



ScanWorks for SmartLF User Manual

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1 Overview

ScanWorks has been designed to convert large format images retrieved by Colortrac SmartLF document scanners into digital form and store this on an attached computer - ***as easily as possible.***

ScanWorks represents a revolutionary software approach to managing the scan to file process for large format scanning. Unlike most other scanning software available today which use an 'adjust and rescan' method to perfect settings for more difficult originals, *ScanWorks* can do all this with a single scan by emulating scanner behavior on the computer. When the scan has been adjusted on-screen the scan (which is already on disk) is overwritten as the Save button is clicked. By activating the inline function these adjustments can be incorporated automatically in all further scans or saved as a Preset. This not only saves valuable time and boosts productivity but it also reduces wear and tear on the original document.

The concept of ScanWorks was arrived at by listening carefully to the needs of scanning professionals and continues to be enhanced regularly to accommodate the constantly changing requirements of the large format scanning market.

“ We hope that you too will find ScanWorks a pleasure to use.” – Peter de Winter-Brown (Sales & Marketing Director, Colortrac Ltd.)

1.1 *How to use this manual*

The manual is divided into five Chapters

Chapter 1. Overview (this section)

How to use this manual, the sections and coverage of the manual

Chapter 2. Software Installation and Graphical Interface –

The ScanWorkssystem requirements, software installation from the Colortrac CD and the ScanWorks Graphical User Interface with descriptions and locations of all the main controls

Chapter 3. Making your first SCAN –

The steps to making your first Colortrac SmartLF scan

Chapter 4. Advanced Scanning –

More Advanced Techniques – Image Controls

Chapter 5. Appendix –

Notes on the hardware installation, USB2, data speeds and file sizes.

Help and Assistance:

Throughout this manual you will see that some text appears in shaded blocks. These areas provide assistance in the form of the **QUICKSTART TIP** which is a summary of the main configuration steps, the **TIP** which is experienced based operator information for faster and more accurate scanning and a **NOTES** heading where you can find further explanatory detail.

2 ScanWorks Installation

2.1 System requirements for ScanWorks and SmartLF

The Colortrac SmartLF scanner sends data to the computer via a USB2 data connection. The critical computer specifications needed to achieve maximum SmartLF performance are as follows:

Operating system: Windows XP or Windows 2000

Processor: At least 2.8GHz, HT (Hyper Threading) processor

Memory: At least 512MB RAM

Data port: USB2 data port (see note below)

Notes:

1. The scan rate is proportional across the full range of resolutions supported by the scanner. Actual scan times will depend on the host system performance. Speeds quoted are for documents less than 16 in width (40.64 cm); wider documents scan half this speed. The quoted scan accuracy is valid for media up to 0.8mm thick and may vary depending on the operating environment and the type & thickness of media. SmartLF scanners are tested using a Mylar target at 20°C +/- 3°C, 60% +/- 10% RH with the media feed set to standard. Some advanced features may not be available in Windows 2000. Contact your supplier for advice on the optimum system configuration for your application. Colortrac Ltd reserves the right to change or amend specifications without notice. Colortrac and Smart LF are trademarks of Colortrac Ltd. All other trademarks are the property of their respective owners. Copyright © 2004 Colortrac Ltd.

2. Windows XP is a mandatory requirement to make available operation of the scanner from the control panel. For Windows 2000 users there may be limitations on the operational control available through the SmartLF control panel. This may change.

3. Connecting a USB1.1 device to a USB2 interface already connected to SmartLF will slow scanning performance dramatically. This is a limitation of the USB interface design and NOT SmartLF.

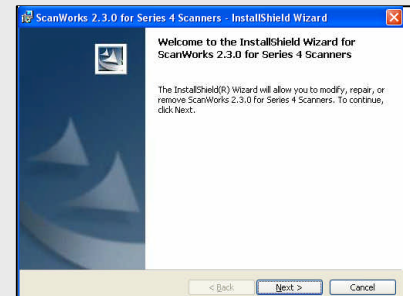
Display settings: The graphics resolution should be set to 1024 x 768 or higher and color depth to full-color, 24-bit color or 32-bit. A 17" monitor is the minimum size recommended for comfortable operation of the graphical user interface (GUI).

NOTE: Certain functions within ScanWorks are not consistent with the SmartLF design and are grayed out.

2.2 Software installation

Insert the Software Installation CD that ships with every scanner into the computer you intend to use with your new Colortrac SmartLF scanner. If the Software Installation Disk splash screen does not pop up right away you may need to right-mouse click and choose AutoPlay, or alternatively use Explorer to double-click the Launch.exe file in the root of this CD. Click *install software* and then proceed to select the operating system used on your computer.

NOTE: You will need to use Administrator privileges to first install ScanWorks. After installation, users with limited privileges will still be able to use the software but will not be able to remove or re-install the ScanWorks product.



2.3 Software registration

The ScanWorks application software is a cost option for SmartLF. Colortrac Ltd. operates a policy of continual product improvement. Normally, as updates and new versions become available these can be ordered and downloaded from Colortrac over the Internet or obtained from your local Colortrac SmartLF distributor. If an update copy of ScanWorks is required and needs to be sent by post then Colortrac will usually make a small charge for this service. Charges for bug correction releases will be at the discretion of Colortrac.

Colortrac will keep you informed of updates and new products unless you expressly wish not to be contacted. If you do not wish Colortrac or their representatives to contact you please check the last radio button before clicking and transmitting the form using the SEND button.

A copy of this manual and a browser based Frequently Asked Questions area (FAQs) is available on the Colortrac SmartLF website. For more help and advice or technical service assistance, please contact your local Colortrac SmartLF dealer or distributor.

www.colortrac.com www.smartlfscanner.com

* July 2004



The warranty and support of your Action Imaging Solutions product will start from the date on this form. If your product is not registered your warranty will start from the date your scanner left the factory

Colortrac
Our Business is Your Image

Home
Products
Downloads
Distributors
Events
Press
Support
Log In
About Us
Contact Us
Contact Form
Register Product

Your name: Colortrac Customer

Company: The Right Move Ltd

E mail:

Tel:

Fax:

Country:

Supplier

Purchase Date December 25th 2003

Product Colortrac 3680e

Serial No. (hardware only)

Who installed the product? ☒ Customer ☐ Distributor

Was the packaging damaged? ☐ Yes ☒ No

Did the product show any signs of damage? ☐ Yes ☒ No

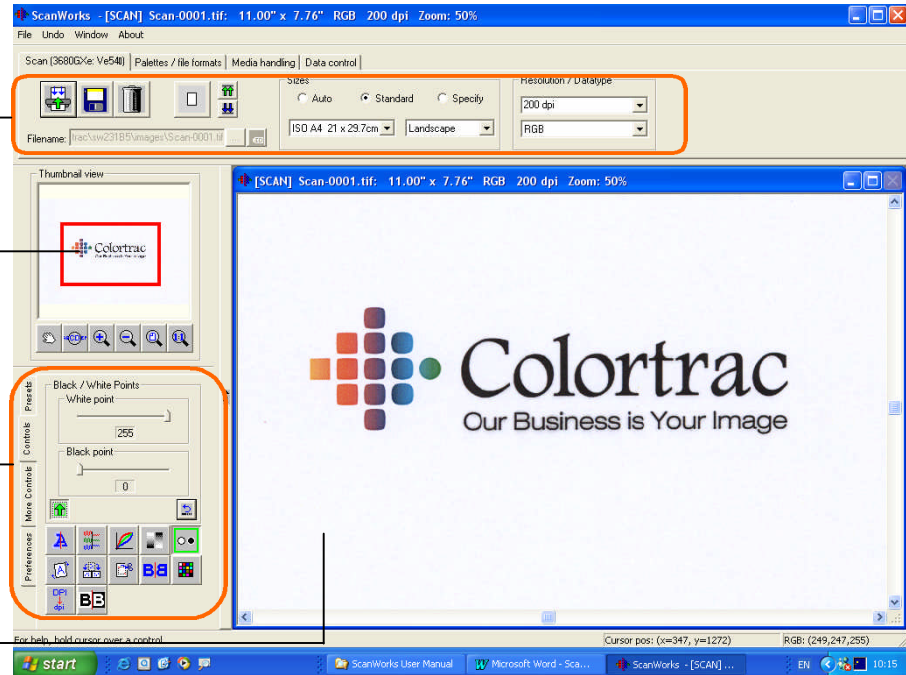
Did the product operate correctly on arrival? ☐ Yes ☒ No

Send

3 Getting Started with ScanWorks

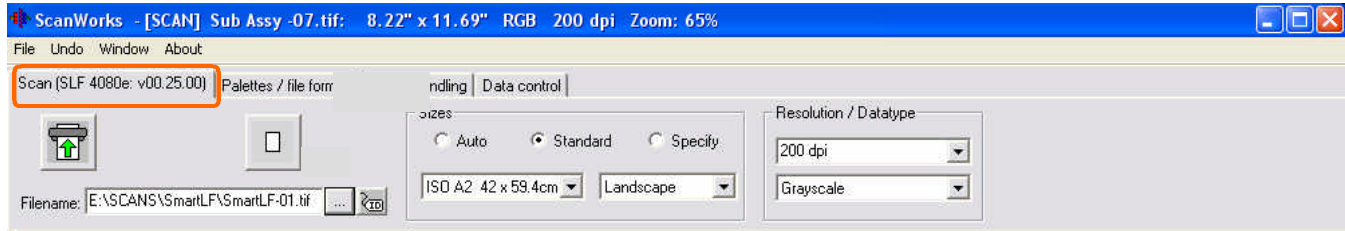
The ScanWorks user interface has four main areas.

- The scan configuration controls
- The overview window
- The editing control area
- The viewing desktop.



3.1 Scan Configuration Controls

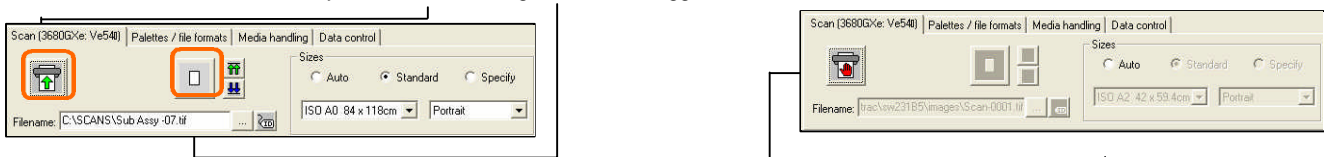
The Scan Configuration Control is split into the SCAN, PALETTES / FILE FORMATS, MEDIA HANDLING and DATA CONTROL tabs



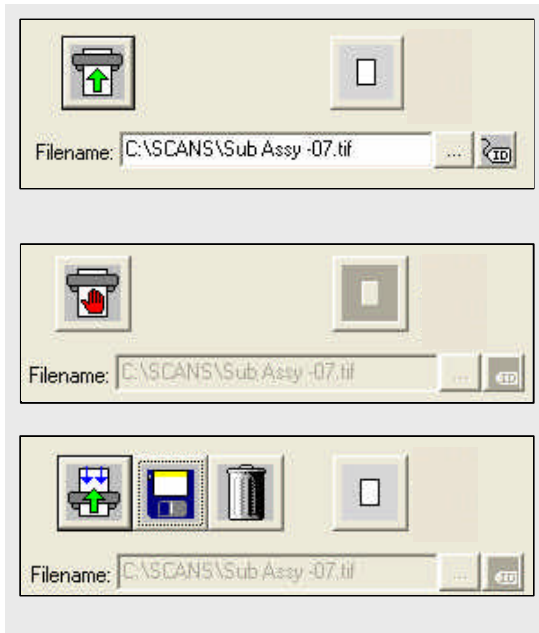
Scan Configuration Controls (ScanWorks v2.30 shown)

3.1.1 Scan

Before a scan has been started only the **Scan** and **Single or Batch**. Toggle buttons are visible in the control area.



The green **Scan** button has three functions. During scanning the **Scan** button icon will change to display a red **SCAN Stop** icon. Pressing it now will **STOP** the scanner. Work already displaying on the viewing desktop can be saved at this point. When the document has been scanned the green **Scan** icon will re-appear with the **Save** and **Delete** icons alongside. At this point the user has three options; to press **Save** and save the data, to press **Delete** and discard the data or to press **Scan** to Rescan the document again.



SCAN (F9 from the keyboard)

The file has been named and the user is ready to start scanning. NOTE that the Delete and Save icons are not present before the scan has been started. All information in the view desktop is true image data at the resolution set up in the scanner configuration controls. A full scan and not a prescan has been made.

STOP (F10 from the keyboard)

During scanning, the scanner can be stopped by clicking the *SCAN Stop* icon on the ScanWorks interface, or by pressing the STOP/FWD/EJECT button on the SmartLF scanner.

RESCAN (F9), SAVE(F11) or DELETE (F12 from the keyboard)


When the scan has completed the user has the option to Rescan, Save or Delete the current image on the viewing desktop

Until the Save button is pressed all Colortrac SmartLF scanners store scan data using a temporary file name. Pressing Save instructs the operating system to apply the name provided by the user to scanned data. Because all of the data is already saved by the time the document stops moving ScanWorks control is returned to the operator very quickly after the Save icon is pressed (*except when the scan has been modified post-scan*).

TIP: The scanner model **number** and internal program (firmware) release is shown in brackets to the right of the word Scan on the first tab of the scan configuration controls. This information will only be visible when the scanner is switched on and ready to scan.


3.1.2 Filename

Manual and Simple Increment

Press the  icon to manually name your file. This button also permits the operator to browse, create folders and even rename files via the right-mouse click menu.

In single scan mode the Colortrac SmartLF scanner will require the user to input the file name before pressing *Scan* - *unless* the user starts the automatic naming process by ending the name with a hyphen followed by a numeric sequence. For example a scan file name typed in as **bracket-03** and then Saved would cause ScanWorks to automatically generate the next file name as **bracket-04**. This will continue until ScanWorks detects an identical filename in the same directory.

4-Tier Auto Increment

Press the  icon to configure automatic incremental numbering for your scan filename.

If you used the **-nn** file naming format above, pressing this icon will display the 4-tier file naming dialogue. Use this feature to create counter-driven names for your scan files. For example: **contract-02drawing-49** can be generated by inputting the appropriate start and end point for each counter. The counters work in a similar way to vehicle odometers except that the number at which any higher order counter will be advanced is not limited to 10. This feature can be used with single scan or *Batch* scanning operations (see next section).

QUICKSTART TIP: Press the ... icon and type a name

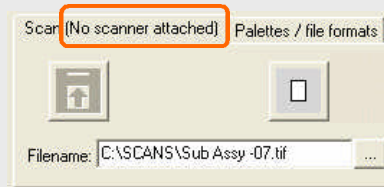
3.1.3 Paper Motion Controls



Pressing this button toggles its operation between *manual start* scan mode and *automatic start* scan mode - often called *Batch* scanning mode. In *Batch* scanning mode ScanWorks will automatically begin scanning the second and all following documents without the user pressing the *Scan* icon. The user only needs to load each document and ScanWorks will take over the naming, saving and eject processes automatically. Batch Scanning is dealt with in more detail later in the manual.



SmartLF has a multi-function STOP/FORWARD/EJECT button on the scanner itself which will stop the scanner if it is scanning, move the document forward prior to scanning or eject the document if it has already been stopped. There is no REWIND facility with SmartLF.



If ScanWorks shows the Scan button, and Eject buttons lit, then the scanner is ready to be used. If the scanner is switched off or not connected to the computer, 'No scanner attached' will be displayed and the *Scan* button will be grayed out.



Scanner icon displayed during Batch Mode (automatic mode)

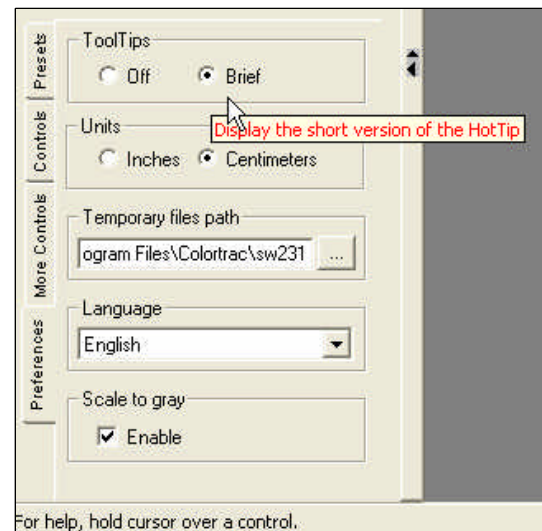
QUICKSTART TIP: Use manual start mode (not automatic batch mode) to begin scanning

3.1.4 ScanWorks Units of operation (mm or inches) – Preferences Tab

The Preferences Preset provides user access to:

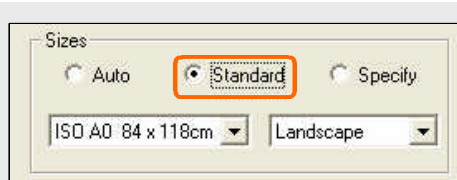
- ToolTips**.....Balloon help giving basic guidance on the control or button under or near the current cursor position
- Units**.....Set ScanWorks to Metric or Inches. All measurement will display and require input using these units.
- Temporary files path** This is the location reserved for all temporary storage required by ScanWorks.
- Language**.....Language setting for ScanWorks
A language change becomes effective after a program restart.
- Scale to gray**For Black and White scanning.
Makes small detail visible when viewing the whole drawing onscreen.

Chinese (Simplified)
English
French
German
Italian
Japanese
Korean
Polish
Russian
Spanish



QUICKSTART TIP: Always use the local hard disk as the temporary drive. Colortrac also recommend for all network based scanning that scans be stored first locally and then transferred to the network afterwards.

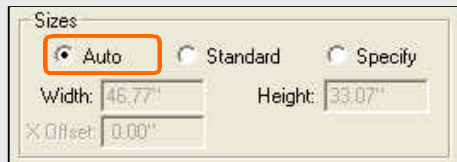
3.1.5 Paper Size Controls



The 'Standard' radio button is selected and highlighted with an orange box. Below the radio buttons, the 'ISO A0 84 x 118cm' dropdown menu is set to 'Landscape'.

Standard size

Use the browse box to select the paper size closest to the size of the document you are about to scan. Paper sizes larger than the physical document will be cropped on length automatically by the scanner and can be width cropped by the operator as required. Paper sizes set smaller than the physical document will capture this area of the document from the point at which the scanner starts moving.



The 'Auto' radio button is selected and highlighted with an orange box. The 'Width' field shows '46.77"', 'Height' shows '33.07"', and 'X Offset' shows '0.00"'. The 'Standard' and 'Specify' radio buttons are unselected.

Automatic size

Check this button to have the scanner automatically detect the document size. Note that for some compressed file formats a full prescan will be required prior to beginning the scan. For most formats only a short document feed is used to find the width of the document with the length detected as the scan completes. Documents can be placed anywhere along the throat of the scanner as long as one of the document sensors is activated



The 'Specify' radio button is selected and highlighted with an orange box. The 'Width' field shows '46.77"', 'Height' shows '33.07"', and 'Y Offset' shows '0.00"'. The 'Auto' and 'Standard' radio buttons are unselected.

Specify size

Useful for non-standard paper sizes where automatic sizing may be too slow. Also for fragile documents it can be better to specify a larger size and then manually crop it using the editing tools rather than selecting *Auto*. *Auto* will prescan & partially rewind the document to determine its width before scanning it.

QUICKSTART TIP: Change Paper size to Standard and select the same or next size up. Use the ruler when *Specifying* paper size

3.1.6 Resolution

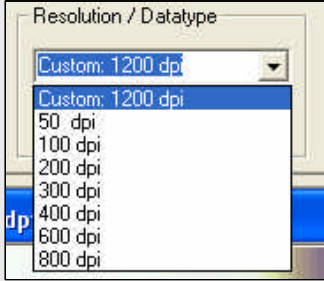
The Colortrac SmartLF scanner is available in three model types - 4080e, 4080c and 4080m. They vary only according to their colour performance. The model number is related to these two parameters in the following way. The Colortrac SmartLF 4080e is used here as an example.

4080e/c/m

denotes *full colour speed (e)*, *low end colour speed(c)*, *monochrome only(m)*

the optical resolution doubled and divided by ten
(In this example optical resolution is 400 dpi)

The active scan width of the scanner in inches
(In this example 40" or 1016mm)

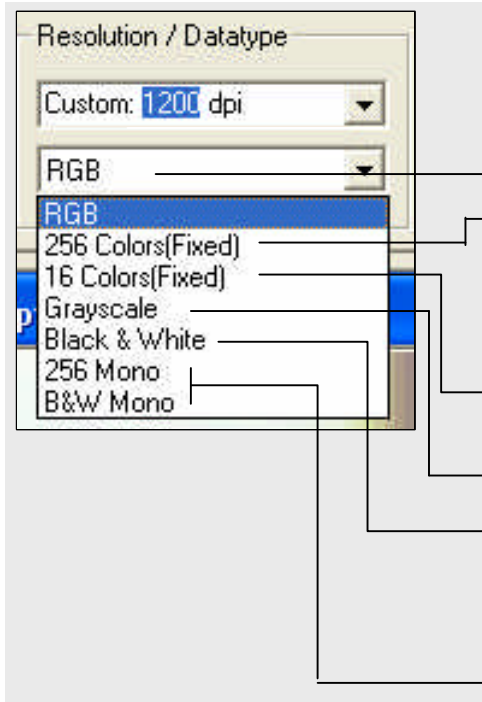


PRESET scanner resolutions can be selected by the user from (optical resolution / 8 *) dpi up to twice the optical resolution (in this example 800 dpi). Higher interpolated resolutions can be generated using the custom settings entry up to a maximum of 2400 dpi (6 times the optical resolution) using interpolation techniques. High interpolated resolutions can place extra demand on computer resources.

* Minimum selectable resolution is 50 dpi

QUICKSTART TIP: Answer the question: “ What resolution do I need for this scan?”

3.1.7 DataType



DataType describes how the color mode of the Colortrac SmartLF scanner is set. For example as a full color device; a limited color scanner, a grayscale or a simple black and white scanner. This is also known as the **Color Depth** of the image. All Colortrac SmartLF scanners use 32-bit primary point data capture as the basis for all color scanning.

RGB means full photographic quality color. This is sometimes referred to as 24-bit or 16 million colors.

256 colors (available as fixed or automatically derived). Useful for maps and schematic drawings and posters where fewer colors can be used without degrading the appearance of the image. Images created with this mode will be approximately 1/3rd the size of RGB scans (uncompressed).

16 color (available as fixed or automatically derived). Useful for maps where there are only perhaps 4 colors. Images created with this mode are 1/6th the size of RGB scans (uncompressed).

Grayscale creates 256 shades from white to black. This file will be the same byte size as a 256 color file.

Black and White reduces an image to a single color, black. All other colors or shades of gray are turned off or discarded. The level at which data is accepted is called the threshold. *Adaptive Thresholding* is an advanced technique to deal with large areas of original where there is low contrast making normal basic thresholding less effective.

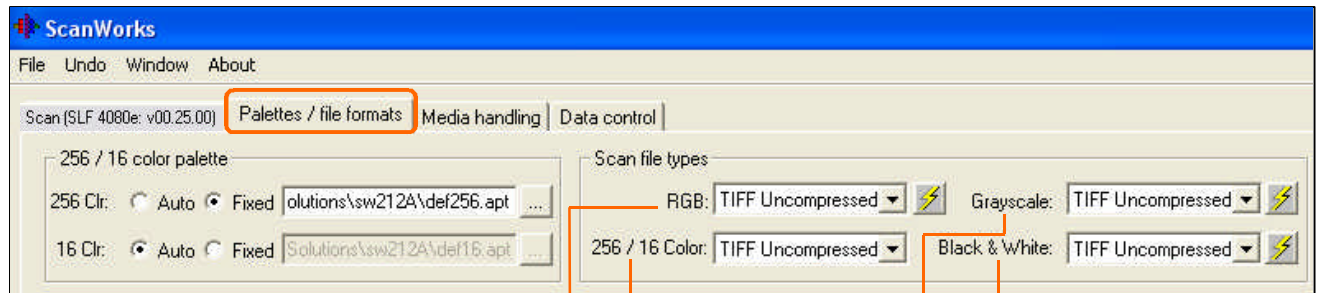
256 Mono and B&W Mono produce the same results as grayscale and Black & White except that they are derived by taking the digital information from a single color channel (green). The effect of this is to triple the scan speed of the scanner. Do not use for black and white scans for images containing green information, as this may not scan properly.

QUICKSTART TIP: Change DataType to RGB

3.2 File Format / palettes

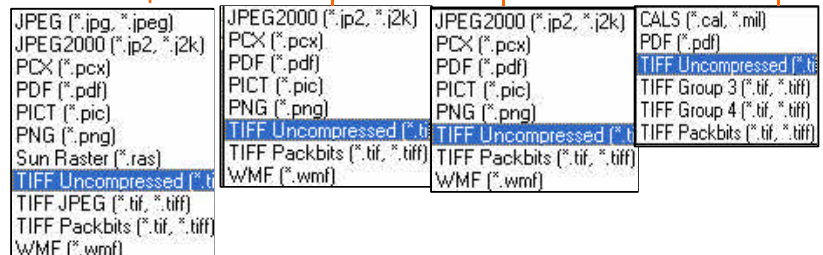
3.2.1 File Format

ScanWorks uses TIFF (Tagged Image File Format) as its default file format. This file format can be used to store digital scan information from small binary black and white images (10-20MB) to large full color images (600MB plus). Not all formats are available for all color modes. Clicking on the second tab, *File formats / palettes*, reveals an area where the file format for each DataType (Color Depth) choice can be set. See the Appendix for more information on Turbo Mode.



Use the scroll button control at the right-hand side of the DataType boxes to pull down the formats available. **NOTE:** TIFF is available for all DataTypes.

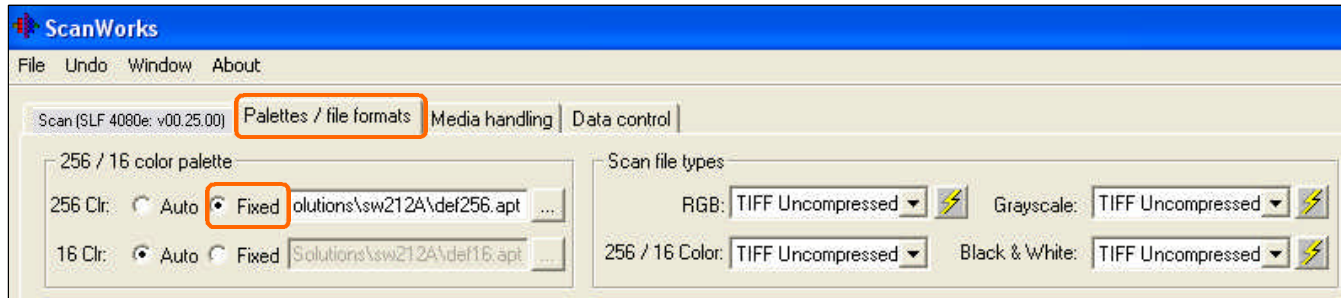
The settings used in one or all of these menus can be stored in ScanWorks Presets.



QUICKSTART TIP: Change RGB Scan file type to TIFF

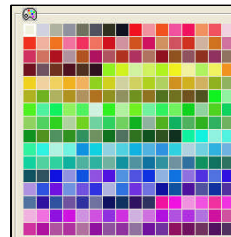
3.2.2 Palettes – Fixed (in-line processing)

The Palette section of the second tab is dealt with here and after File Format (3.2.1) because it is less important for users who are just getting started with color scanning. Palettes enable a scanner to produce image files with fewer overall colors. A full color scan with 16.7 million colors is wasteful of disk space to capture a map with just 32 base colors. Fixed palettes assign the actual color in the original to the nearest color in the palette. The fixed palette may often be unsuitable for a map with many similar colors. Colortrac SmartLF supports 256 and 16 fixed color palettes.



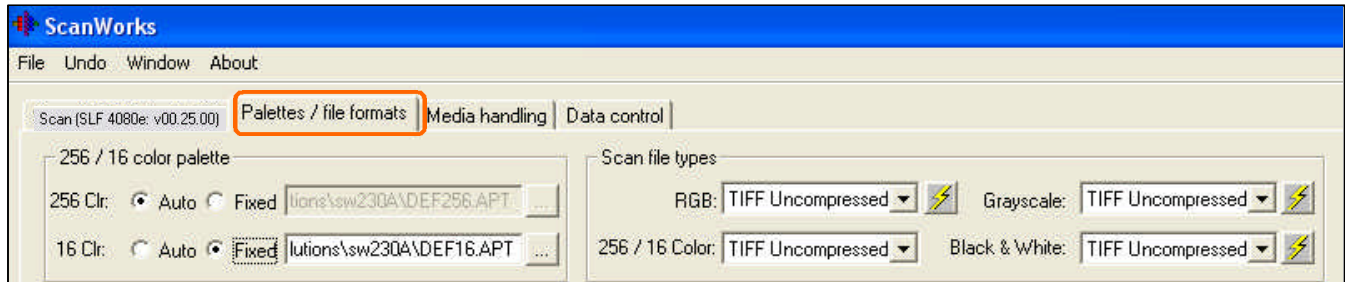
Note that the sea area of the map is speckled with blues of quite different intensity. This is because the scanner is taking the color at this point and forcing it into the best category it has. Fixed palette scanning is most effective when scanning a set of documents for which a palette has been derived automatically – see next section.

NOTE: Inline means processed by the scanner instead of in the computer. This can benefit slower computer systems.

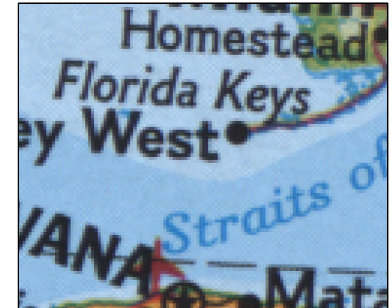
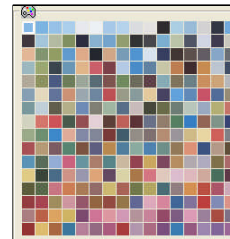


3.2.3 Palettes – Auto (in-line processing)

When the scanner is set for Auto palette the resulting scanned colors are much closer to the colors in the original. For best results a 16 color map will need to be scanned using a 256 color palette because pure colors are never pure and begin to fade and change slightly over time.



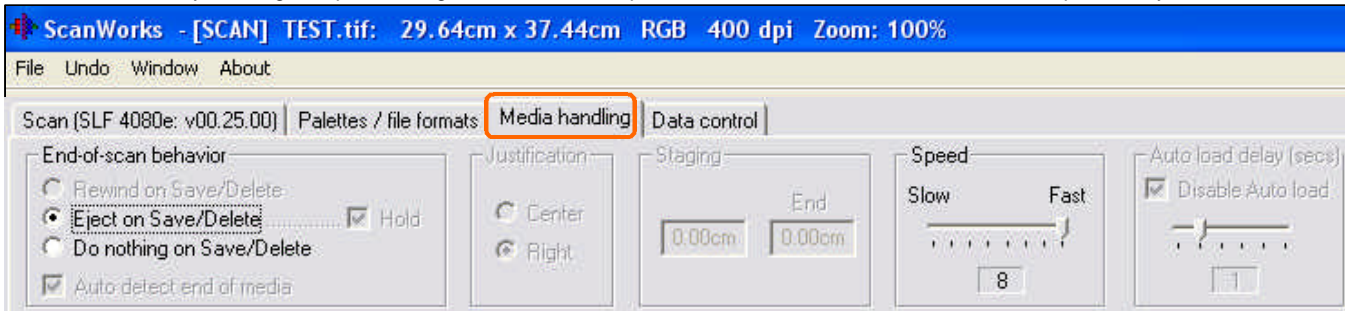
Note that the scan color quality produced when the scanner carries out an autopaletted scan is much better than the result from the fixed palette scan. The scanner achieves this by first taking a low-resolution full color prescan of the original. From the prescan, it analyses the colors to find out which ones are important and considers their coverage of the image area. These details are then processed to make the new optimized palette. The palette is then downloaded to the scanner and used for the final scan at the resolution set by the user. The result is a much closer and finely balanced image that is nearly as good as full color but occupying 66% less storage space. Palettes generated from an auto palette scan can be saved as the fixed palette using the “Convert to” tool dialog. Useful for scanning multiple documents that are similar such as quad maps. No need to need to auto palette each one separately!



TIP: Always set DataType for 256 colors(Auto) or 16 colors(Auto) when using auto-palettting

3.3 Media handling

This tab controls whether the scanner should eject the media after the operator *SAVES* or *DELETES* a scan. It is also the tab where the speed of the scanner can be controlled to match the performance of the computer. For the best scanning results, rapid stopping and starting of the scanner should be avoided by lowering the speed setting of the scanner if required. This will not affect overall scan time and productivity.



End of scan behavior

Rewind on Save/Delete Not available for SmartLF

Eject on Save/Delete After the scan completes clicking Save or Delete will Eject the document to the rear of the scanner

Do nothing on Save/Delete After the scan completes clicking Save or Delete will leave the document at its current position

Auto detect end of media Available when Do nothing selected. The scanner will detect the end of the media

For most file formats and a paper length set oversize the scanner will produce a digital document matching the physical length of the document by detecting its length as it scans. The width will remain as set. No prescan is needed. Scanner behavior is identical for Standard or User defined sizes.

For most file formats and Auto paper size selected the scanner will determine first the width and detect the document length as the scan is completed. No prescan is required.

For some file formats auto detect has no effect and ScanWorks must either be used with a known paper size or paper size must be determined prior to the scan proper through the automatic Prescan operation. Autosize Prescan is carried out by ScanWorks when AutoSize is selected for some formats that involve compression, see Table on page 24. Note that in V230 Hold and Detect are overridden if the user specifies document size in excess of the physical document size.

Hold checked The document FORWARD WINDS in scan direction after an *EJECT* but remains gripped in the scanner

Hold uncheckedThe document is released by the scanner after an *EJECT* and the document falls to the floor or tray

Justification

CenterNot available with SmartLF. SmartLF always side justifies the document.

Side.....Scan from the side using the raised edge (good for smaller documents)

Staging.....Not adjustable/ available in SmartLF

Speed

Speed 1.....(slowest)

Speed 8.....(fastest)

Alter the scan speed if necessary to keep the scanner running continuously and to avoid stop/ start scanning which can lead to poor image quality through the production of image artifacts, blurs or spectrum effects.

Auto load delay.....Not adjustable/ available in SmartLF.

Disable auto load Not adjustable/ available in SmartLF

QUICKSTART TIP: Click Do nothing, check HOLD, FAST

End of Media / Autosize Behavior Table for ScanWorks:

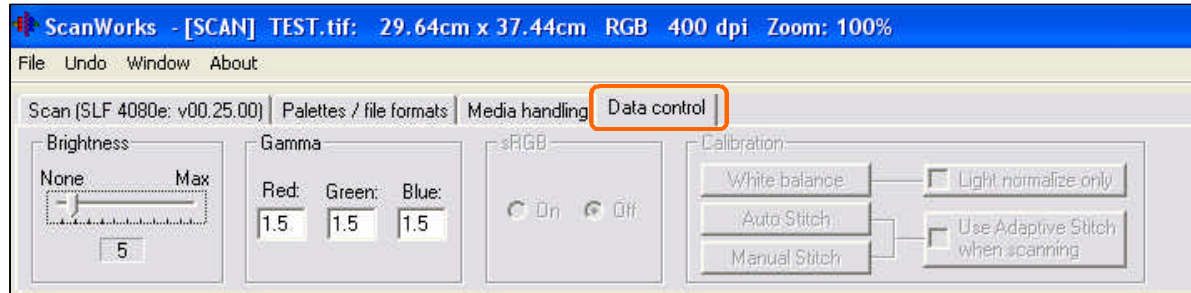
| Format | RGB | 256 color | 16 color | Grayscale | Black and White |
|---------------|-----|-----------|----------|-----------|-----------------|
| CALS | | | | | |
| JPEG | | | | | |
| JPEG2K | | | | | |
| PCX | | | | | |
| PDF | | | | | |
| PICT | | | | | |
| PNG | | | | | |
| SUN | | | | | |
| TIFF G3 | | | | | |
| TIFF G4 | | | | | |
| TIFF JPEG | | | | | |
| TIFF PACKBITS | | | | | |
| TIFF RAW | | | | | |
| WMF | | | | | |

- **Green:** Line count is updated in real time (just like uncompressed tiff).
- **Red:** Behaves as before, either filling the remainder of scan with white or prescanning entire document for autosize.

Note that PNG (Portable Network Graphics) files, a popular Microsoft graphics standard and supported by all the major Microsoft applications, can be used with full autosize or end of media detect support. This means that for an unknown size of document a full-length Prescan is NEVER necessary.

3.4 Data control (the scanner internal settings)

This tab provides control of *Brightness*, *Gamma* and selection of raw RGB scanning or sRGB (standardized RGB) scanning. Use of sRGB provides corrected color output suitable for standard Windows peripherals like monitors and color printers. Certain colors may scan better with sRGB turned off.



Brightness Controls the amount of white in the scanned image (default value depends on the scanner model)

Gamma Controls the depth of the colors seen by the scanner (default values are 1.5, 1.5, 1.5 for R G and B)

NOTE: The scanner Brightness and Gamma settings are not intended to be changed regularly by the user and have been set to the optimum values for the machine.

Calibration

White Balance Automatic

Light normalize only Automatic

Auto Stitch Automatic

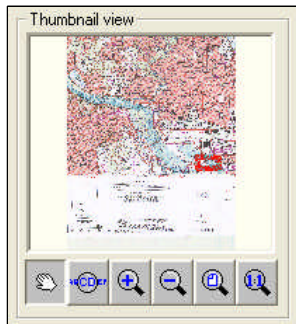
Manual stitch Automatic

Use Adaptive Stitch Automatic

QUICKSTART TIP: SmartLF needs no warm-up time to reach maximum colour performance

4 The Thumbnail Window

ScanWorks will always make the scanned image fit the *Thumbnail view* window. At the same time ScanWorks will begin to display the same scan data filling the *Desktop window*. If the *Zoom in* controls under the Overview window are used the image displaying in the *Desktop window* will enlarge but the image size in the Overview window will not change. After the first zoom a red rectangular *Zoom Indicator* will be displayed in the *Overview window* indicating the section of the main image which has been enlarged and now fills the *Desktop window*. As the zoom is repeated the Desktop view becomes +larger while the *Zoom Indicator* shrinks.



1:1 zoom

No magnification (1 pixel in the file is displayed as 1 pixel on the screen)

Fit to Window

Fits the image to the window (sometimes call zoom extents) – default zoom

- zoom

Reduce magnification or zoom out (Zoom indicator gets larger)

+ zoom

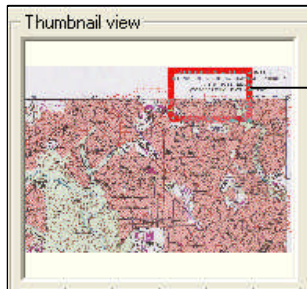
Magnify the image or zoom in (Zoom indicator gets smaller)

Loupe

Use to magnify the scanner image in the desktop viewer window

Hand pan icon

Move in any direction.

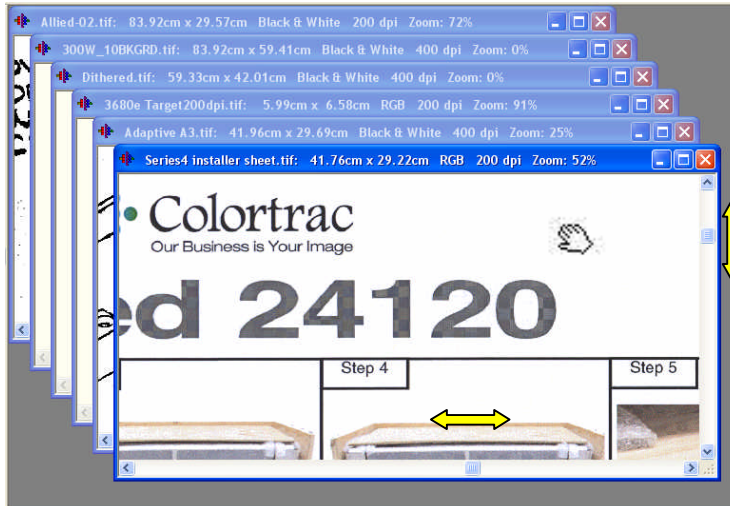


Zoom Indicator pan


Right-click the zoom indicator and drag to pan across the scanned image (fastest pan method).. Also click and drag out a square (marquee) in the thumbnail view window to have that part of the image display in the *Viewing Desktop window*.

5 The Viewing Desktop

The ScanWorks *Viewing Desktop* window is a 'Live' view of the original image at the resolution set in the scan configuration controls. This means that the scan can be inspected for completeness (no missing edges) in the first view of the original as it appears onscreen. Next it can be viewed at 1:1 to very rapidly quality check the image – all in one single operation. This is a Colortrac SmartLF productivity feature.



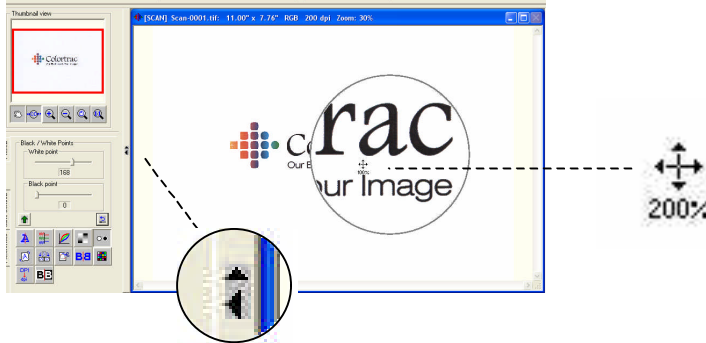
All scan data is directed immediately to the viewing desktop where it can be inspected, cropped, rotated or deskewed using the *Editing Controls*.

Use the horizontal and vertical sliders at the sides of the *Viewing Desktop* to navigate around the scanned image. Alternatively, click the  control below the thumbnail view to activate the hand-panning tool. The Zoom controls can be used with the hand-panning tool.

Use the hand pan to move the zoomed image in any direction. Use the left click to zoom in and the right click to zoom out

TIP: Use the top pull-down Window menu to arrange multiple scans on the Viewing Desktop – tile vertically, horizontally or cascade

5.1 The 'Loupe' and Screen display modes



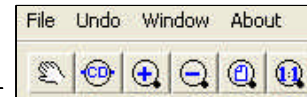
The Loupe tool permits the operator to quality check the scan as it first appears with greater freedom to change the zoom using the right-click of the computer mouse. It can be moved over the full image and the zoom altered by clicking the right mouse button. Toggle the Loupe icon to turn this feature ON and OFF.

The Loupe window can be resized by dragging the edge of the circle. The loupe window will also display what ever is beneath the cursor when the cursor is positioned outside of the loupe window.

The main viewing desktop can be switched to fill the whole screen by clicking on the *small arrows* in the view window left margin. Clicking the same arrows again, (toggling) will restore the viewing window to the Standard display size with the full editing and file controls visible.

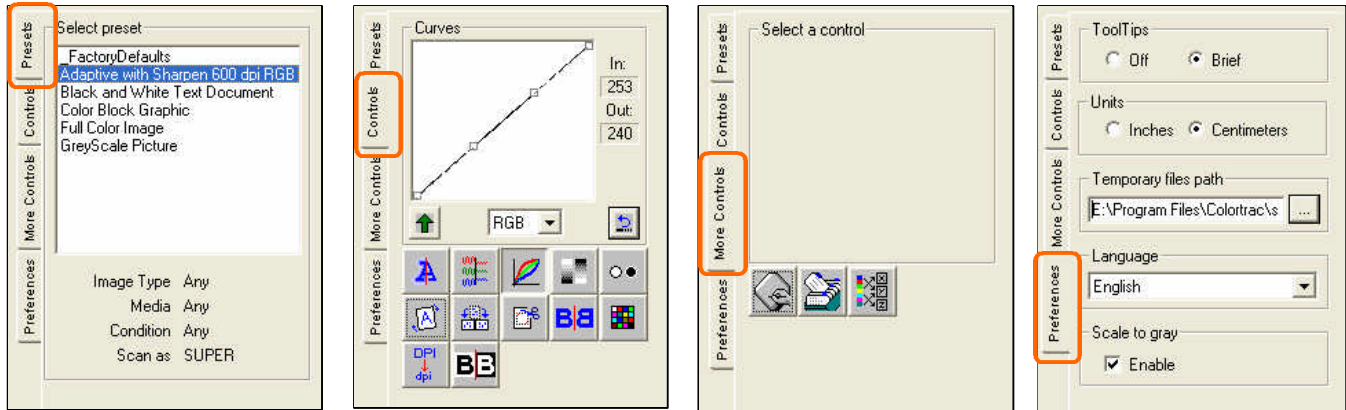
Top graphic shows the Loupe magnification set to 200%

Lower graphic shows ScanWorks set for Full Screen display mode. Clicking the arrows in the left border toggles each display between Standard and Full Screen mode.



View Controls available in Full Screen Display Mode

6 The Tabs inside the Editing Controls Area



Presets Clicking this tab reveals the Presets available. These can be altered and deleted by the user as required.

Controls This tab brings up the Editing controls relevant to the currently selected color mode or DataType of the scanner (for example Full Color RGB, Black and White, Grayscale or Indexed Color)

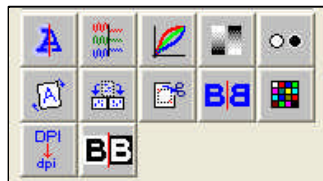
More Controls This tab reveals further controls for running external editors and indexing programs as well as the Color classification module of ScanWorks for color separation and feature extraction.

Preferences Use this tab to set the units used inside ScanWorks, the Language, the location of the temporary files, the Tool Tips status and to enable/ disable Scale to gray.

7 Editing Control Area (color and image editing controls)

7.1 Filters and Controls for RGB and Grayscale

These controls allow the scanner operator to alter the RGB or Grayscale image shown in the *Viewing Desktop Window* WITHOUT rescanning the document. The operational concept behind ScanWorks is that the image can be edited in front of the user as required and then if necessary these changes can be made automatic (or 'IN-LINE') for all subsequent scans. Examples of IN-LINE editing can be simple operations like *Rotation* and *Inversion* of the image (changing white to black and black to white) to more complex operations like *Sharpening* or altering the *Black and White Points*.



NOTE: Sharpening and De-noise filters are only relevant for full color (RGB / 24-bit) and grayscale scanning modes. ScanWorks may display different or fewer tools for the other scan modes.



Sharpening.....Improve the focus of text and fine lines. Start with +1
Blur.....Soften the focus of photographic details



Noise RemovalRemove spurious effects and image aberrations. Particularly useful for removing moire effect produced by halftoned originals. Also useful for dust and speckle removal.



RGB Controls.....Alter the intensity of R G and B using color curves



Contrast.....Increase / decrease image contrast
Brightness.....Increase / decrease image brightness



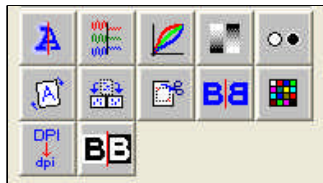
White point.....Combines the white end of the spectrum
Black point.....Combines the black end of the spectrum



DeskewAdjust the image to line-up horizontally or vertically

Filters and Controls for RGB and Grayscale - contd.

Grayscale is very similar to full color or RGB 24-bit when a single color channel is considered. Full color scanning uses the Red, Green and Blue channels each with 256 levels. The grayscale scanning mode uses 256 levels but using a single 'color' K or black. In the Colortrac SmartLF scanner grayscale can be generated by using the output from all three R,G and B cameras or by just using the G camera – so-called greenscale scanning. Greenscale scanning is three times (3x) faster than ordinary Grayscale scanning.



Rotate image..... Rotate through 90, 180 or 270 degrees



Crop image Delete unwanted border data from the image



Mirror Mirror the mage about the y-axis



Color Depth..... Change 24-bit to 256 to 1 bit (binary)
Reduction



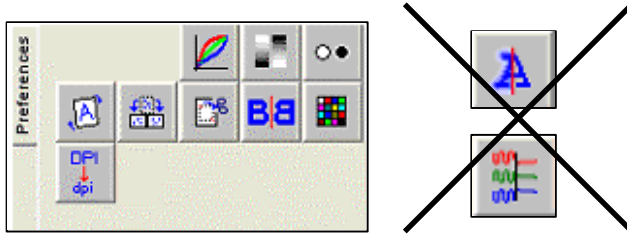
Resample..... Reduce the resolution of the scanned image



Invert..... Change white for black (blueprint scanning)

7.2 Filters and Controls for 256 color (or indexed color)

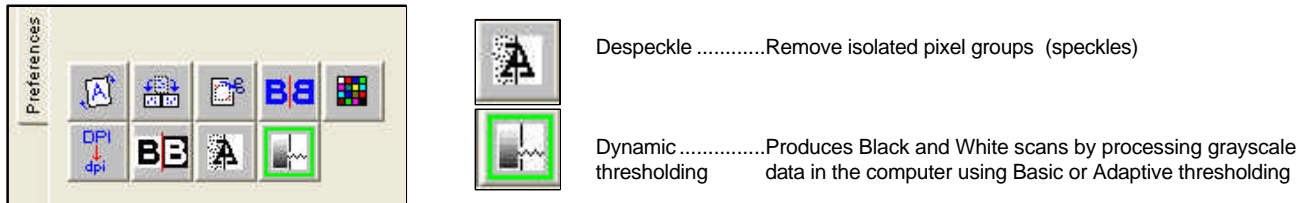
When ScanWorks is being used with the scanner in 256 or 16 color the Sharpening and Noise Removal filters are NOT available



The sharpening and noise removal filters only work with RGB (24-bit full color) or grayscale scan data

7.3 Filters and controls for 1-bit color or Black and White (binary color)

When ScanWorks is being used to run the scanner in Black and White mode some of the *color only* filters will disappear from the tool group. Black and White scanning introduces the Despeckle and Dynamic Threshold controls (see below)



8 Making your first SmartLF SCAN

8.1 Checking the settings

ScanWorks settings checklist

Scan icon is green inside ScanWorks
 Paper sizing = Standard, size = A4 portrait
 Resolution = 200 dpi
 End of scan = Do nothing
 Filename = TEST or similar
 Speed = Fast (*)
 Load delay = 1 second



Scanner checklist

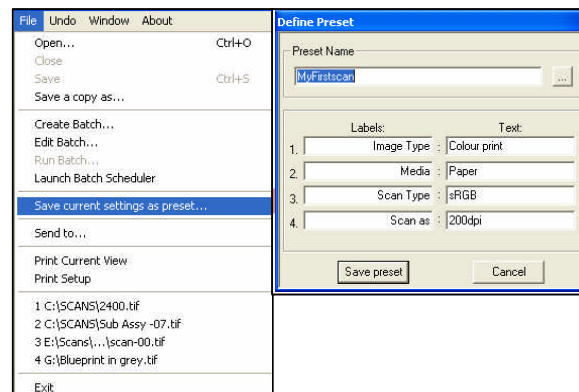
Check the scanner is on and displaying the word READY
 Load a document face down in the scanner.

(*) denotes default setting

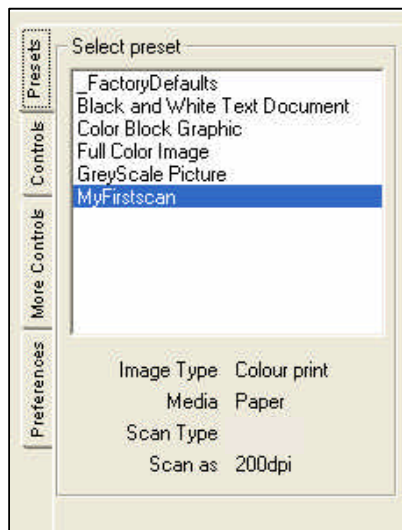
8.2 Saving your first Preset

The Preset option in ScanWorks is provided to allow the user to capture any mix of settings. It is useful practice to save these settings now so they can be reloaded at any time during the scanner familiarization and training period.

Note that whenever ScanWorks is closed it will reload with the settings that were in use when it was shutdown. If the program terminates abnormally, no settings will be saved. Reloading this Preset will restore the settings shown above.



All saved Presets can be listed by pressing the Presets tab in the editing




controls area. As the user changes to other presets the ScanWorks settings linked to that preset alter in the ScanWorks interface. Once selected the database details for Image type, Media, Condition and Scan are displayed in the lower panel.

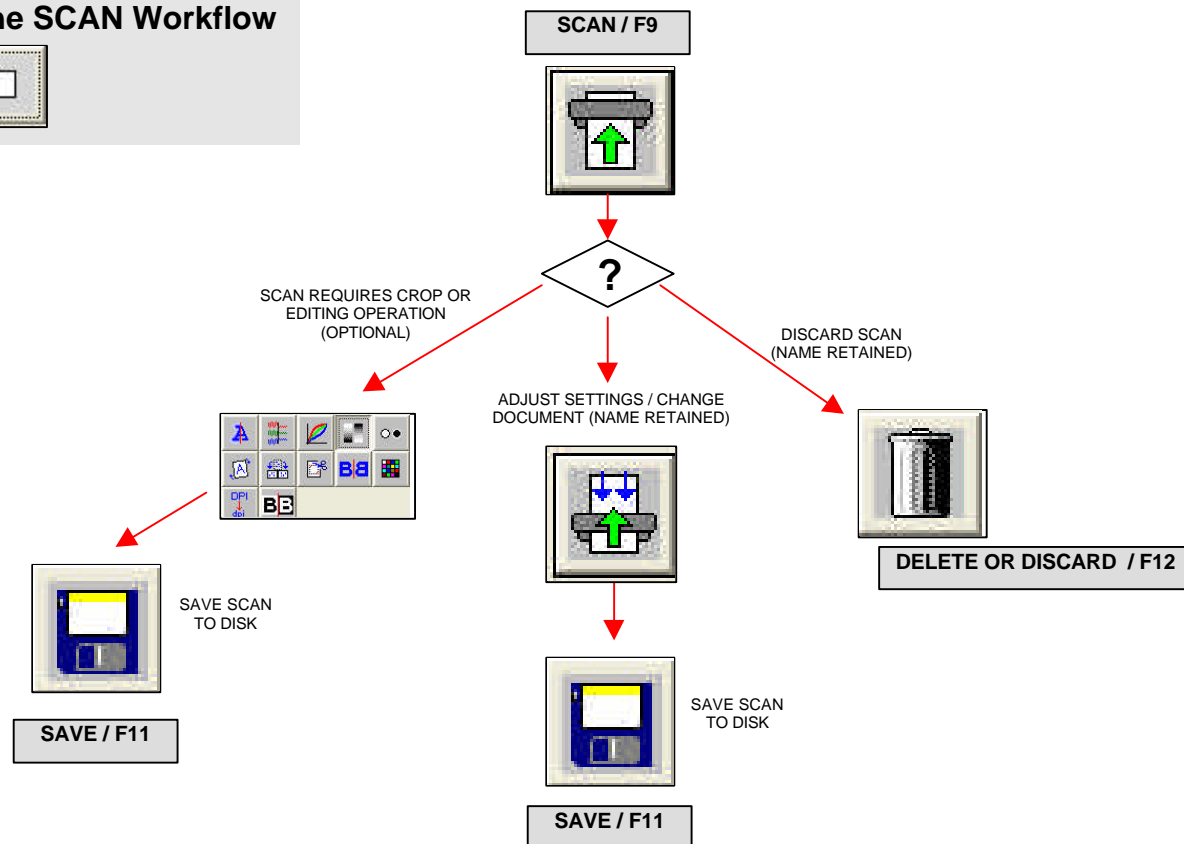
The Labels in any preset can be changed to reflect the nature of the scanning work being carried out by selecting the existing text and re-typing a new label.

Presets can be changed by selecting the Preset, making the ScanWorks setting changes and selecting Save current settings as preset in the ScanWorks File menu.

8.3 Starting the scan

- Place the document on the scanner to the right-hand side of the paper tray, face down with the top of the document nearest the rollers and allow the document to load.
-
- Now using the cursor, click the SCAN  button or press F9 on the keyboard to begin scanning.
- Review the image shown in the viewing desktop
- If the image is OK press the Diskette icon (or F11) to save the image. The document will remain gripped in the scanner. For production scanning change the End of scan setting to 'Eject'

The SCAN Workflow



The BATCH SCAN Workflow



SCAN / F9



In Batch Mode...waiting for next document

Press "Pause and Edit" to make changes to the scan currently on screen.

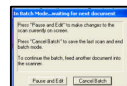
Press "Cancel Batch" to save the last scan and end batch mode.

To continue the batch, feed another document into the scanner.

Pause and Edit

Cancel Batch

?



PAUSE/ EDIT

INTERRUPT SCAN FOR
CROP OR EDITING
OPERATION

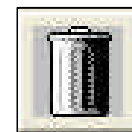


SAVE SCAN
TO DISK



SAVE / F11

CANCEL (FINISH)
BATCH



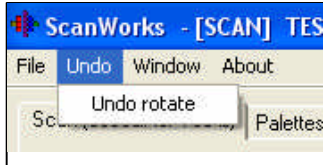
CURRENT SCAN
DISCARDED AND
SESSION ENDED

SCANNER
AUTO LOADS AND
AUTO SAVES
DOCUMENTS PLACED
IN SCANNER

9 The ScanWorks Pull down menus

| ScanWorks - [SCAN] TEST.tif: 29.0 | |
|------------------------------------|--------|
| File Undo Window About | |
| Open... | Ctrl+O |
| Close | |
| Save | Ctrl+S |
| Save a copy as... | |
| Create Batch... | |
| Edit Batch... | |
| Run Batch... | |
| Launch Batch Scheduler | |
| Save current settings as preset... | |
| Send to... | |
| Print Current View | |
| Print Setup | |
| 1 TEST.tif | |
| 2 E:\Scans\test.tif | |
| 3 Greyscale.tif | |
| 4 24120.tif | |
| Exit | |

- Open any previously saved scan file
- Close any current file (after editing or reworking)
- Save current file to a NEW OR DIFFERENT NAME
- Run the Batch utility within ScanWorks
- Add to or Delete the files used in the Batch process
- Run the Batch
- Save ALL current settings to a User PRESET
- Use current scan as an email attachment
- Send current view to the Windows printer
- Configure the Windows printer for printing current view
- Last four scans loaded
- Leave ScanWorks



UNDOS are multiple and operation sensitive. This means they change to reflect the type of editing operation currently being undertaken.

For example UNDO

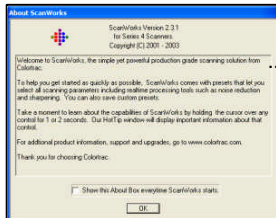
- Deskew
- Crop
- Rotate
- Mirror
- Sharpen
- Blur
- Type conversion (a reduction to fewer colors)
- Reduce resolution

NOTE: To *undo* a recent RGB or black-white adjustment (to the brightness or RGB curves) the RESET button on the tool dialogue must be used. If a scan has been made with a tool active as an inline device IT CANNOT BE UNDONE. Scans in this case will need to be rescanned with the relevant tool switched off.



The Window Menu provides access to:

- Cascade the scans inside the Viewing Desktop
- Tile horizontally all scans inside the Viewing Desktop
- Tile vertically all scans inside the Viewing Desktop
- Line up minimized scans inside the Viewing Desktop



About: - Version number of ScanWorks

10 Scanner Maintenance

10.1 Light warm-up period

The SmartLF CIS integral LED light source is ready to go within 6 seconds from power-on with no warm-up or stabilization time required. SmartLF requires no time consuming alignment or calibration, gives excellent quality images right after power-on and has a light source of practically unlimited life span. When not in use the scanner can be switched off to conserve energy but is conveniently ready to go - at the flick of a switch.

10.2 Calibration

The normalisation and colour calibration for Colortrac SmartLF are set at the factory and maintained automatically by the scanner internal circuitry. No user intervention is required for these operations. There are no calibration consumables.

10.3 Cleaning the scanner glass

Occasional cleaning of the scan glass will be required for SmartLF. The scan glass is a chemically hardened scratch resistant material which should last much longer than regular scanner glass but can be replaced as a service consumable if/ when required.

10.3.1 Stitch Procedure

Stitching for SmartLF is factory set and maintained electronically by the scanner.

11 More Advanced Techniques – Image Controls

The Inline (Auto) and Reset buttons - IMPORTANT



The unchecked INLINE button. Each edit function has its own Inline (Auto) button. Checking this button causes ScanWorks to **automatically** apply the tool in real time or at the end of the scan.



The checked inline button means that automatic editing is ACTIVATED and ScanWorks indicates the ACTIVE control using a green or yellow outline border. A green border indicates processing during the scan. A yellow border means the action is applied automatically after the scan has completed.



An activated Sharpen / Blur control

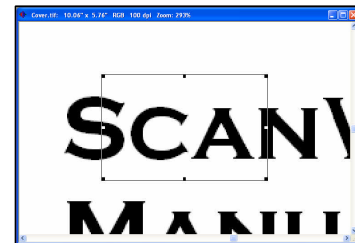
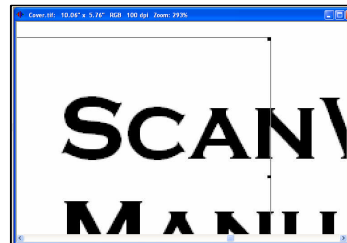


An activated Rotate control (rotation is carried out after the full image is scanned). Inline (post) button displays a red bar



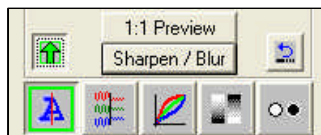
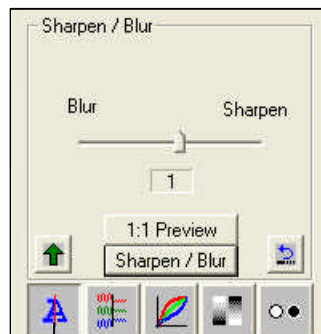
An often overlooked control, the RESET button is more than a simple slider reset. Clicking this button adjusts the size of the Crop Box and Deskew tools to suit the current zoom.

The images to the right show the Crop Box before and after resizing to suit the current Zoom.



ScanWorks User Manual

11.1 Sharpen / Blur



The Sharpen / Blur Control set for Sharpen1. This control has a 1:1 Preview button which can show the user how the image can expect to look after the filter has been applied on the portion of the image visible in the viewing window (auto zoomed to 1:1).

When the required amount of filter has been found the Sharpen / Blur button is clicked to process the whole image. The image will now need to be saved to store the **Sharpened** form of the image.

The 'enabled' but borderless 'A' icon tells the ScanWorks operator that the tool is being applied **interactively**.

The green INLINE button and green border around The 'A' button indicate that the filter is being applied **during the scan**.

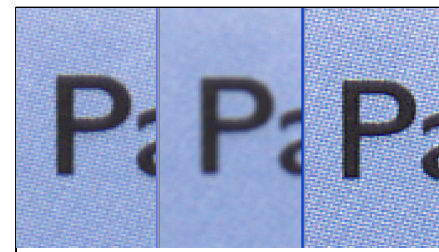
This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the scanning process. In manual use, the result of the edit replaces the image shown in the viewing window.

Notes / recommendations:

For the Sharpen control use a setting of 1 to bring up 200 dpi maps to a sharper more focussed result without the disk space implications of using a higher resolution.

Blurring affects all detail in a scan.

Sharpening is effective at 1:1 and low zooms for example copies

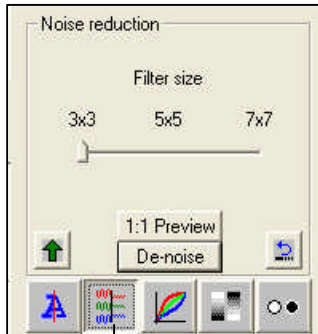


Normal

Blurred -1

Sharpen +1

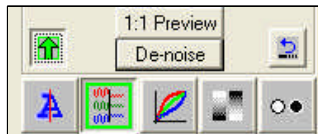
11.2 Noise Reduction



The Noise reduction Control set for 3x3. This control has a 1:1 Preview button which can show the user how the image can expect to look after the filter has been applied on the portion of the image visible in the viewing window (auto zoomed to 1:1).

When the required amount of filter has been found the De-noise button is clicked to process the whole image. The file will now need to be saved to store the **De-noised** form of the image.

The 'enabled' but borderless 'Waveform' icon tells the ScanWorks operator that the tool is being applied **interactively**



The green INLINE button and green border around The 'Waveform' button indicate that the filter is being applied **during the scan**.

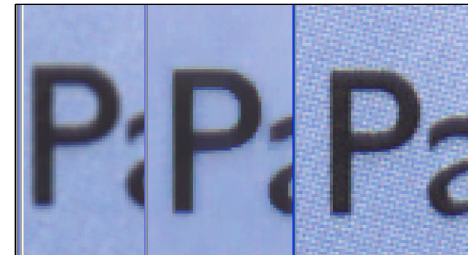
This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the scanning process. In manual use, the result of the edit replaces the image shown in the viewing window.

Notes / recommendations:

Use where there are print screening problems – usually where the resolution of the scanner 'interferes' with the resolution of the printed original.

Maintains detail *and* removes screening patterns *without* losing sharpness.

Use of this control in-line will slow down scanning depending on the resolution used.

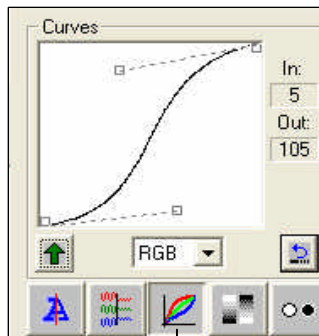


Blur -1

DeNoise 7

Normal

11.3 RGB Curves Editing



The RGB Curves Editor. This can be used to control the intensity of the primary scanner colors of Red, Green and Blue. This control **Preview**s the effect of altering the curves in real-time and updates the image in the viewing window.

When the required amount of filter has been found the image can be saved to store the **effect** of the filter on the original image.

The 'enabled' but borderless 'Curves' icon tells the ScanWorks operator that the tool is being applied **interactively**.



The green **INLINE** button and green border around the 'Curves' button indicate that the filter is being applied **during the scan**.

This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the scanning process. In manual use, the result of the edit replaces the image shown in the viewing window.

Notes / recommendations:

This control can be used to increase the color saturation of the image being scanned or in the editor.





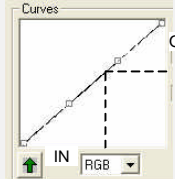
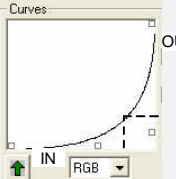
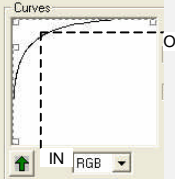
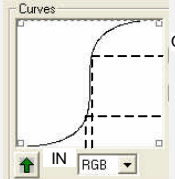
The characteristic 'S' curve is often used to strengthen colors in a scan.

A filter although SET will not be active for any scan unless the **INLINE** arrow or green border are showing. To apply the setting manually to a scan 'click' the slider control or curve grips.

Use this control with a single color selected to change the intensity of this color in the scan. For example remove blue or increase red to add warmth to an image.





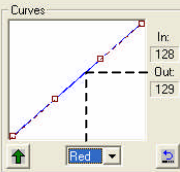
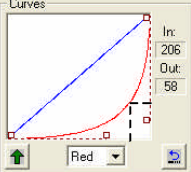
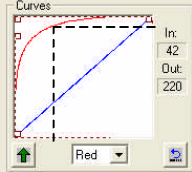
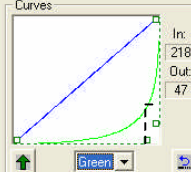
11.3.1 Using the ScanWorks RGB curve editor



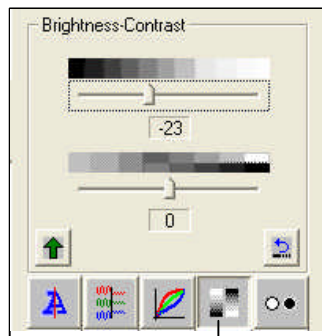
| Neutral RGB | Saturation | De-saturate | S-curve |
|---|---|---|--|
|  |  |  |  |
|  |  |  |  |
| Linear filter setting applies no changes to the red, green and blue signals. There is no increase or reduction in the gamma of the scan data. Alter the RGB values as a group or individually as red, green or blue | The curve is dragged low to increase the saturation of all colors. Note how the background has darkened and the lighter shades are now lost as the midtones are lost. | For a low input there is high output. This will mean a movement of the colors to white as the red, green and blue signals get larger (nearer 255). Weaker colors get brighter | Used to lighten the background and the lighter colors while improving the contrast and general color. Colours in the mid tones are boosted. Very light and very dark colours are not affected much |

Using the ScanWorks RGB curve editor continued . . .



| Neutral Red | Low Red | High Red | Low Green |
|---|---|---|--|
|  |  |  |  |
|  |  |  |  |
| The red channel is selected as the channel to be adjusted. The green and blue channels will not be affected by any adjustments to the red curve | The red curve is dragged low to reduce the red components of the scan | The red curve is dragged high to increase its intensity allowing it to dominate over blue and green | The green curve is dragged low to reduce the green components of the scan. Blue and red are stronger |

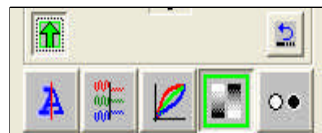
11.4 Brightness - Contrast



The Brightness and Contrast slider pair. This control Previews the effect of altering the sliders in real-time and updates the image in the viewing window.

When the required amount of filter has been found the image can be saved to store the **effect** of the filter on the original image.

The 'enabled' but borderless 'Brightness-Contrast' icon tells the ScanWorks operator that the tool is being applied **interactively**



The bright-green INLINE arrow and green border around the 'Brightness-Contrast' button indicate that the filter is being applied **during the scan**.

This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the scanning process. In manual use, the result of the edit replaces the image shown in the viewing window.

Notes / recommendations:

The Brightness control can be used to bring out shadow information. It can also be used to compensate for ageing tubes in the scanner as the scanner gets older.







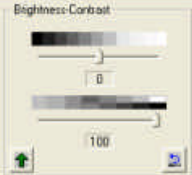

Contrast will take out subtle information leaving only the strong colors

A filter although SET will not be active for any scan unless the INLINE arrow or green border are showing. To apply the setting manually to a scan move the slider control(s).

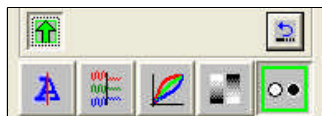
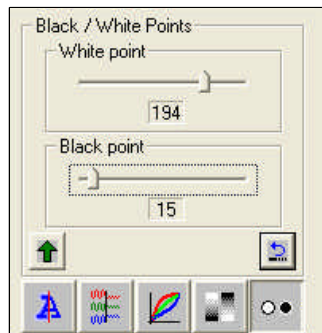
11.4.1 Using the ScanWorks Brightness / Contrast curve editor



Brightness controls the amount of white in a scan. Contrast controls the tonal quality of an image

| Brightness High | Brightness Low | Contrast High | Contrast Low |
|---|--|--|---|
|  |  |  |  |
|  |  |  |  |
| High brightness moves every color towards white and effectively puts more white into the images | Low brightness takes white out of an image and makes the image much darker. This is not the same as saturating or decreasing the gamma | Contrast exaggerates the divisions between colors by removing any tonal quality. Colors move towards their primary state – C M Y K R G B and Black | Low contrast softens the divisions between colors eventually making the entire image gray |

11.5 Black / White point



Showing the Black Point control set to 194 and the White Point control set to 15. These controls Preview the effect of altering the sliders in real-time and will update the image in the viewing window. When the required amount of filter has been found the image can be saved to store the **effect** of the filter on the original image.

The 'enabled' but borderless 'Black+White dot' icon tells the ScanWorks operator that the tool is being used by the operator **interactively**.

The bright-green INLINE arrow and green border around the "Black+White dot" button indicates that the filter is being applied **during the scan**.

This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the scanning process. In manual use, the result of the edit replaces the image shown in the viewing window.

Notes / recommendations:

Use White-point to remove unwanted off-white backgrounds from scans.









Use Black point to increase the purity of black information in scans. Be careful not to over use as they will increase the harshness of an image if used excessively.

A filter although SET will not be active for any scan unless the INLINE arrow or green border are showing. To apply the setting manually to a scan move the slider control(s).

11.5.1 Using the Black – White Slider



For grayscale and full color images. This control collects grays and off-whites together.

| Low White Point | High White Point | Low Black Point | High Black Point |
|--|---|--|---|
|  |  |  |  |
|  |  |  |  |
| White Point can be used to remove background grayness. Note the light shades are lost in the center of the image | Aggressive White point will remove all the lighter shades because they have a large white value | A low Black Point can be used to darken black detail, however it can sometimes make text appear blocky and unnatural | A high Black Point groups all colors except the lighter shades. |

11.6 Deskew



Press to re-size Deskew
reference line to fit current
zoom

The Deskew Control set for 0.54 degrees. This is an interactive control and requires the operator to identify the longest horizontal or vertical line in the image and for them to place the Deskew marker ends onto each end of the line.

When the required amount of deskew has been found the Deskew button is clicked to process the whole image. The file will now need to be saved to store the **Deskewed** form of the image.

The direction of the deskew rotation is determined automatically by ScanWorks but can be entered manually (overridden) by the operator

Deskew is interactive and **must** be carried out by the operator.

Notes / recommendations:

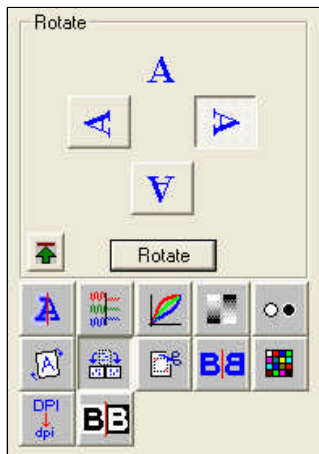
Use where the image is not oriented perpendicular to the viewing window. Where possible always re-scan the document instead of carrying out a deskew.

If you must deskew the image and need to refine the process do not deskew an already deskewed image - always UNDO a deskew and start again for a better final result.

ScanWorks does not support anti-alias deskewing and some post-deskew image irregularities may be visible at high zoom factors.

TIP: At minimum zoom, roughly stretch the ends of the deskew tool to each end of the longest horizontal or vertical line in the image. Now zoom into the drawing over one end and affix the deskew marker. Now, by making a right mouse click, drag the *thumbnail area of interest* to move the zoomed area along to the opposite end of the line being used as the deskew reference. Affix the second marker. Finally click the deskew button to complete the deskew.

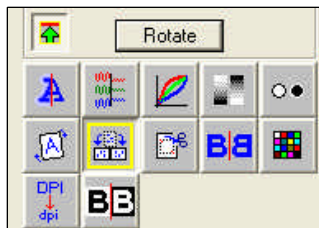
11.7 Rotate



The Quadrant Rotate Control set for 90 degrees clockwise.

This function can be set **INLINE** (by clicking the green arrow) to **automatically** rotate every scan image. The graphic left shows this feature in manual mode.

The 'enabled' but borderless 'icon' tells the ScanWorks operator that the tool is being used by the operator **interactively**.



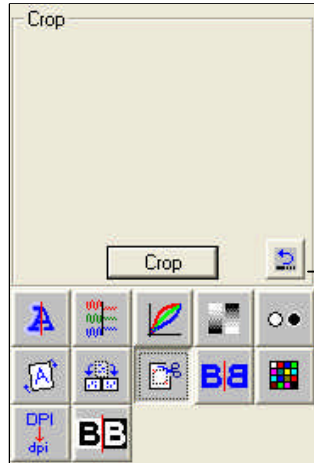
The bright-green **INLINE** arrow with the **RED** bar above and yellow border around the 'Rotate' button indicates that **automatic** image rotation has been selected. *Note: Rotation in fact occurs automatically directly after the scan finishes*

Notes / recommendations:

Use to rotate an image. Useful to rotate by 90 degrees A0 drawings which are being scanned SEF (short edge first) in the scanner. After processing, rotated drawings will present LEF (long edge first) or *landscape* in the viewing window.

Use of this control *in-line* can slow down the overall scan time depending on the resolution used. The speed of this process is also affected by choice of file format. Compressed file formats (for example TIFG4) will take longer to process.

11.8 Crop



The Crop Box.

This is a realtime manual control and performs the conversion in the viewing window.

When the required amount of crop has been decided upon the operator presses Crop to cut away all image data OUTSIDE of the crop margin.

The 'enabled' but borderless 'Crop' icon tells the ScanWorks operator that the tool is being used *interactively*.

This tool is **NOT** available as an ***automatic*** feature.

Press to re-size Crop box
to fit current zoom

Notes / recommendations:

Use to quickly clean up irregular edges of any scan. If you crop too much you can undo with ScanWorks – how many times will depend on the memory in the computer.

Remember to use the RESET button to resize the Crop Box and grips to fit your zoom instead of manually zooming out to find them.



11.9 Mirror

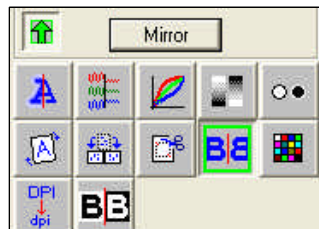


The Mirror Control.

This is a realtime manual control and performs the conversion in the viewing window.

This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'INLINE' during the scanning process. In manual use, the result of the edit replaces the image shown in the viewing window.

The 'enabled' but borderless 'Mirror' icon tells the ScanWorks operator that the tool is being applied *interactively*.



The bright-green INLINE arrow and green border around the 'Mirror' button indicates that the filter is being applied **during the scan**.

Notes / recommendations:

Use for transparencies where the 'printed' side closest to the CCDs during scanning must be revolved about the y-axis.

11.10 Convert to . . .



The Convert to Control set for 256 colors.

Step down to file formats with lower Color Depth or fewer colors. If the image showing in ScanWorks was scanned in RGB then all of the shown reductions will be possible. The Color Depth may be changed in steps manually (always towards the fewer color version) or by skipping intermediate levels if required as an inline process.

The 'enabled' but borderless 'Checker' icon tells the ScanWorks operator that the tool is being used by the operator *interactively*.

The bright-green INLINE arrow with the RED bar and the yellow border around the 'Checker' button indicates that the filter is being applied *after the scan*.

TIP: Conversion allows colour scans to be reduced to files of fewer colours and smaller byte size at medium to high resolution and is suitable for maps, schematics and similar. Not effective for photographic images where it is preferable to reduce the resolution and use JPEG or JPEG2000 to reduce scan file size instead.

Notes / recommendations:

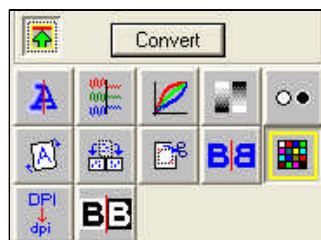
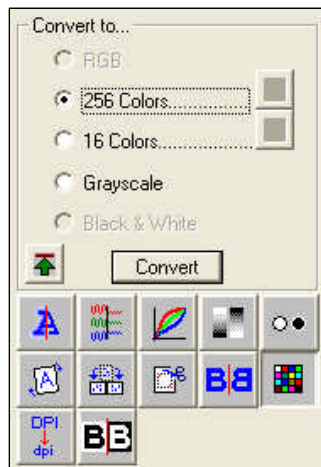
Use to convert Full color scans to files with fewer colors to reduce file size.

Use to change color scans to grayscale.

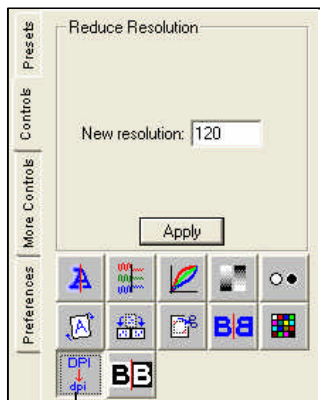
Use to change grayscale scans to binary (black and white)

Use of this control in-line will incur extra processing time after the scan and depends on the resolution used and the size of the image.

This is a real-time manual control and performs the conversion in the viewing window.



11.11 Resample



The Convert to Control set for 256 colors.

Step down to lower resolutions to reduce the file storage size of the scan.

Resample is not available as an offline function and **must** be carried out by the operator.

The 'enabled' but borderless 'Checker' icon tells the ScanWorks operator that the tool is being used by the operator **interactively**.

Notes / recommendations:

Use to make smaller file sizes. Use this feature to produce scans for word-processing documents where high zoom/close-up detail is not required.

This is a real-time manual control and performs the conversion in the viewing window.

TIP: Resampling a scan from 400 dpi down to 72 dpi will reduce the byte size (the area) of any scan by a factor of $72/400 \times 72/400$ or 0.032. The physical dimensions will be approximately 0.18 of those previously in each of the axes. For scans intended to be viewed on a monitor, 72 dpi is a good general resolution which maintains both legibility and keeps the storage size of the document to a minimum.

11.12 Invert



The Invert Control.

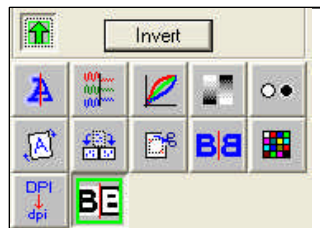
Use this control to move any shade of black through white to the opposite end of the gray spectrum. Turn blacks to white and white to black.

This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the scanning process. In manual mode, the result of the edit replaces the image shown in the viewing window.

The 'enabled' but borderless 'Invert' icon tells the ScanWorks operator that the tool is being used by the operator *interactively*.

Notes / recommendations:

Use where the scan is produced the wrong way around in a black and white sense. For example engineering blueprints where the background will scan as black and the foreground or line information as white.

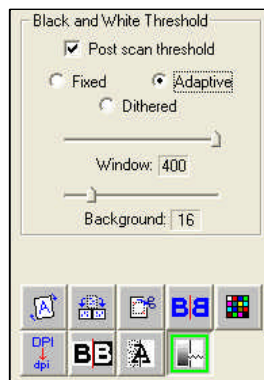


The bright-green INLINE arrow and green border around the 'Invert' button indicates that the filter is being applied *during the scan*.

12 Monochrome scanning – Interactive Dynamic thresholding

The Colortrac SmartLF scanner is an excellent monochrome scanning device. Monochrome scans are very small in storage format terms and can occupy as little as 250 Kbytes for an A0 1189 mm x 841 mm drawing when compressed using 2D TIFF Group 4 compression. Engineering plans and drawings are converted into raster format and emailed rather than sending a hard copy. TIFF4 is also a very common file format and compatible with most viewers such as Kodak Imaging, Paint and many others.

Select : DataType = Black & White or Black & White Mono (high speed Green channel mono)
Resolution = 200 dpi



The Black & White Threshold Control

This is a 'Virtual Scan Tool' and when used offline this edit tool produces the same effect as when used 'Live' during the normal scanning. In manual mode the result of the edit replaces and continually updates the image shown in the viewing window.

The Black and White thresholding control can be set to produce Basic, Dither or Adaptive output. Black and White Thresholding is a filter that works permanently to produce BW data in the scanner or in the computer. When thresholding is selected for *in computer* ScanWorks (termed "Post-scan threshold") provides interactive control over the thresholding levels for Basic and Adaptive methods. 'Virtual Thresholding' permits optimization of the image while only needing to scan ONCE.

Notes / recommendations:

Use to produce very small binary files which store only ON (binary 1) or OFF (binary 0) data.

Use Basic Thresholding for clean drawings with no background noise or dirt.

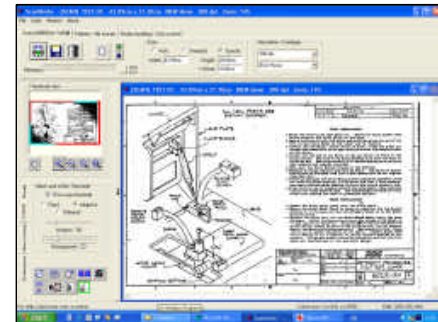
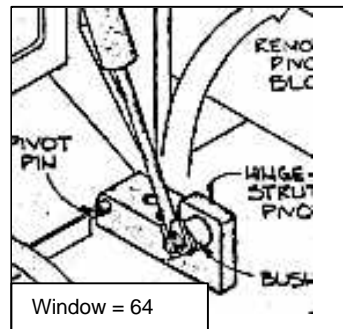
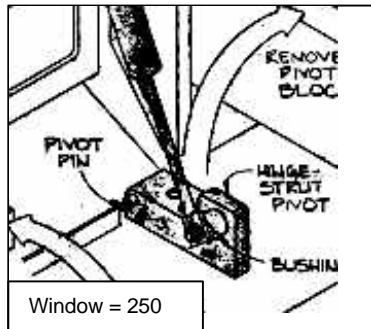
Use Adaptive Thresholding for drawings where the background density approaches the foreground (lines) and contrast between the two is poor.

Do not assume Adaptive thresholding is always best. Do not leave it switched on for clean drawings.

TIP: Post-scan thresholding or *in-computer thresholding* allows INTERACTIVE adjustment without rescanning

12.1 Adaptive Thresholding in Black & White.

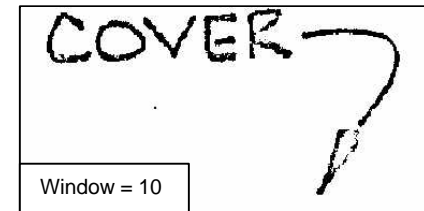
1. Enable Post scan threshold in the top of the Black and White controls dialogue
2. Select **Adaptive**. Post scan thresholding causes grayscale data to be returned to the computer.
3. Raise the Window and Background controls to minimum effect (move both sliders to the right)
4. First increase the Background darkness to bring up any faint detail (graphic left)
5. Second reduce the Window size to sharpen up lines, increase contrast and remove area discoloration (middle graphic)



6. Increase the background darkness until speckles begin to appear
7. Choose a difficult area of the drawing and check that the Window setting is optimum
8. Save these settings as a Preset, Save the file and resume scanning.

TIP: Too low a Window setting will begin to outline block data and remove the center of any filled area – even arrowheads. It will also make text look faint and of poor quality.

TIP: For greater scanning speeds *after* scan settings have been established interactively, enable processing in the scanner by unchecking the 'Post scan threshold' button.

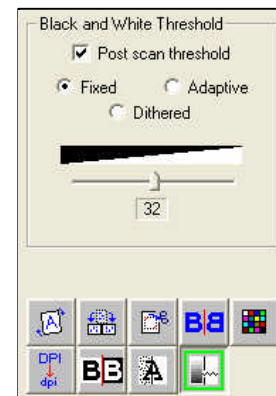


12.2 Basic Thresholding in Black & White

1. Move the slider first to the right and then make the image darker by moving it to the left to bring up detail in the drawing.

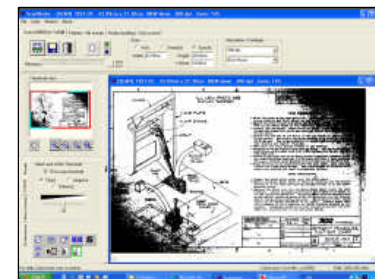
NOTES: Basic thresholding will apply a uniform threshold across the whole drawing. This will not be suitable for all drawings especially those with a non-uniform background such as blueprints, Diazo copies and badly reproduced originals. Note that copies from digital plain paper copiers are electronic binary copies and so may not respond as expected to the adaptive thresholding process.

Basic thresholding may not allow drawings that have regions of low contrast to be scanned effectively (see graphic below).



Scale-to-Gray is a feature that improves the view of the scan when seen zoomed out in the view window of ScanWorks. As the user zooms into the image the grayscaleing gives way to the pure binary of the true image. Without this feature, lines may appear to be missed from the scan when seen at full zoom.

TIP: Basic thresholding produces the best results for scanning clean drawings.



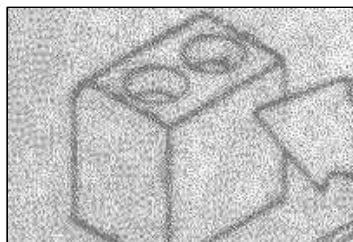
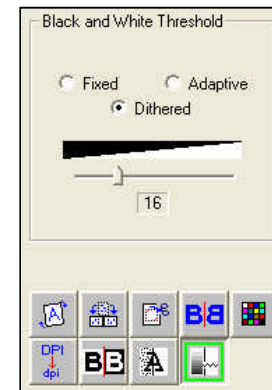
12.3 Dithered Thresholding in Black & White

1. Select Dither and then move the slider first to the right, then move it to the left to bring up more detail in the drawing.

NOTES: Dither responds differently from Basic or Adaptive thresholding and provides a gradual increase in the amount of detail seen in the drawing as the slider is moved to the left. Dithered output produces a binary file that can be stored in the compressed TIFF4 format. As the background level is increased, more black pixels are used. Increasing the background still further moves pixels closer together. A Dithered black and white file will be much smaller in file size than the same drawing held in the grayscale format although can be almost as useful.

TIP: Although the image may appear weak on the screen there will be a significant improvement in the information visible when the image is printed out on a black and white printer.

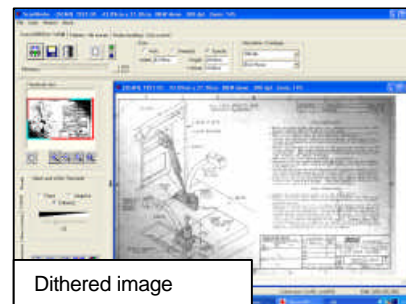
TIP: Sometimes very feint lines in a drawing may fail to be revealed using conventional Basic thresholding. This is where Dither Binary can be very effective.



Dithered threshold image



Grayscale image



Dithered image

12.4 Despeckling with Black and White scanning

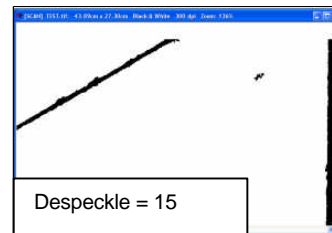
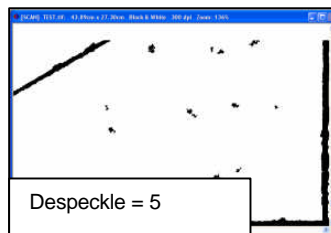
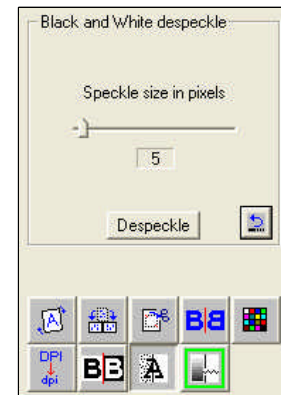
Despeckling is a process used to remove isolated areas of black pixels after a scan has been scanned in black and white. The control works by removing any group of pixels whose largest pixel dimension is *LESS* than the size set in the despeckling dialogue. Despeckling is closely related to the quality of the thresholding, particularly the setting of the Background level. Certain drawings are best left with some background speckles or Noise after thresholding and these can be cleaned using the despeckle function. This command affects the entire loaded image.

Post scan threshold – In this mode use of the despeckle command prevents any further interactive thresholding of the scan. Despeckle can still be increased and undone (top menu Undo command) multiple times. It is normal to despeckle as the final operation. Changing the threshold will change the requirements of any despeckling operation.

In-scanner threshold – Despeckling in this mode behaves as above and just like a regular non-interactive scanner. To change the threshold the document must be re-scanned.

ScanWorks supports multiple UNDO which means that if too many pixels are removed the process can be undone back to a less aggressive level.

TIP: Care must be taken not to set the despeckle level higher than the size of the smallest decimal point, dots or other vital information in the scan image or these will be lost and could make the scan useless. Right click and drag a selection rectangle around what you consider to be a 'speck'. The actual size will auto populate the speckle size box eliminating guesswork.

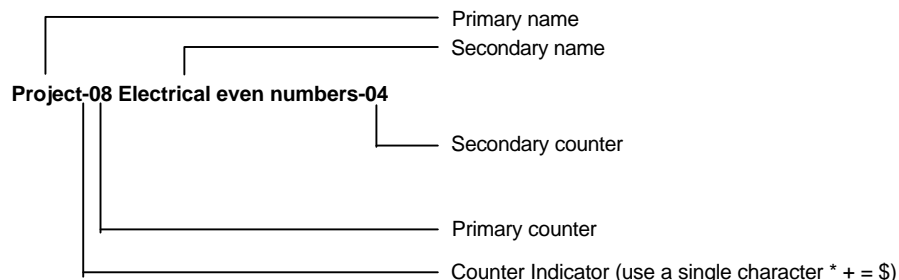


13 4 -Tier Auto Increment File Naming



This feature of ScanWorks allows the Colortrac SmartLF user to create more complex file names for scans based on an auto increment and roll-over system. Normal incremental file naming is activated by using a `filename-nn` construction. Entering *Project-08* as the filename in the normal way and then pressing the ID button will reveal that the name can increment to a max value of 99 in steps of 1 as expected.

This can now be expanded further by adding more information through the ID dialogue and using the increment parameter and max and min values. For example:



Filenaming setup

Counter indicator:

Filename: Project*11 Electrical odd numbers*05

NOTE: The increment control checkbox must be clicked to force Counter 2 to advance Counter 1 when it reaches its max value. If left unchecked all numbers will increment by their respective settings for every scan made. The start value becomes the minimum value. Place the Counter Indicator immediately before the numbers you wish to control.

TIP: Do not use the slash / as the Counter indicator in the file sequence

Filenaming setup

Counter indicator:

Filename: Project-08

Counter 1
Min value: 08
Max value: 99
Increment by: 1
☐ Increment when Counter 2 resets to Min value

Counter 2
Min value: 1
Max value: 9999
Increment by: 1
☐ Increment when Counter 3 resets to Min value

Filenaming setup

Counter indicator:

Filename: Project-08 Electrical even numbers-04

Counter 1
Min value: 08
Max value: 99
Increment by: 1
☒ Increment when Counter 2 resets to Min value

Counter 2
Min value: 04
Max value: 60
Increment by: 2
☐ Increment when Counter 3 resets to Min value

OK


14 Printing from ScanWorks

ScanWorks supports any normal Windows printer driver through the File>Print Current View and File>Print Setup choices from the main File menu.

Option *Print Setup* permits the usual Windows driver quality and media selections to be made

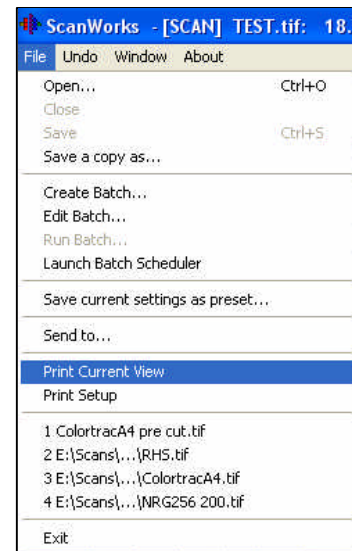
Option *Print Current View* takes the scan data as seen in the Viewing Desktop Window

How to use the Print option

1. If you wish to print the whole scan press the  button to display the whole image in the view window
2. If you require only part of the image to be printed, zoom the image until the required section fills the view window
3. Select *Print Current View*, choose the paper size in the printer and press *Print*

NOTES:

Printer drivers can behave according to their own set of rules, particularly large format printers where the outputted paper size can vary between A4 and A0. You may experience odd relationships between the size of the image to be printed and the actual output. ScanWorks displays the image size in the status information at the top of the image window



TIP: Usually from the Control Panel, create a Custom *Test* Paper size and use this to check how your driver behaves inside ScanWorks

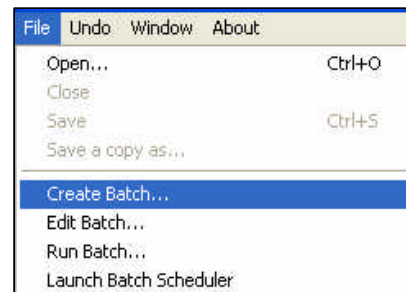
15 ScanWorks Batch processor

The ScanWorks Batch feature allows the scanner operator to perform a variety of editing and reformatting functions on scan data AFTER scanning. The instructions for the Batch operation can be taken from a pre-existing Preset or entered through the Batch dialogue. Typical Batch operations might be to rotate documents or compress them into a smaller file formats or even change the format altogether.

15.1 Running Unattended (Auto-save)

To compress Black and White files select *Create Batch* and set as follows:

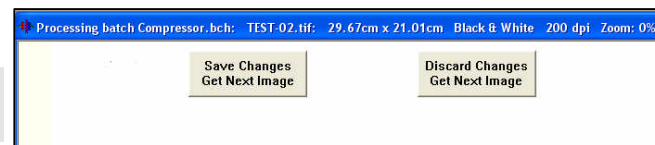
1. Select settings for Batch, choose *Use current settings*
2. Place the uncompressed files in a separate directory and then click Add to browse. Marquee the files for processing and press OK
3. Click Run unattended (Auto Save)
4. Check *Save images in new location* and browse to a new directory to hold the compress form of the files
5. Check *Save images in new format* select TIFF4 from the pull-down choices. File re-formatting must be done in this mode
6. Supply a name using the ... button and press OK
7. Select Run Batch from the ScanWorks File menu and browse to the name entered in 6. To run the batch press OK



15.2 Running with Operator present (Quality Control mode)

This permits the operator to process previously scanned files using the ScanWorks Editing Tools. Operations like crop, rotate and deskew can be carried out on the scans before pressing the *Save Changes Get Next Image* or *Discard Changes Get Next Image* buttons. Change the QC setting to *Operator Present* to activate.

TIP: If you experience problems with the last file in unattended mode turn off log file generation. If use of *Crop* hides the image, press the right-mouse button to restore the image behind the crop lines.

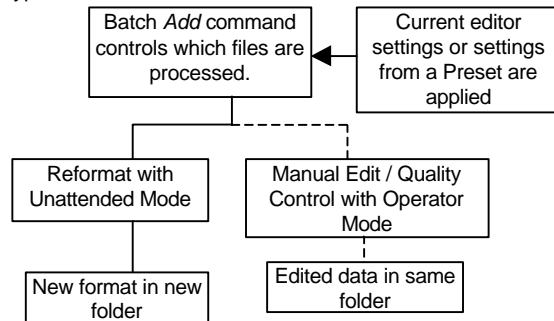


15.3 Using Presets with ScanWorks Batch command

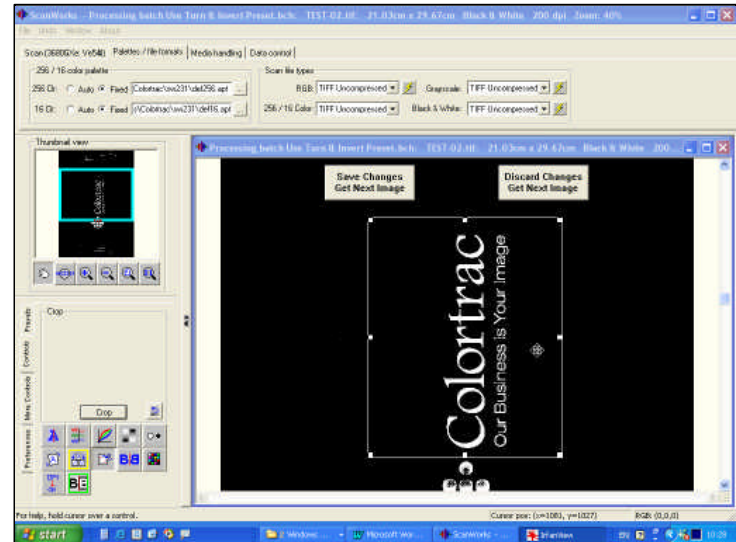
Preset can be used to pre-select operations such as Rotate and Invert for example and the Preset can then be called upon by a Batch process to operate on a group of pre-scanned files. ScanWorks Batch Preset uses only the Editing commands of the Preset and any settings in the Preset dealing with Format change will be ignored. For example to Rotate and Invert some uncompressed Black and White scans follow the instructions below.

1. Make a black and white scan with ScanWorks to establish the correct scan settings - Black and White Mono
2. Activate the Invert and Rotation tools within the Editing Tools and specify Inline by clicking the Arrow. Save as a Preset
3. Select Create Batch... from the File menu of ScanWorks
4. Choose Use settings from Preset (the Preset created in step 3 above)
5. Add files to be processed in the normal way
6. Choose to Run with Operator present or using Timer
7. Give the Batch a name and press OK
8. Run the Batch named in step 7

Typical Workflow



TIP: Select files for processing in groups of ten. Use the file date stamp to confirm which files have been processed.



15.3.1 The Batch Command interfaces.

Operator Present Mode

The settings displayed right are as follows:

- The Settings will be taken from the Turn & Invert Preset
- Quality Control is ON which means that Save and Delete buttons will be displayed in the viewer for each scan
- The Batch has been given a name QC Mode Turn & Invert
- Note files cannot be converted in this mode only edited.

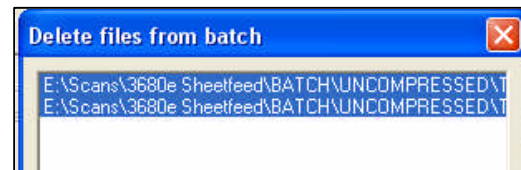
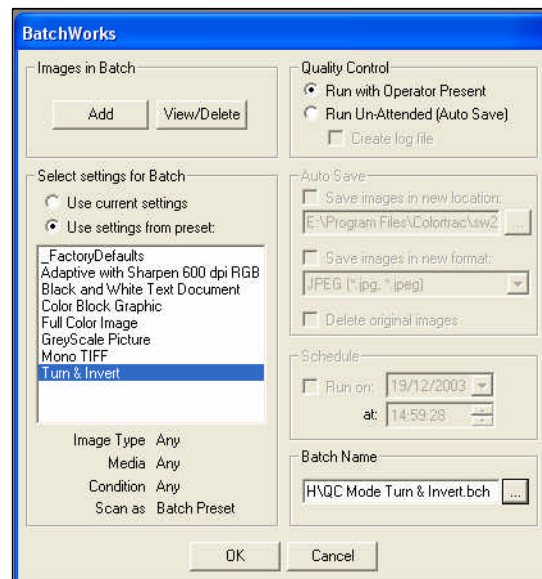
TIP: Batches cannot be stopped once started, therefore group files in manageable numbers

TIP: When deleting files from the Batch always select the file(s) using the mouse and/ or shift key before clicking delete. Files can be added to existing batches from different directories.

Unattended Mode

The settings displayed below are as follows:

- The Settings will be from the Turn & Invert Preset
- Quality Control is OFF which means that all selected files will be processed in one continuous operation
- The Batch has been given the name Compressor unattended



The options not set are listed below:

- Log file in text format (same folder as batch.or .bch files)
- Delete original images
- Schedule for timed operation

TIP: Batches cannot be stopped once started. Group files in manageable quantities.

TIP: Keep *Delete original images* option unchecked and always maintain backups of important files

15.4 Using the ScanWorks Batch Scheduler

If a Batch is created with a time set up using the Schedule fields of the configuration screen and this batch is run from the ScanWorks *Run Batch...* command (File > Run Batch) ScanWorks launches the Batch Scheduler.

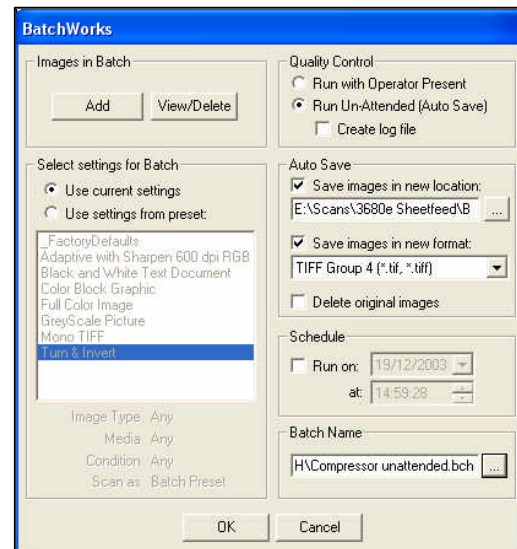
15.5 Creating a Batch configuration in ScanWorks

Use File > Create Batch... and complete the boxes inside the interface. Make selections for operator quality controlled batch processing or stand-alone processing without an operator. In stand-alone mode all processing is handled totally automatically

15.6 Editing a Batch configuration in ScanWorks

Use File > Edit Batch... and select the batch to be edited.

TIP: Editing a batch does not allow the user to change or select a different Preset. The purpose of the Edit Batch command is to select new files for batch processing. To have a batch use a different Preset create a new batch and choose a new name or overwrite the old batch name.





16 Color Classification

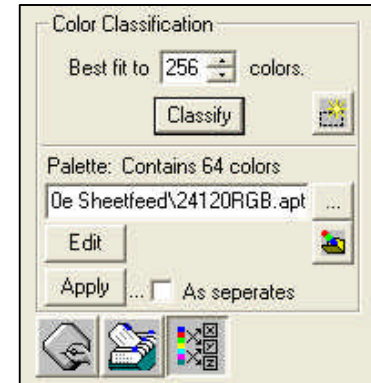
ScanWorks Color Classification allows the user to carry out the following operations:

- To change any color in the scan to a different color
- To change a group of colors to any member color or a different color completely
- To reduce the number of colors in a scan for the purposes of reducing the file size or making the data suitable for vectorisation



16.1 Reducing a Full Color scan to 64 or fewer colors

1. Begin by clicking the icon above in the More Controls tab. Note Color Classification is only available when DataType is RGB or 24-bit Full Color.
2. Zoom into the image and note the coloration across the picture
3. Change the number in the *Best fit to* box from 256 to 64
4. Press the Classify button and note the change in the background as seen in the viewer behind
5. In the Color Classification window press  in the lower left hand corner
6. Supply a palette name and press OK

Note that image has reverted to full color but the filename supplied in 6 has been entered into the palette name field. We are now told the palette contains 64 colors. To convert the scanned image to 64 colors either press the Apply button or press  to replace the standard 256 color palette with this 64 color palette in the *Color Palette / File Format* tab of the Scanner Configuration Controls area. If the palette is replaced by the 64 color version the document will need to be scanned again to produce a new 64 color version of the same document. This palette can now be used with other similar documents. Scans containing between 16 and 256 colors occupy one third of the disk space of files scanned in Full Color – (uncompressed TIFF)




TIP: To use this palette regularly the DataType must be changed to 256 Colors(Fixed) from RGB or the scanner will still scan in Full Color.

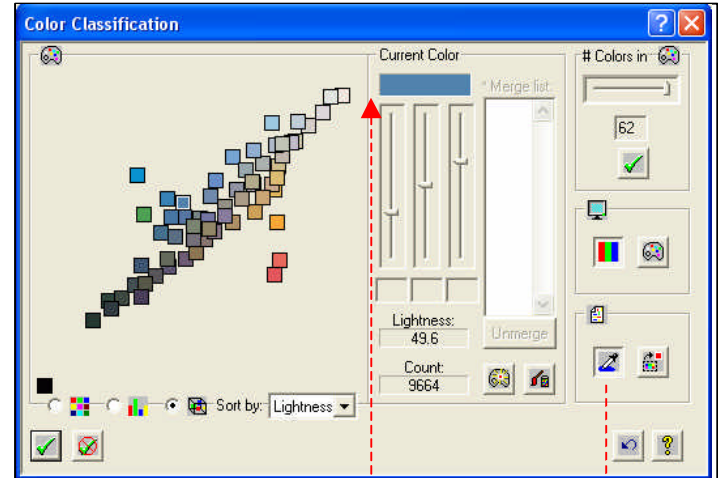
TIP: Use  to see the Full Color version and  to see the Palette reduced image

16.2 Combining and changing colors in a scan



To further reduce the colors from the Color Classification dialogue move the slider in the top-right corner and press the tick below. To apply the new colors permanently to the scan without rescanning press the tick in the lower-left corner, supply an name for the .apt file. Now press the Apply button in the ScanWorks Color Classification tab.

To change one color in a scan . . .

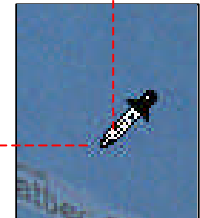
1. Choose the 3-D representation icon and *Sort by* Lightness
2. Use the  to click on the scan and identify a color to the Color Classification module. The Current Color will change to the color under the Dropper nib.
3. To change the color move the sliders
4. To save the scan with these changes click the tick in the lower left corner and Apply






To change more than one color in a scan . . .

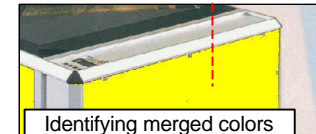
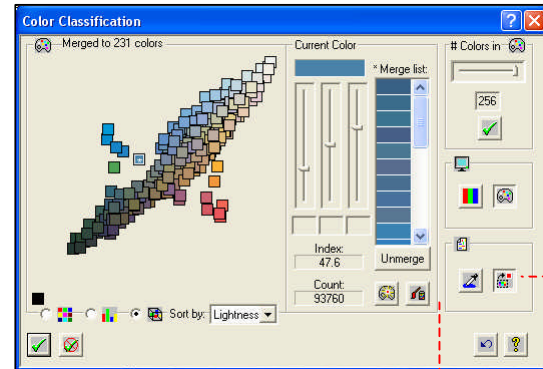
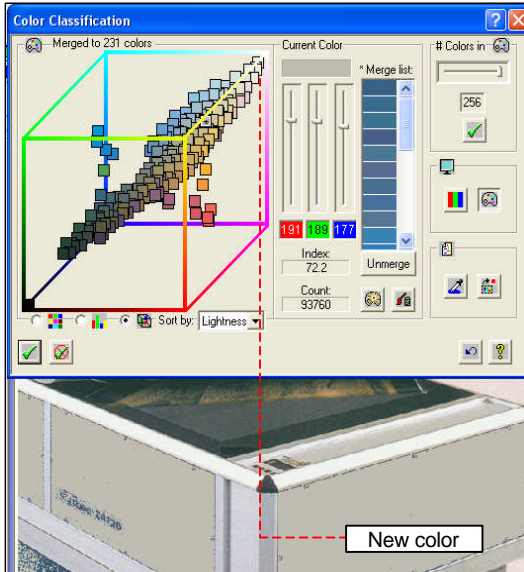
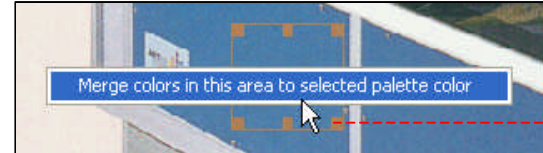
1. Choose the 3-D representation icon and *Sort by* Lightness
2. Use the Dropper  to click on the scan and identify a color to the Color Classification module. The Current Color will change to the color under the Dropper nib.
3. Use the Color Combine Button  to place a marquee (or square) over the colors to be combined / changed.

Printed information often has more than one colour making up a colour - as in the example of blue (right)



Combining and changing colors in a scan contd. . .

4. Move the marquee around and use it to add more colors to the merge list.
5. Identify the colors selected in the merge by pressing the  icon
6. Change the color of the Identifier color using the  icon
7. Alter the color of the merged colors using the sliders
8. Click  in the lower left to save the palette, then press Apply to apply this to the Full Color scan



17 Appendix

17.1 Hardware Installation – (skip this section if your scanner is already installed)

17.2 USB2 precautions

Where there are USB peripherals sharing the same computer and these are USB 1.1 standard, the USB2 speed of SmartLF will not be achieved and scanning will be slow. If it is necessary to use USB 1.1 devices alongside SmartLF these should be used with via a separate USB channel e.g. by fitting a secondary USB card to separate the SmartLF and any slower USB 1.1 devices.

17.3 Computer hardware recommendations

SmartLF needs a Hyper Threaded Windows XP or Windows 2000, 2.8GHz, 512MB RAM computer as a minimum specification to meet the speeds described in the documentation.

17.4 Cable length

The standard USB2 cable supplied with all Colortrac SmartLF scanners is 2 metres long. Longer cables can be used but care should be exercised because the quality of USB2 cables and USB2 adapter cards can vary, even for similarly priced examples.

17.5 Color Depth file size calculations (without compression)

A few useful calculations covering the storage space needed for various methods of scanning.

For a Full Color or RGB file each pixel occupies 1 byte for red, 1 byte for green and 1 byte for blue or 3 bytes per pixel. This means that each pixel can have 256 levels of R, G and B or 256x256x256 or 16.9 million colors. A 200 dpi A0 file will be 207MB in size

A 24-bit full color file will occupy 3 bytes for every pixel. A 200 dpi A0 file will be $200 \times 36 \times 200 \times 48 \times 3$ byte per pixel = 207 MB in size

A 256 color file occupies 1 byte for every pixel. A 200 dpi A0 file will be $200 \times 36 \times 200 \times 48 \times 1$ byte per pixel = 69 MB in size

A 16 color file occupies $2^4 = 16$ or half of 1 byte per pixel. A 200 dpi A0 file will be $200 \times 36 \times 200 \times 48 \times 0.5$ bytes per pixel = 34 MB

A Black and White or binary file is 2^0 or = 1 or one eighth of one byte per pixel. A 200 dpi A0 will be $200 \times 36 \times 200 \times 48 \times 0.125$ bytes per pixel = 4.3MB

17.6 ScanWorks licensing limitations

ScanWorks image editing for non-TIFF images is limited to a single user. This means that although ScanWorks can be installed on second and subsequent computers the saving of data to file formats supported by the licensed image libraries within ScanWorks will not be available. This is to protect the license arrangements between Colortrac Ltd. and the purveyors of the library. Observance of this principle is part of your contract as a user of the Colortrac SmartLF scanner and software.

17.7 Turbo Mode button

Use of Turbo Mode will double the scan speed in the paper direction. This process uses a high quality interpolation in the computer to replace dots removed at the scanner to increase scanning speed. Wide images may require a powerful computer.

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SmartLF

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