

WiseScan interface options and controls for Colortrac SmartLF Scanners

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WiseScan interface options and controls

Depending on the main mode chosen (Scan-To-View, Scan-To-Print, etc.) and the scanner type (TWAIN or directly supported) WiseScan's main window may have different sets of controls. When working with a TWAIN scanner the management is performed in the native TWAIN driver and WiseScan operates only the image output and post processing.

Main Scanning Toolbar (Direct Support)

The upper pane contains the operation buttons and output options.

Option	Description
	Starts batch scanning.

	Starts scanning of a single sheet.
	Starts pre-scan. You can adjust all the options of the single and batch scanning on the pre-scanned image.
	Starts pre-scan area.
	Stops scanning but does not close the WiseScan pane. Red when active and grey when unavailable.
	Sends the <i>Eject</i> command to the scanner.
	Switches layout. Hides/Opens the bottom pane of the dialog with the preview and tabs.

When all the options are set; you can hide the bottom part of the dialog by pressing the  button. Pressing this button again opens the bottom pane.



The bottom pane contains the preview window, the buttons that control the contents of the preview window and the tabs in which you set the scanning options.

The set of options is preserved between sessions in the preset files (see description of the *Main* tab).

There is also a Progress/Status bar in the bottom of the WiseScan dialog window.

Preview Window and Buttons (Direct Support)

The preview window is very useful in the pre-scan operation because you can fine tune parameters before scanning.

The preview window is equipped with a frame and five buttons.

The blue frame inside the preview window shows the pre-scan area –this is the area that will show up in your main application window. You can change this frame by dragging the handles or drawing a new rectangle using the right mouse button.

The  button opens and closes a separate preview window (right side image). This separate window has additional horizontal and vertical rulers and also the *Scan* and *Pre-scan* buttons.

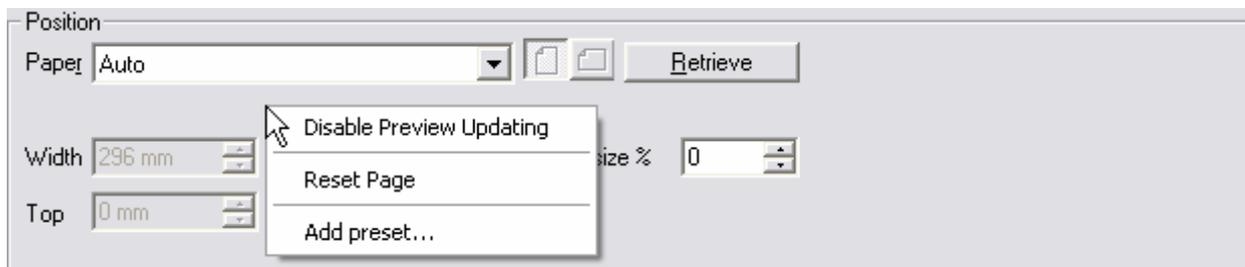
The  button enters a mode of redefining the scanning area.

You can start the scanning of a fragment with  button.

The  button disables preview updating.

Pages context menu (Direct Support)

On any page you can recall the context menu by right-clicking somewhere in the main tab pane area.



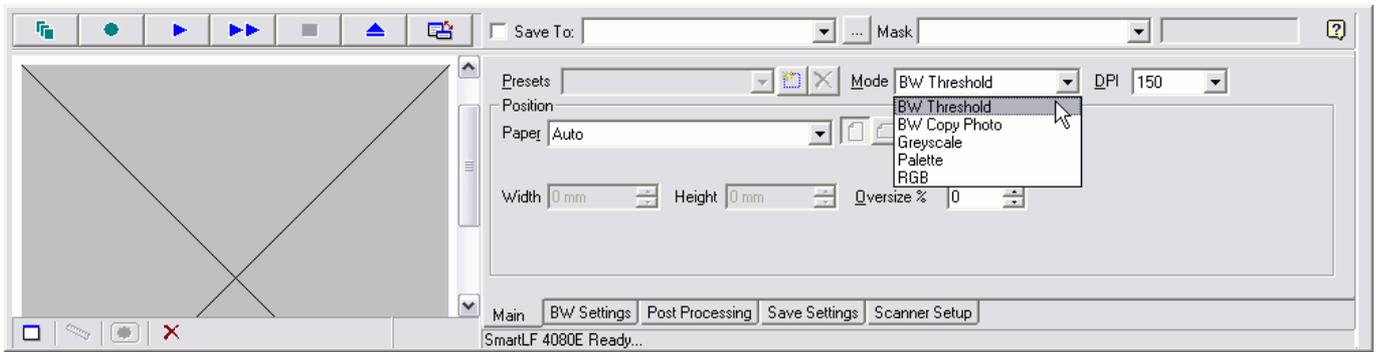
The *Disable Preview Updating* option enables or disables automatic preview rescanning after changing the page content.

Choose the *Reset Page* option to reset the page content to the default state.

Choose the *Add Preset* option to add the current page content to the presets.

Main Tab (Direct Support)

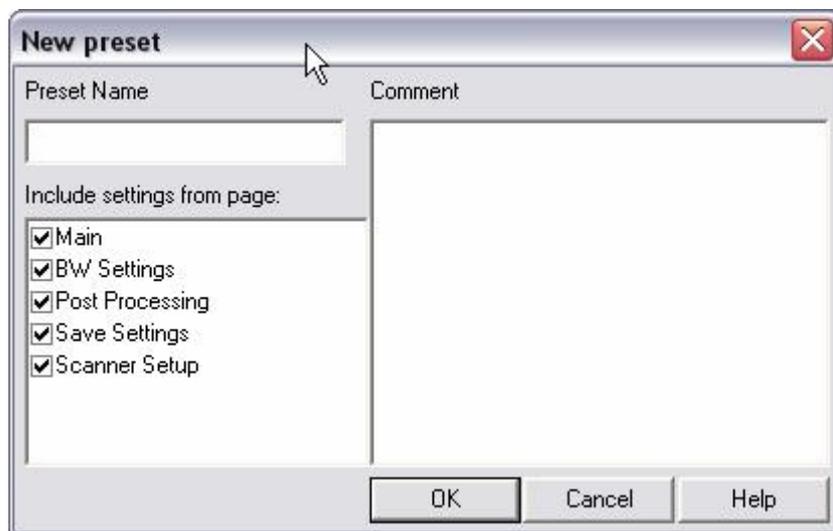
This tab contains a setting that controls the paper size, scanning mode, resolution and also the option to save settings between sessions.



Presets

A scan preset is a combination of previously defined and stored tabs in WiseScan. Scan presets can be selected from the drop-down list; and then they can be amended, renamed, or deleted. Presets are handy for storing, recalling and standardizing your favourite settings. The paper size settings cannot be saved in presets.

Clicking on  button opens the *New Preset* window where you can define the parameter groups to be saved and add your own comments.



The  button deletes the selected preset.

Modes



The *Mode* combo-box contains scanning modes supported by the selected scanner. Different scanning modes can be applied for different types of scanning assignments. There are true colour and reduced colour modes. Some monochrome modes are especially efficient for enhancing details on difficult and blurred drawings. Some modes are specially designed for printed output (copying) while others are more suited for file storage.

The availability of specific scanning modes and the adjustment options for each mode depend on your scanner model. For example, colour modes are only available with a colour scanner. WiseScan adapts to the detected scanner and displays only the relevant modes.

Every scanning mode has its own set of options that can be tuned in the corresponding tabs: *BW settings*, *Colour Setup* or *Palette*.

BW Threshold – is used for technical drawings and line art. When the scanner camera looks at a drawing, it converts what it sees to grey tone levels between 0 and 255 with dark tones represented by low values, light tones by high values and middle tones by middle values. When scanning using a specific threshold all grey tones below the selected threshold value will be represented as black pixels and all grey tones above the selected threshold will be represented as white pixels. For example, if you have a very faded line drawing, you might want to increase clarity by setting a high threshold, thus forcing some of the

greys back to their original black. This produces the potentially smallest file size as each scanned pixel becomes a single bit, either black (1) or white (0), depending on whether its grey level is below or above the threshold.

BW Copy Photo – used for copying (scan and print) of continuous shades of gray like in photos.

GreyScale – in this mode 256 grey levels are recognized for each pixel (1 byte, 8 bits per pixel). This creates a good reproduction of complicated B/W images like B/W photos. Some originals, for which you can not achieve good quality when scanning in *BW Threshold* mode, can be scanned using *GreyScale* and further processed (mainly binarized) using tools from the host application to which WiseScan is attached.

Palette – is used when scanning images such as colour technical drawings, geographical maps, etc, in which true colours can be represented by a limited set of colours, defined in colour palette.

Using mapping to a selected colour palette greatly reduces the data volume, increases the scanning speed and minimizes disk storage requirements by only requiring 8-bit definition per colour pixel compared with 24-bit colour pixel definition in true colour (RGB) mode.

RGB – 24 bit true colour mode is used when capturing all of the colours of an image. This mode produces large files since the colour depth is defined to 16.8 million colours.

DPI (resolution)

The possible list content varies from scanner to scanner.

Scanning resolution is the number of pixels per inch (dpi) in the resulting (scanned) image. An image with a high resolution will contain more and smaller pixels than an image with equal dimensions with a lower resolution. High resolution images will therefore normally display more detail and a wider colour range than a low resolution scan. However, high resolution scans produce larger files with the usual setbacks in relation to disk space, load time, etc.

Your selection of resolution will therefore depend mainly on how you intend to display the image. For offset printing, high resolutions work best while for screen and web display, lower resolutions will suffice. Normally, 300 dpi and above are considered high resolutions. High resolutions can also be necessary if small details (like in maps) must be displayed clearly.

The image resolution should be determined before scanning i.e., before your original is digitized and the image transformed to pixel data. The *Resolution* list for a given scanner contains optical resolution value in angle brackets, such as <400>, which is the physical characteristics of scanner camera, and the enhanced (interpolation) values such as 300, 600, 1200, etc (depends on the scanner model). When you set interpolation value of resolution, the colour of every dot is calculated by the scanner hardware and software.

Position

This section defines the paper size, margins and options to control feeding.

The *Paper* list contains a variety of formats. There are also options to feed paper of non-standard sizes:

Auto – the size and position of sheet is detected automatically during the pre-scan step. The obtained size is then shown in the *Width* and *Height* boxes. Please refer to the *Expand to nearest standard paper* checkbox and the *Autodetection threshold* in the *Scanner Setup* tab.

AutoWidth – only the width of a sheet is detected automatically during the pre-scan step. The obtained size is then shown in the *Width* box. Please refer to the *Pre-scan length for AutoWidth mode*, the *Expand to nearest standard paper* checkbox and the *Autodetection threshold* in the *Scanner Setup* tab.

Fixed Width – you only define the width of paper and the scanning completes until the end of the sheet is reached.

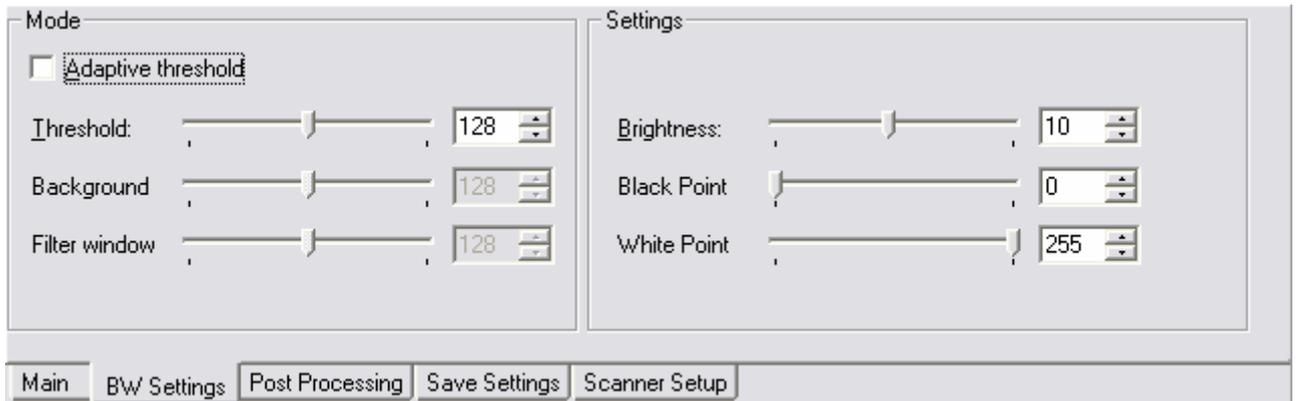
Custom size – you can define your own paper size in disabled boxes.

You can choose portrait or landscape paper orientation with the *Portrait* and *Landscape* buttons next to the *Paper* list.

The *Retrieve* button starts a procedure of automatically retrieval of the pre-scanned sheet size. If these sizes coincide with those of one of the standard formats, this format appears in the *Paper* list.

Setting a non-zero value to the *Oversize %* box helps you to compensate losses caused by small size inconsistencies or original skewing.

BW settings Tab (Direct Support)



This tab is shown when you choose *BW Threshold* from the Mode list in the Main tab.

The *Adaptive threshold* tick-box – when ticked – triggers the automatic threshold feature. When the scanner is using this feature the image is sampled and the threshold is adjusted according to the image quality as the scan progresses. In most cases the scanner is clever enough to offer a satisfactory result automatically.

In the *Adaptive threshold* mode the parameters for *Background* and *Filter window* are active.

Background allows the operator to adjust the background details. Increasing the background will add more faint details from the image to the scan.

The *Window* allows the operator to sharpen the lines by increasing the contrast and removing discolorations.

Tip: Re-adjust the background after you have sharpened the image using the *Window*.

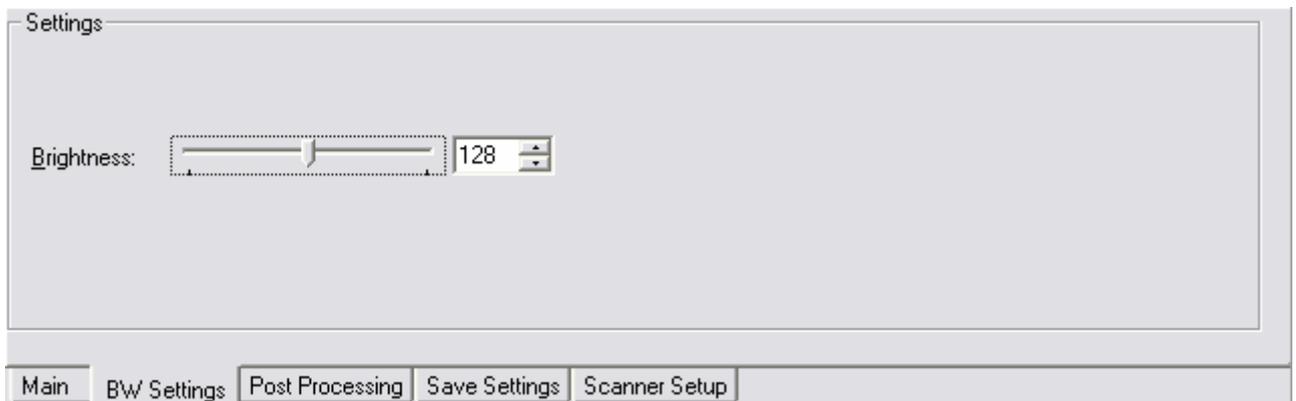
If the automatic mode of the *Adaptive threshold* produces a satisfactory result – remove the tick from the tick-box and adjust the image threshold using the *Threshold* slider manually by setting the threshold level for the whole scan. The higher the Intensity value, the whiter (fainter) the overall image appears.

The *Filter window* changes the thickness of lines during scanning, i.e. the bigger the area the thicker the lines that will be detected, Note Having the Filter Area set too high can change entire regions too being black.

The *Brightness* control allows the operator to set the level of data acquisition by brightness. Lowering the brightness will produce a darker scan (acquire more data from the image) and conversely increasing the brightness will reduce the amount of information acquired during scanning.

Black Point – the spin-box indicates the level of greys converted to black. Setting the value to 128 will convert all grey pixels containing more than 50% of black to pure black. For example, this is useful if you need to scan in areas where the color is faint converting them to black.

White Point – the spin-box indicates the level of greys converted to white. Setting the value to 0 will turn will eliminate all information from the scan. Setting the parameter correctly can be useful if you need to scan in the background on the image as white color only.



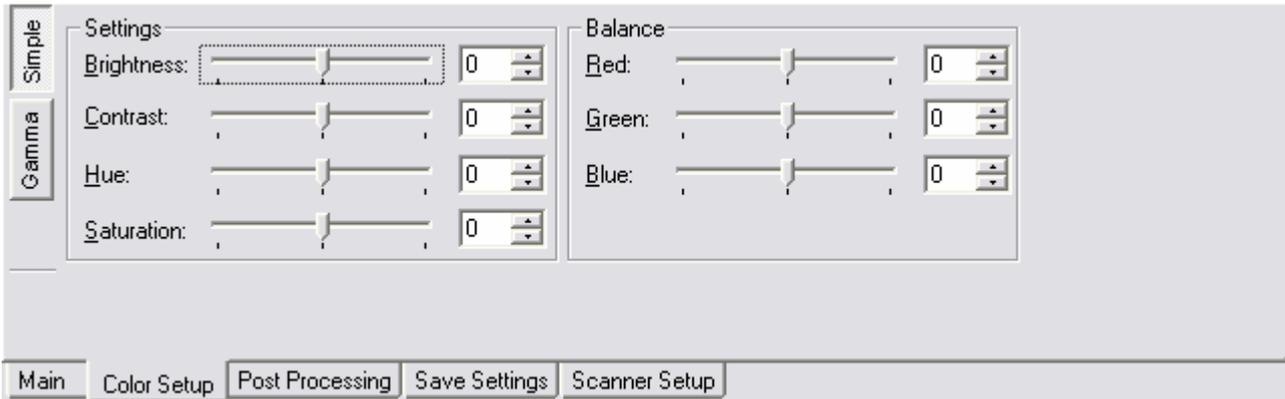
This tab is shown when you choose *BW Copy Photo* from the Mode list in the Main tab.

The *Brightness* control allows the operator to set the level of data acquisition by brightness. Lowering the brightness will produce a darker scan (acquire more data from the image) and conversely increasing the brightness will reduce the amount of information acquired during scanning.

This function works just like a similar setting on a copy machine – enhancing faint images with more details when brightness is reduced by creating a dithered B/W output - reproducing grey tones on B/W plotters with a better result. Correctly dithered, a pure B&W image will appear as if it was a greyscale image when printed.

Colour Setup Tab (Direct Support)

This tab opens when you select *RGB* or *GreyScale* mode in the *Main* tab.



This tab has two sub-tabs: *Simple* and *Gamma*.

The *Simple* sub-tab allows changing the colours in HSV and RGB colour modes:

Brightness – the overall compensation of brightness of all colours. It is used to make lighten images that are too dark or vice versa. *Gamma* provides a much more versatile tool for brightness correction.

Contrast – positive values (positioning slider to the right) makes dark tones darker and light ones lighter and the details in the mid-tones more distinctive. Negative values (moving slider to the left of the central tick) yield the opposite result.

Hue – is the colour name in HSV colour model.

Saturation – changes the intensity of colours.

Balance of Red, Green, and Blue – fine tuning the component colours in the image in RGB colour model. The Options in the *Gamma* tab allow you to control image brightness in a much more flexible way than simply changing *Brightness* and *Contrast*.

Setting gamma

In *Gamma* – you create the curve that defines how the specified ranges in brightness distribution change. This operation is also called changing the colour profile. You can create different curves for component colours (channels).

The first step of creating the Gamma curve is to define white and black points. In RGB colour mode – the black colour is presented by zero value in Red, Green and Blue and for white all the values are equal to 255.

In *Gamma* you define your own values for black and white, thus cutting the sub-range off the brightness distribution.

Setting white and black points and correcting gamma:

1. Pre-scan the image.
2. Open the *Colour Setup* tab and choose *Gamma*.
The picture shows the *Gamma setup* dialog for setting the black and white points and correcting gamma curves. You can drag and drop the shape of the curve in the channel display area to facilitate your requirements.



3. The histogram shows the overall distribution of brightness; from the Channel list you can select the histogram for component colour brightness distribution.

4. Click on the  button and pick a black point from the image. While you move the mouse pointer over the image, the black line shows the current point brightness in the lower part of the histogram and the black point icon is shown next to the Colour point label in the dialog. The spin boxes in the Colour point section show the RGB numeric values of the current black point. These values can be edited using the keyboard.
Clicking on the image finishes the black point selection. To change the black point you need to press the  button again. You can also encompass an area on the image and an averaged value of brightness will be calculated as the black point.
5. Click on the  button and pick a white point from the image. While you move the mouse pointer over the image, the white line shows the current point brightness in the upper part of the histogram and the white point icon is shown next to the Colour point label in the dialog. The spin boxes in the Colour point section show the RGB numeric values of the current white point.
Clicking on the image finishes the white point selection. To change white point you need to press the  button again. You can also encompass an area on the image and an averaged value of brightness will be calculated as the white point.
6. Now the white and black lines on the histogram show the positions of the selected white and black point on the histogram. You can drag these lines using the mouse or change the numeric values in the Red, Green and Blue spin boxes.
7. From the *Channels* list you can also select histograms for component values and edit points plus extreme brightness for Red, Green and Blue colours. This can help you to fine-tune the colour profile, for example to depress colour speckles. Do not use this option until your experience is adequate to fully understand the principles of gamma tuning.
8. The *Reset* button  discards all settings.
You can also calculate the white and black points automatically by pressing the  button.
9. The *Apply* button commits black and white point values to the settings.

There are four 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 the 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 colour 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 colour brightness on the image.

To change the shape of curves for the Red, Blue or Green channels, select the corresponding colour name from the *Channel* list. In the following example the red curve has been defined.

4. Place the mouse pointer over the left lower edge of the histogram. A bold point will appear showing that the line, limiting the Gamma curve from the left part (where the dark tones reside) is selected. You can drag the bold point to shift the area where the Gamma correction operates as shown on the picture below.

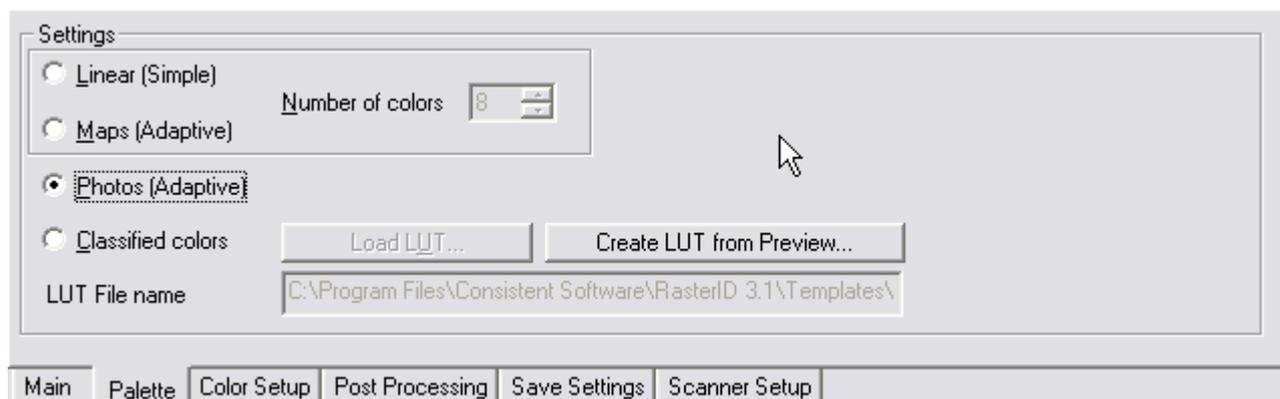
The dark tones to the left of line are not affected by Gamma correction.

You can perform the same operation with the right limit on the gamma correction, thus cutting off light tones. The bold point and the limiting line appear when you place the mouse pointer on the upper right edge of the histogram.

This is an alternate way of defining the black and white points on the Gamma correction template.

Palette Tab (Direct Support)

This tab appears only when you select *Palette* mode in the *Main* tab. The options of *Palette* scanning mode are also tuned in the *Colour Setup* tab.



In *Palette* mode the scanned image is coloured with a maximum of 256 colours. These colours, called indexed colours, form a palette. The palette can be saved in separate file for future use and loaded to control the scanning.

The methods of assigning colours to resulting points are:

Linear (Simple) – the colour range is divided into 256 equal segments. In each segment the colour is averaged. The points on the scanned image are assigned the colours that result from this averaging. Thus the index colours are linearly distributed. This method does not require an extra scan pass.

Maps (Adaptive) – mostly the same as the previous but involving an extra scan pass. Maps are usually created with a smaller number of colours than photos. During the extra scan pass the program creates a limited palette using the same rules as for *Photos*.

You can decrease the number of palette colours in the *Number of colours* field.

Photos (Adaptive) – WiseScan performs an extra scan pass creating a palette of 256 colours and the colour usage histogram is calculated. The min/max values of this histogram become the initial data for the adaptive rule creating the 256-colour palette. Finally the scanning is performed using this palette.

Classified colour – this method uses the palette of indexed colours created by other applications. To use such a palette press *Load LUT* button (LUT stand for Look Up Table). The currently loaded palette is shown in the *LUT file name* box.

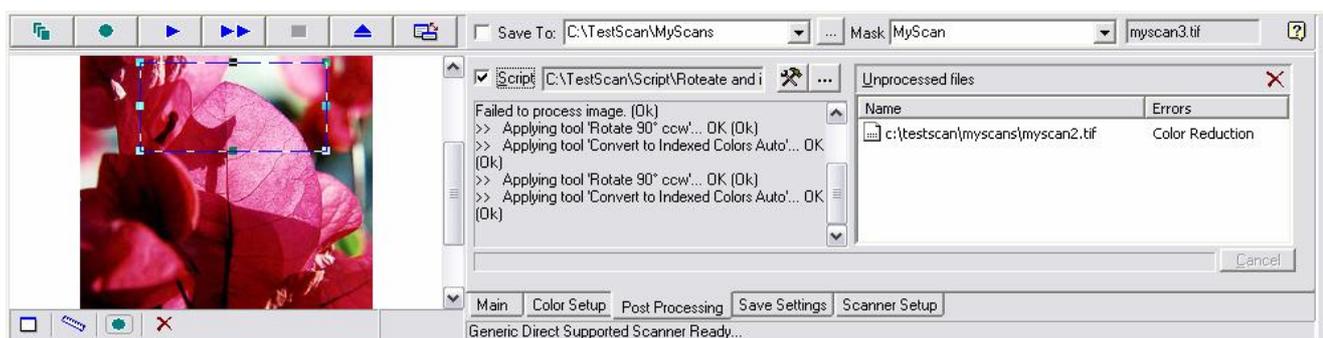
Create LUT from Preview

This button will set WiseScan to sample the loaded image and make a calculation of colours. This method is automatic and it can often save time if the image has clear separated colours. Some images are more difficult and will require the operator to manually separate and combine colours for the desired result.

This function is mostly used if your original is a full colour image of good quality and you have several similar images that you need to scan. You can then create a LUT that can be used to unify scanned images to the same palette. Please note that one palette can create an excellent result on one image and terrible result for another.

Post Processing Tab (TWAIN and Direct Support)

After scanning and enhancing by means using WiseScan, the image can be processed further by the host application's tools before being saved.



In the *Post Processing* tab you can assign a script to be applied to scanned files. The script is a text file that contains a sequence of host application commands.

You can create it using the application's tools or pressing the  button next to the *Script* field of the *Post Processing* tab.

The existing script can be opened in the standard *Open File* dialog activated by pressing the  button.

If the *Script* checkbox is on, the commands from the selected script are applied to every scanned image. You can temporarily switch off this checkbox if required.

The *Output* window and the status bar in the bottom of the *Post Processing* tab reflect the progress. The *Cancel* button stops the current script command (but does not undo the results of any previous changes to images).

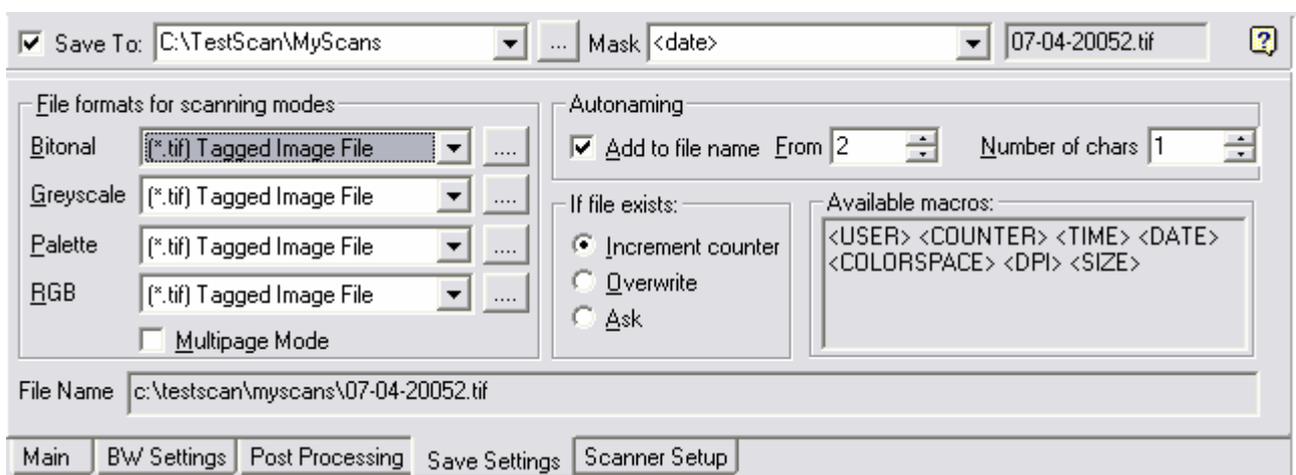
During the script processing errors may occur.

They are listed in the *Unprocessed files* window. The *Errors* column contains the names of the commands that failed on the given image. The process that caused the script to terminate processing will show in the errors column.

The file can be purged from the *Unprocessed files* list by pressing the  button.

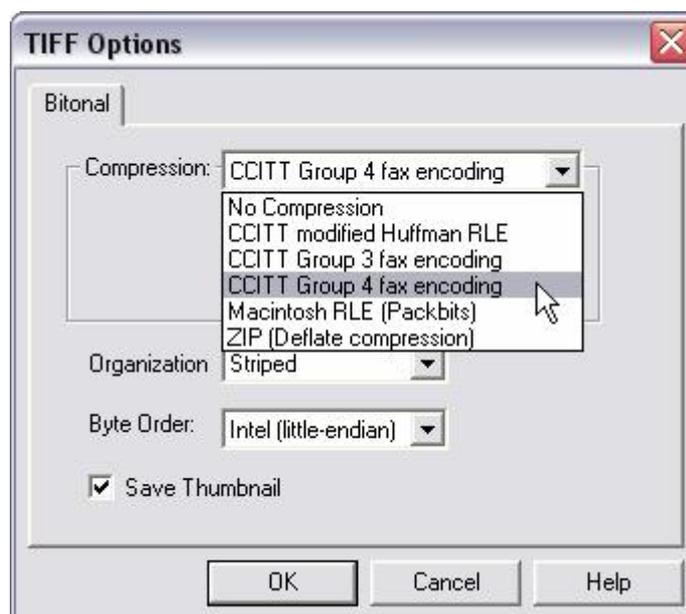
Save settings Tab (TWAIN and Direct Support)

In this tab you assign the file saving options and tune the auto naming scheme. Some system parameters can be used as a file mask – explained below.



The File type list contains available formats. You can set *Multipage* mode for TIFF and PDF files.

The  button opens the *Save Settings* dialog in which you can set the saving options for TIFF and JPEG files.



The *If file exists* section defines actions to be taken when file naming conflict occurs. If you choose the *Increment counter* – the existing file will be left intact and the scanned image will be saved in the file with the incremented counter. *Overwrite* means saving the scanned image to the existing file name – thus erasing its previous contents.

In both above cases the scanning session continues without any user intervention. This is very convenient for the batch scanning mode. If you choose *Ask*, the program opens the standard Windows *Save As* dialog box and lets you specify the file name manually.

The *Autonaming* section defines a scheme of automatic file name creation and defines the destination folder.

You can compose file and output folder names with the following components:

a. Macros - the available macros can be used to create filenames and destination folder in the *Output* and *Mask* windows. They must be typed in angle brackets.

<USER> is the system user name.

<COUNTER> is the numeric counter defined in the *From* and *Number of chars* boxes.

<TIME> and <DATE> add the system time and date stamps into the auto numbering scheme.

The available <MODE> values (*BW*, *GreyScale*, *Palette* or *RGB*) correspond to the current scanning mode set in the *Main* tab.

b. Numeric counter. You set the number of characters (with trailing zeros) and the initial number. The *Automatically add to file name* checkbox switches on/off the usage of the numeric counter.

c. Characters. In the *Mask* box you can add characters to macros and numeric counter values.

In the *Output* box you can add macros and characters, representing subfolder, for example, "C:\SCANNING*<COUNTER>*".

The  button next to *Output* box opens the standard Windows *Select folder* dialog. You can type characters into the *Output* box. You can also set an FTP address as the destination folder.

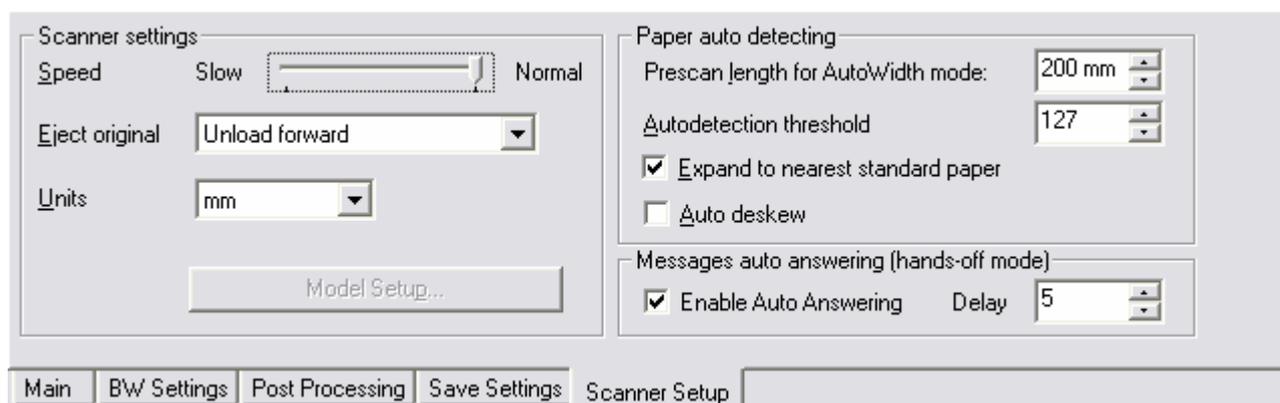
In the *Mask* box you can add macros and characters that pre-appends to the numeric counter value in file name. For example, if the system user name is John, and the mask value looks like "<USER>--", the filenames created may look like, JOHN--002.TIF etc.

The current file name can be seen in the *Preview*. The settings in the above described auto naming scheme examples generate the following filenames: C:\SCANNING\001\JOHN--001.TIF, C:\SCANNING\002\JOHN--002.TIF, etc. Thus you place every scanned file into a separate folder. Separate folders can also be generated if you use <TIME> macros instead of <COUNTER> in the *Output* box since time value changes every second. Other schemes of output folder name creation suggests saving all scanned files in one folder.

After every scan you can edit the auto naming scheme and enter additional data into the *Output* and/or *Mask* boxes. Switching the *Output* checkbox off disables manual editing of the output folder and filename and forces the strict usage of the previously defined auto naming scheme.

Scanner setup Tab (Direct Support)

The Scanner setup tab contains the options specific to the selected scanner that can be controlled through WiseScan.



Scanner settings

The *Speed* slider controls the speed of moving an original in the scanner. It is mostly useful for scanning valuable and worn originals at a lower speed. (This option depends on your scanner model)

The *Eject original* combo-box controls the kind of original ejecting. (This option depends on your scanner model)

To change WiseScan display units use the *Units* combo-box.

Use the *Model Setup* button to tune the scanner model specific controls and settings.

Document protection mode intends for special handling of old or curled papers during previewing and first pass detection. It limits pre-scanning length by user defined value for safe rewinding such kind of papers.

Please note that this settings affects on "Auto" mode and causes improper paper length detection.



Paper auto detecting

These settings control auto detection in Auto and AutoWidth modes.

The Pre-scan length for AutoWidth mode controls the first pass scanning length to determine the original width.

When the *Expand to nearest standard paper* checkbox is turned on, WiseScan automatically finds the nearest standard paper size and set these limits for scanning.

The Auto-detection threshold controls a level of grey tones to detect the paper margins. During heavy usage of the scanner the greyscale profile created from an empty scanning area may cause the scanner to set an incorrect paper size. If this happens, try to find the proper threshold value by manipulating the controls and inspecting the ensuing result.

The Auto Deskew estimates the skew angle during preview and then performs an automatic Deskew on the image during scanning. In Scan-To-File/Print/Net where you cannot use scripts because the image is not preloaded into memory. If you need to Deskew using a separate a batch routine later.

The Deskew might be to time-consuming in direct scanner support but for BW images the time added to the scan is negligible.

The Auto Deskew Main target is Scan-To-Print - in this mode you cannot fix the image with scripts or post-processing so any operator error cause loss of time and money – and maybe a small tree from a big jungle somewhere (paper).

Messages auto answering (hands-off mode)

When the Enable Auto Answering is turned on, the program gives the default answer after the specified Delay timeout - for all messages appearing during work.

How to (Tips and Tricks)

Selecting the Best Mode and Resolution

First, you need to select scan mode and scan resolution. The Scan mode defines the number of colours to be used when scanning an image and resolution influences the density of details obtained after scanning.

Your choice depends mainly on two factors – the category your original belongs to and the digitizing purpose. In the first instance, your choice of scan mode is influenced by the original's category, while choice of resolution is influenced by both factors – original's category and digitizing purpose.

Originals are divided into categories according to the following criteria;

- media type (print method) and its physical features (roll, aperture card, thick media, aged media)
- information – type of information on the original (mechanical drawing, colour map, photo)

For mechanical drawings and other engineering documentation, print method is quite critical since it greatly influences the quality of information presented on the original. If the original is performed using light-chemical print methods, for example, blue prints, sepia and others, then you will need additional efforts to handle such media.

Some scanning modes are designed for specific purposes, meaning that they are not used in other situations (e.g., Copy mode), while others can be used in several situations. Advice about selecting scan mode is provided in the table below.

The table contains original examples presented according to information type and media type.

ORIGINAL TYPE

Scanning drawings and one-colour sketches of good quality on homogeneous background; background colour and foreground colour are distinguished clearly.

SCAN MODE

B/W threshold

Scanning drawings and monochrome sketches of poor quality on non-homogeneous background; such as blue prints, sepias, etc.	B/W threshold
Scanning originals in greyscale mode. This mode may be useful when scanning monochrome originals of poor quality with further correction using the adaptive binarization command.	Greyscale
Scanning colour originals of any type (photos, maps, colour plans) with a limited number of colours.	Indexed colours
Scanning colour originals with limited colour number (e.g., maps) when matching the image colours to the colour set in a palette.	Indexed colours, "Classified colours" method
Scanning colour originals using the maximum colour number (24 bits); allows saving all colours and details of a colour image.	RGB

When you need to scan in indexed mode?

Information contained in maps, schemes and other colour media is often printed with limited colour number (under 256). When scanning such originals in RGB mode, resulting images may contain up to 16 million unique colours, which considerably exceeds the colour number actually used when printing originals.

Scanning the original in indexed mode allows you to reduce colour number to the desired quantity. Thus, scanning time and resulting file size will be considerably reduced compared to scanning the image in RGB mode.

It should be pointed out, that you can scan originals in RGB mode, and then convert the resulting image to indexed colour mode manually using the tools of the main program the WiseScan is connected to. However, if your original is large it may require a lot of resources from your computer (e.g., A1 format original scanned in RGB with resolution 300 DPI has a size of approximately 200 Mb).

After the scanning mode is chosen, you need to choose scan resolution. This value defines the density of details you will get from the scanning or the actual number of dots your scanned image will consist of.

Scan resolution represents a number of dots obtained when digitizing one inch of the original. Resolution is measured in DPI (dots per inch).

When selecting resolution you should consider type of the original, future output method (monitor, paper) and future use of image (vectorization, correcting, etc.).

Some advice on how to select resolution is provided in the table.

USAGE	SOLUTION
Vectorization and text recognition.	To get a good result you need to have at least a resolution of 300 DPI.
Printing.	Select resolution depending on printer type and features.
Binarizing and separation by colour.	To get a satisfactory image quality when binarizing, you need a resolution of at least 300 DPI
Greyscale scanning for adaptive binarization.	Since this method is applied to originals of poor quality with complex background / lots of "noise" you need to use the scanner's optical resolution to get the most details.

When scanning monochrome originals, you should set maximum possible resolution value (i.e. optical), but not less than 300 – 400 DPI. If necessary, the resolution can always be reduce later using the *Change Resolution* command.

To select resolution, apart from the above-listed advice, you should perform a visual control of quality of objects and details. For example, if continuous lines are broken after scanning, try increasing the resolution.

Obviously, an image with high resolution conveys details and colours better, but it takes more space on disk and in memory. Setting the resolution too low (less than 150 DPI) may result in decreasing quality, appearing moiré effect and segmented lines. Setting higher resolution values (500-700 DPI) enlarges file size, and therefore increases the time needed to process them.

When selecting high resolution, you should also consider that maximum available resolution does not always allow you to get the data quality corresponding to resolution as the maximum values often are interpolated - calculated by the scanner.

Scanners execute scanning using the optical resolution, and then re-calculate the resolution to the user-specified value. The scanner's optical resolution is marked with angle brackets, for example <426>.

If you want to extract maximum information for digitizing of the original, you should set optical resolution only.

If there are no special requirements to scan resolution, you can use the value of 200-300 DPI.

If you are not sure about the purpose of the original at the point of scanning, it's better to set the resolution value higher.

When selecting resolution, note that it will be impossible to get any additional data (new details, colours) from the image after scanning; this includes increasing the accuracy of details by changing the resolution. This is why you should be very accurate in selecting scan resolution.

If you have a set of different type originals, it's wise to sort them before scanning. Criteria depends on the originals themselves; you may sort them out according to information type presented (maps, drawings, aerial photos, etc.), size, orientation (portrait, landscape). Then, you can continue to sort them further within each category - especially if you got many originals.

Applying this procedure you will save time on settings to execute scanning. It would be perfect to sort originals so that you could execute scanning of similar originals with the same settings, and according to process. For example, if your originals contain images rotated by 90 degrees, you can apply the *Rotate* command to all images at once.

If your originals are similar after sorting - you can apply batch scanning, which only requires timely feeding.

Other scenarios

Originals stored on rolls.	To avoid skipping or skewing during scanning, you should unfold the originals and leave them flat for a while.
Aged originals.	Use a special envelope when possible and minimize the number of passes through scanner to minimize tear and wear. You should also reduce the scanning speed to assure that the originals are intact and to improve the scanning quality
Thick originals.	Use take-up tray or support the originals as they are coming out of scanner and use reduced scanning speed.

Tune Original Size Settings

You can size originals using different ways. Your task is to select the most convenient way for each particular case. The instructions below will help you.

To size an original so that the scanner could interpret it correctly, you need to specify the way your original has been loaded – by centre or side. You select loading method using the *By centre* checkbox, which should be selected if your original is loaded by centre, and cleared otherwise.

If you want to scan the whole original you can use the function for auto-detecting the original size. If you only need a part of the original you need to specify that part.

You select sizing method entirely depending on the specific original or a set of originals. There some basic situation listed below with advice about what sizing method to select. The examples assume that your original is already loaded in the scanner.

- CASE 1  You know a format, for example, ISO A3.
-  1. Select the format name in the *Paper* combo box and choose orientation by pressing the appropriate  button.
2. Start scanning by pressing the  button. Scanning will be executed in one pass.

- CASE 2  You know both original sizes (width and height)
-  1. Select *Custom Size* in the *Paper* combo box and then enter the correct values in the *Width* and

Height fields.

If you have a lot of originals of the same size, it is convenient to create your own format with these values.

2. Start scanning by pressing the  button.

If no standard format exists of the size required - you can create it yourself using the *Preferences* dialog > *Papers* > *Add* button.

CASE 3  You only know one size – either width or height.

1. Select *Custom Size* in the *Paper* combo box, and then enter the known size in the corresponding field (*Width* or *Height*). Then press the *Auto* button next to the unknown size.

2. Start scanning by pressing the  button.

First pre-scanning is executed to detect the unknown size, and then the scanning itself is performed.

When one of the *Auto* buttons is pressed or in the *Paper* combo box auto-detecting method is chosen, the procedure for defining size will be performed for each of the loaded originals. If you want to define size one-time, use the *Retrieve* button.

If you do not want to perform two passes through the scanner, you can measure your original using the scanner ruler, and then enter the values as described in case 2.

CASE 4  You don't know any of the original's sizes.

1. Choose *Auto* from the *Paper* combo box.

2. Start scanning by pressing the  button. First the pre-scanning is executed to detect unknown sizes, and then the scanning itself. The size values detected during pre-scanning are displayed in the corresponding fields. If a format for this size already exists, it will be displayed in the *Paper* combo box.

If you do not want to perform two passes through the scanner, you can measure your original using the scanner ruler, and then enter the values as described in case 2.

CASE 5  You know the width but not the height and you need to feed the scanner using the height axis. In this case use detecting height automatically (as described in case 3), this will require two passes through the scanner. To avoid this and also save scanning time you should use the *Fixed Width* example.

This method is designed to scan originals that have similar widths but different height.

1. Choose *Fixed Width* from the *Paper* combo box.

2. Start scanning by pressing the  button.

The resulting image will have the same height as the original.

CASE 6  You are only interested in a part of the original; there is no need for you to scan the whole original.

1. Execute pre-scanning by pressing the  button.
2. Mark out the area that you want to scan by left click and drag area of interest.
3. Finally use the scan fragment button  to scan the selected area.

It's preferable to load thick originals by centre to avoid skewing. Loading thick originals by side could damage your scanner.

Tune selected scan mode

Each scan mode comes with settings that influence the resulting raster image. You can find the settings of colour modes in the *Colour setup* tab. *Palette* mode comes with some particular settings located in the *Palette* tab. All colour channels of an

image are available regardless of colour scan mode chosen. This is possible, because settings are applied to the images in the scanner colour presentation, which has all three channels. All monochrome modes are tuned using the *B/W settings* tab.

The influence of the current settings on the resulting image is evaluated using pre-scanning, which is performed at a lower resolution. You should also perform visual control when tuning. After you have changed settings, the program performs pre-scanning automatically to display changes.

When you use settings prepared for a particular original type, pre-scanning is not needed.

After pre-scanning is executed, the original is displayed in reduced size in the WiseScan pane. The fragment captured in the selection frame is displayed in the main program window. You can view any image part in the program window. To do this, move the preview frame to the desired image fragment, and pre-scanning will be executed automatically.

You can only apply increased or reduced size and scale to the display and pan in the program window when pre-scanning images.

Pre-scanning is executed automatically if any settings located in the tabs *B/W settings* or *Colour setup* have been changed. This will affect the position of the preview frame that defines the fragment displayed in the main program window.

After changing the original size, scanning mode or resolution, the preview frame moves to the upper part of your original.

When pre-scanning is executed, the image is fed into the program window gradually as the original passes through the scanner. If you are not satisfied with the result you can interrupt scanning at any time using the **Stop**  button.

When you've opted to detect the original sizes automatically or are using the adaptive palette calculation methods pre-scanning is executed automatically.

How to perform pre-scanning:

1. Define the required settings in the WiseScan dialog.

2. Execute pre-scanning (the  button) and visually confirm the result.

If you are satisfied with the results, you can start scanning using the  button. Otherwise, continue to change setting until you get a satisfactory result and then execute scanning.

Tune B/W threshold mode

You can adjust this mode using the *Threshold* slider located in the *B/W threshold* tab. Moving this slider; you set the threshold value for converting an image into B/W. When scanning originals of different types, you need to change this value. Use pre-

scanning to choose this value – press the  button. If some details are missing (information becomes white points), you need to reduce the threshold value by moving the slider to the left. If the image looks too dark (background information starts filling the image with black points), you need to increase this value.

Tune Palette mode

Working with the settings in the *Colour setup* tab are common for all colour scan modes, and it is described on page *Setting RGB mode*. Some settings that are relevant to palette calculation methods are particular for this mode, therefore they are described below.

When scanning in Palette mode, conversion into indexed mode is performed using different methods. You can select the correct method in the *Palette* tab.

The simplest method is linear. When selected, a common fixed palette is used for conversion of all images.

When you scan originals containing many colours (for example, photos) it's better to select the *Photos* method. Using this method, you obtain an indexed image containing the maximum number of colours.

If your original contains less than 256 colours, it's advisable to select the *Map* method. In the *Colour number* field you should enter the number of colours already displayed, but adding few extra.

When the methods *Map* and *Photos* are used, first pre-scanning is executed to calculate the palette. The scanning is then done using this calculated palette based on the image from the pre-scan.

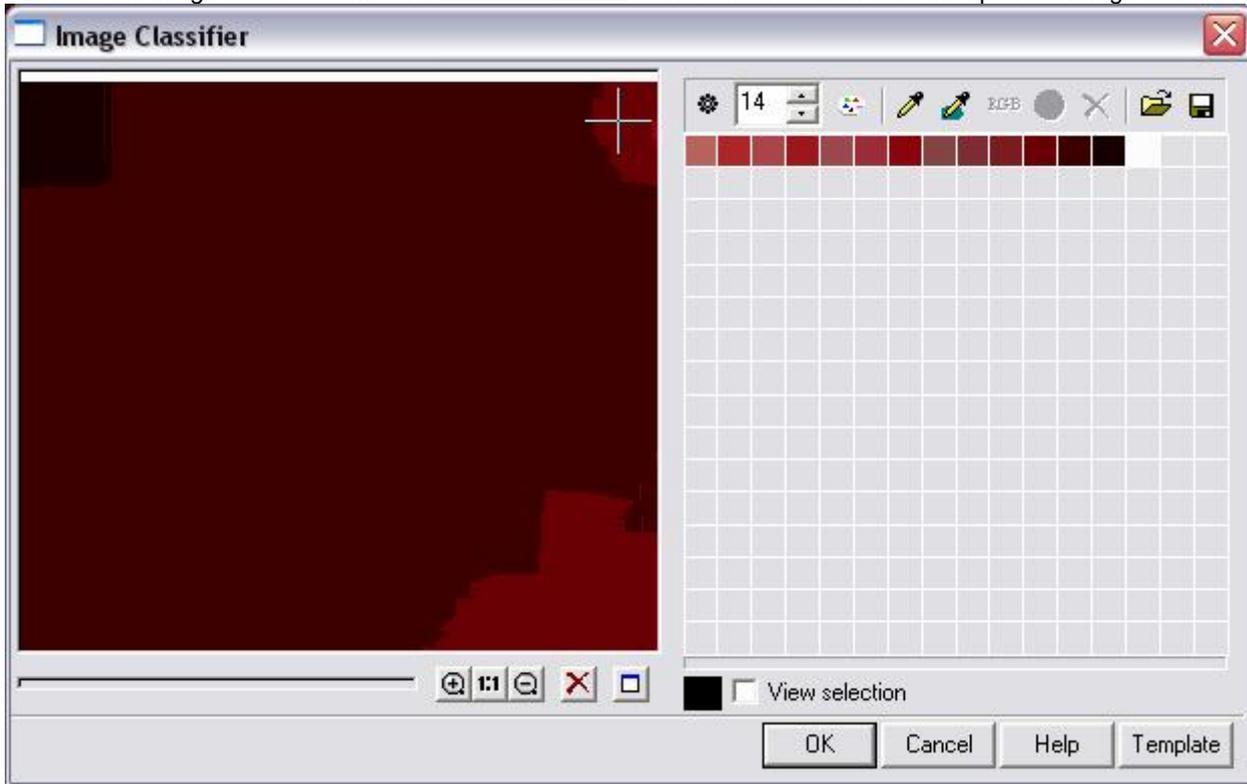
The most correct method to get an indexed image on the basis of the original with a limited colour number is using *Classified colours*; however this method requires the palette to be prepared in a specific format. Read about this method in the following paragraph.

How to create palette for Classified colours

1. Select an original that represents a typical colour original, and then scan it in RGB mode setting default values for colour setting parameters (do not change settings for brightness, gamma and do not use filters)



2. Start the *Image classifier* command in the Colour toolbar. This will open the Image classifier



3. To define a number of colours in the palette you can use one out of two methods; press the  button to calculate the palette automatically or enter the number of colours in the corresponding field. Then press  pallet button to show the result

4. To achieve required result you can use the editing tools for the palette (merging, deleting and reassigning colour values), observing the result in the document window as you edit. To view a selected colour – turn on the *Highlight* option.

5. Save the palette to a file with the Save  button.

Now, to use the created palette during scanning, specify the path to this palette in the field *Load LUT-file*.

Classified Colours

When scanning in *Palette* mode, you can select one of the methods to be used for converting images to indexed mode. The methods are divided into two categories. Those belonging to the first category reduce colour number using a palette that is calculated on the basis of the current original (adaptive methods) or using a common palette. The template rules – *Linear*, *Photography* or *Map* belong to the first category.

A method that belongs to the second category is *Classified colours*; and this method also reduces the colour numbers contained in the original. The key component in this method is a palette of a special format, which keeps information on the correspondence of colour in RGB-space versus the palette colours.

The palette is created on the basis on a true colour (RGB) image using a special editor.

All possible colours in RGB-space can be presented by a specific position on a cube further sub-divided into smaller cubes. Each sub-cube holds a finite number of similar colours. The *Palette Editor* is used to classify the colours in RGB-space, i.e. specify which palette colour will be associated with the colours from a particular cube.

Since close colours usually get into the same cube, their dots obtain the same colour in the indexed image. This allows using one palette file when scanning images that have a similar colour profile.

Please note that due to the fact that all colours are based on more or less influence (more or less colour) from three basic colours (red, green and blue) a scanned image may not be quick to colour classify. If the occurrence of red in a blue colour is larger than the occurrence of green you may find that the colour classifier wants to merge this blue colour with a red definition, thus creating a speckled pallet of red dots in your ocean.

Raster images scanned with one palette file can be further processed using the same settings. For example, they can be binarized and separated by colour with only one command run.

The advantages of the *Classified colours* method:

- scanning results are predictable;
- all images scanned with the similar palette file will have the same palette and colour profile;
- allows getting uniform objects;
- do not require pre-scanning;
- palettes can be saved for future use.

Features:

- you need to prepare palette prior to use;
- a specific palette must be used for each type of colour originals.

Tune RGB mode

Parameters for tuning this mode are located in the *Colour setup* tab, where you can make the following adjustments:

- brightness and contrast;
- saturation and colour hue;
- colour balance;
- gamma;
- points of "black" and "white".

How to change brightness and contrast

Moving these sliders causes a linear change of brightness and contrast. To increase brightness move the slider to the right, to reduce brightness – move it left. Moving the contrast slider to the right increases its value, moving it left – decreases it. To change brightness nonlinearly you can use the gamma function (described below).

How to change saturation and colour hue

Using the *Saturation* slider you can change the saturation of all colours. To reduce the saturation move the slider to the left, to increase saturation – move it right. To change colour hue for all colours; use the appropriate slider. If you enter a positive value, hue is changed clockwise and if you enter a negative value – the hue is changed counter clockwise.

How to change colour balance

Each of the three sliders is responsible for one out of three colour components. Moving their positions either increases or reduces the "weight" of each component.

How to set gamma value

1. From the *Channels* list select one to process. To work with all channels; choose Master.
2. Place your cursor on the needed part of the curve and press the left mouse button. Then keeping the button pressed, modify the curve to get the required result. If you already know the appropriate gamma value – enter this value in the *Gamma* field.
3. To view the way a new gamma value influences the resulting image, execute pre-scanning by pressing the *Apply* button. If you want pre-scanning to be started automatically whenever you have changed the curve or entered a new value –select the *View* checkbox.

Why do we need to change gamma

You need to tune gamma to lighten or darken a particular colour range on the image.

All the three colour channels can be modified as one or separately. You increase gamma the gamma value to lighten the image and reduce gamma value to darken the image. For example, if you scan a blue sea using a reduced gamma value – the sea will turn dark blue and conversely increasing gamma will turn it light blue.

Which tool is best for changing brightness and contrast?

There are two templates for changing image brightness – linear and non-linear. In the program they are implemented by the commands *Brightness/Contrast* (linear); *Levels*, *Gamma* (non-linear). When using linear templates, the brightness of each element is increased by a fixed value. For example, if you enter the value 10 in the dialog of the *Brightness/Contrast*

command, then the brightness value of each pixel will be increased by 10. To reduce brightness you should enter a negative value, which then will be subtracted from the brightness value of the image elements.

Using a non-linear template using gamma-function – the new values are calculated according to a formula, in which input and output values as well as gamma value are presented. Gamma values smaller than 1 make the image darker and values greater than 1 make it lighter. Using gamma-correction you can darken and lighten desired colour ranges.

Using S-shaped curves may help solve typical problems with scanned images, namely when dark image parts look too dark containing few details, and light ones look too bright. You can compensate these faults by creating a curve as shown.

Using Post processing

Scanned images can be processed using the main program commands. Scripts are used to store a sequence of commands with parameters. Command files are created and edited with the *Script Studio* command.

The set of commands used to process images depends on the main program that WiseScan is connected with.

Here are the main operations that can be executed using scripts.

ACTION	COMMAND
- de-skewing a scanned original automatically	Deskew
- eliminating distortions of a framed original	4-point correction
- rotating by a specified angle	Rotate by 90, 180, 270
- Mirroring by X and / or Y-axes	Mirror by horizontal Mirror by vertical
- Fitting an image size to the closest paper format	Fit to closest paper
- Cropping empty margins automatically	Crop automatically
- Cropping by frame automatically	Crop by frame
- Smoothing	Smooth
- De-speckling	De-speckle
- Hole removing	Hole remover
- Separating by size	Separate by size
- Thinning and thickening	Thin, thicken
- Separating by colour	Separate by colour
- Binarization	Binarize
- Blurring	Blur
- Increasing sharpness	Unsharp mask
- Printing	

To process scanned images with command files, you need to turn on the *Process* checkbox and specify the path to the script.

If you want to specify path to an existing script, press the  button. In the dialog that appears – select the required script file.

To create a new script press the  button – the *Script Studio* dialog box appears. Select the desired commands from the list, and then move them with the mouse to the right pane of the dialog, representing your script. Command parameters appear when clicking “+” at command name. Save the created script to a file. Now you can start scanning.

For detail description of working with command files see the page *Script Studio*.

The course of script execution is shown in the *Post processing* tab of the result output field. If an error occurs during the processing of a file, this file is written to the list of *Unprocessed files*. Double-click on the file name to open it in the main program.

Commands to include with command file

Apart from selecting the right scan mode, you need to select operations for image post-processing. You create scripts depending on the type of original. Note; some commands can process certain images types (e.g. monochrome) only. Further, when you have created scripts for each type of original, you only will have to select the appropriate script.

Skewed images

An image may be skewed when it is loaded in scanner or while passing through the scan track. If you scan in monochrome mode, you can add the *Deskew auto* command to the command file.

Distorted image

It's hard to avoid distortions altogether even if scanner feeding mechanisms are built for great accuracy.

On a distorted image the rectangular frame may turn into parallel piped (both sides are distorted in the same way) or to a polygon.

To eliminate such distortions you can use the 4-point correction command.

This command only works with framed monochrome images. If your image is colour (for example, map), it can be corrected manually using the main program.

Moiré image

Scanning printed originals may bring some residue (moiré). For moiré suppression you can use image smoothing with further increasing sharpness.

To apply these operations on all acquired images add smoothing filter (Adaptive Blur command) to the script and then add the sharpening filter (Unsharp mask command).

Tips when saving images

When saving scanning results, you need to specify where to save the file, its name and format. You can specify local or network drives as well as FTP-server to save your file. Naturally, you must have authorization to write data to the specified path. For this, contact the local network or FTP-server Administrator.

File name is given automatically by the program according to the operator chosen method.

You select format depending on image type (colour or monochrome) and also the scope of future application for the file. If quality is your first priority you should select format that does not change the image, for example TIFF. If you want to obtain the minimum file size, use JPEG.

Specifying where to save

Specify where to save your images in the *Save as* field, for example, F:\RASTER\ or \\NETSERVER\RASTER. If you want to place resulting files on FTP, enter a string like ftp://LOGON:PASSWORD@PATH/TO/FOLDER, for example ftp://Leksey:superpassword@csoft.ru/files/.

Naming methods

Files can be named in different ways (selected in the *Save Settings* tab)

1. File name is combined from your input in the mask field plus an ordinary number, for example, drawbatch_028(.tif). Numerical number is specified in the *Number of chars* field. The number to start with is specified in the *From* field.
2. File name is created from variables. For example, if you use the variables DATE and TIME, you will get a file name like this: 0310202_18-07.

Format selection

If you do not have special requirements; you can select TIFF to save all the images (monochrome, indexed, colour).

By default, each image is saved to a separate file. If you decide it more practical to store all images in one file, you can take advantage of a multi-page file (*Save Settings* tab >checkbox *Multipage*); select either TIFF or PDF format. You can also add pages to existing multi-page files. To do this, specify the name of the required file in the *Mask* field.

When selecting format please note that some formats are intended for colour image storing, for example JPEG.

Image formats differs by compression type - "loss" or "lossless". JPEG format implies using "loss" compression will decrease the quality to some extent, but it will allow you to reduce the file size. The TIFF format implies using "lossless" compression, so this format does not change your image data, but the resulting file may be penalized by becoming rather large.

When saving 24-bit images, large files are usually created. This is not that critical for images of other types (monochrome, greyscale).

After you have selected save format; it may be necessary to define this format. To do this press the  button, located near the format list.

To set image quality when saving in JPEG, use the *JPG quality* parameter. The value 100 represents maximum quality, 1 represents the minimum quality.

There are some factors to be considered when choosing TIFF format. One of them is selecting the compression type which depends on the image type you are saving. Choose compression *Group 4* to save monochrome images and Packbits – for true colour images.

Selecting the TIFF format influences the speed of working with images (open and view) and it also defines if the image can be read by another computer or another raster editor. Do not choose Tiled if you intend to transfer the image to another company. The reason for this is that not every handling images program supports TIFF-images written as Tiled. To save in a format is compatible with other programs choose Striped organization with string size equal to 0. Also turn off the writing thumbnails to file (*Thumbnail* checkbox).

In the *Format* list set default value – Intel. It defines byte-order element in file.

Format selection – pros & cons

This table contains some advice about how to select formats when saving colour images. For monochrome images TIFF Group 4 compression is most often optimal TIFF Group 4 is also the standard FAX transmission protocol and as such a global format.

CASE	FORMA T		FEATURES
● Printing images;	TIFF		Image quality 100 % loss-less
● Storing images in electronic archive;			Large files when saving RGB-images
● processing images (e.g., binarization, correction, vectorization)			
● Reproduction for documentation or for transferring images by e-mail	PDF		1. Reduced image file if stored at low resolution 2. Easily exchanged and viewed using free software
			1. Very large files when stored for reuse in editing or conversion 2. Very slow operation due to file size
● Transferring images by e-mail or publishing on WWW	JPEG		Considerably reduces image files
			1. Image quality decreases 2. When editing an image, each intermediate saving decreases quality

Scan in batch mode

If you use batch scanning the scanning starts immediately after an original has been loaded into the scanner.

During the waiting period when operator is loading another original, the dialog with the *Cancel* button is displayed. You can stop batch scanning anytime by pressing this button.

Make necessary settings to scan a set of originals. Since all originals will be scanned with the same settings you should sort them before you start scanning.

Start scanning by pressing the button  in the WiseScan dialog.

To stop batch scanning, press the *Cancel*  button.

Direct Supported Colortrac SmartLF scanner models

Note: This list is subject to changes – please refer to your local Colortrac distributor.

Colortrac SmartLF scanners

"SmartLF 4080M"

"SmartLF 4080C"

"SmartLF 4080E"