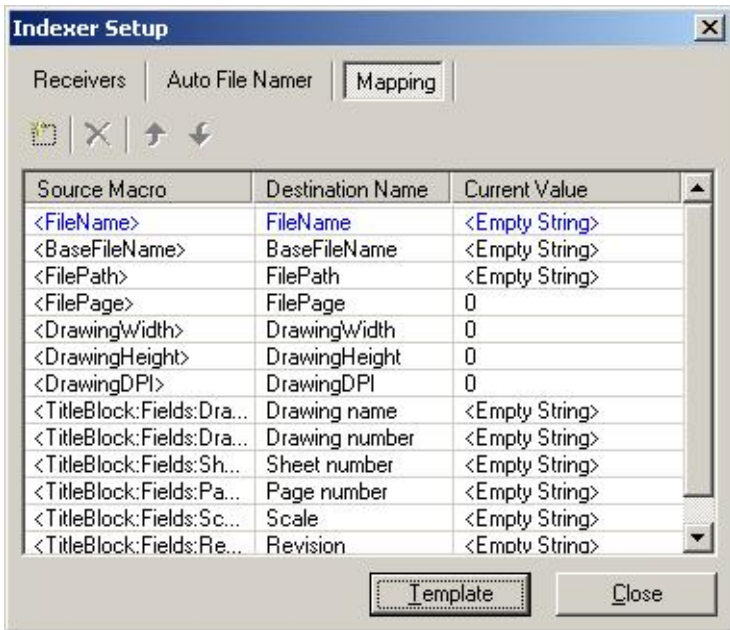
Archives:	
	RasterID - roman - General purpose
	<input type="text"/>
<input type="button" value="Select"/> <input type="button" value="Create"/> <input type="button" value="Delete"/>	

Now EDA is prepared to receive files.



4. Do the following actions in RasterID 3.5:

Go to the Indexing Output dialog (the Tools menu), choose the Mapping tab to create macros for the fields in the EDART template, or press the button Template > Load and load the previously created ones.

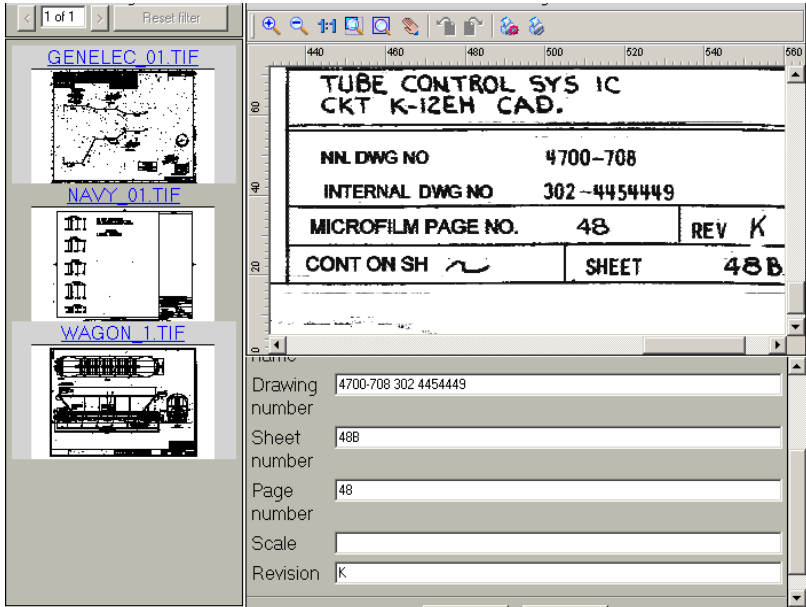


Mapping is a set of triples:

- Source Macro – one of predefined macro function (see below for the full list of Macros) or predefined user string.
- Destination Name – the attribute name used during data exporting.
- Current Value – the value of “Source Macro” that depends on the processed file as well as on its contents.

You can add, remove or modify these triples.

5. After the *Recognize Title Block* command is executed, the defined information will appear in the specified fields.



### A list of available macro functions

- <RasterID> - the reference to CSRaster Control. Can be very helpful for advanced data manipulation.
- <FileName> - the fully qualified name of currently loaded file (PATH\FNAME.EXT).
- <BaseFileName> - the file name only (FNAME).
- <FilePath> - the full path to file (PATH).
- <FilePage> - the current page number for multipage files.
- <DrawingWidth>,<DrawingHeight>,<DrawingDPI> - the loaded raster image attributes.
- <TitleBlock> - Title Block template name.
- <TitleBlock:Name>,<TitleBlock:BoundMinX>,...,<TitleBlock:BoundMaxY> - recognized template attributes.
- <TitleBlock:Fields> - a collection of recognized title block fields.
- <TitleBlock:Fields:[Field\_Name]> - the text value of a recognized field.
- <TitleBlock:Fields:[Field\_Name]:[Property]> - the recognized field property.

You can combine any sequence of above macro functions and strings to create more complex mappings.