EPSON EXPRESSION™ 1640 XL

Scanner Software

Reference Guide

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Introduction

Features

The CD-ROM that comes with your scanner contains the EPSON scanner software suite, including EPSON TWAIN Pro and TWAIN Pro Network (The network version of EPSON TWAIN Pro). The software suite is the perfect companion for your EPSON scanner. Using your scanner and the software on the CD-ROM, you can scan images in color, grayscale, or black and white, and save them as files or print them out. Other software such as EPSON Scanner Monitor and PageManager for EPSON support the Start Button feature to make scanning much easier. EPSON Scan Server allows your scanner to be used over a network.

❏ The software supports the following EPSON scanners: EPSON EXPRESSION 1640XL

❏ EPSON TWAIN Pro and EPSON TWAIN Pro Network directly control all of the features of your EPSON scanner. This program is the standard cross-platform interface for other applications.

The CD-ROM also contains other applications that let you use your scanner in exciting new ways. For detailed information, refer to the supporting documentation.

❏ EPSON Scanner Monitor allows your scanner to access software that supports the Start Button feature.

❏ EPSON Screen Calibration utility allows you to calibrate your scanner and monitor to reproduce images identical to the originals.

❏ PageManager for EPSON is TWAIN-compliant software that supports the Start Button feature. This feature allows you to scan and send data to a target application with a single push of the Start button. For more information on PageManager, see your PageManager documentation.

About This Guide

The information in this guide is divided into six chapters, with a glossary and index provided for your reference.

❏ Chapter 1 explains the basic steps of scanning.

❏ Chapter 2 provides a complete description of EPSON TWAIN Pro and TWAIN Pro Network features. Refer to Chapter 2 when making scanning settings.

❏ Chapter 3 explains how to calibrate your monitor to match your EPSON scanner. If you notice that colors on your screen or in your printout do not match the original image, see this chapter.

❏ Chapter 4 contains maintenance and troubleshooting information. If your software does not operate properly or scanned images are not what you expect, see this chapter.

❏ Appendix A contains various specification information.

❏ Appendix B contains customer support information.

Notes *contain important information and useful tips about your scanner and software.*

To set up and use the scanner, see your scanner's *User's Guide*. EPSON TWAIN Pro and EPSON TWAIN Pro Network online help can also provide you with information on making settings in EPSON TWAIN Pro or EPSON TWAIN Pro Network.

Chapter 1

Scanning Basics

Main Window and Preview Window

EPSON TWAIN Pro and EPSON TWAIN Pro Network have two main windows. The EPSON TWAIN Pro window or the EPSON TWAIN Pro Network window (main window) and the Preview window.

Note:
All settings and functions available from the two main windows are the same for both EPSON TWAIN Pro and EPSON TWAIN Pro Network. Although most of the illustrations and explanations in this guide are for the EPSON TWAIN Pro, they also apply to EPSON TWAIN Pro Network.

Main window
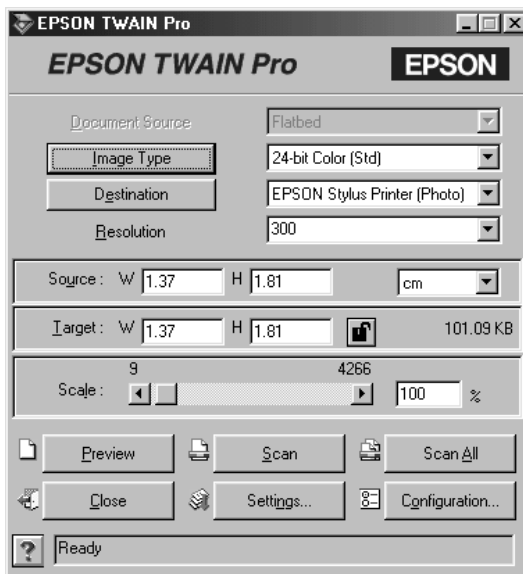
The main window gives you access to the controls, where you can make basic settings, such as Document Source, the type of the material you are scanning, how you are scanning, output destination, scanned image size, and so on. If you want to specify the areas of the images to scan or you want to see the effects of your settings before scanning, click **Preview** to open the Preview window and display the preview images in the window.

Preview window
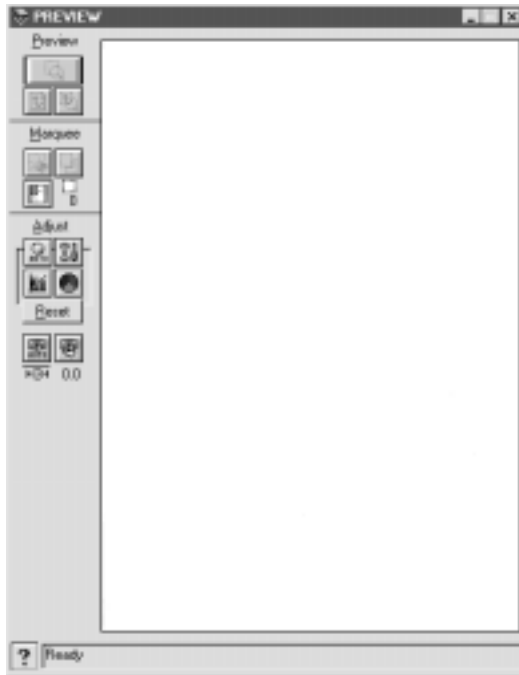
In the Preview window, there are more options available to give you greater controls over your scanning image. Powerful tools are available to help you adjust tones, colors, focus and other elements to optimize your images.

Optimizing Image Scanning

EPSON TWAIN Pro can automatically adjust and optimize the exposures and colors of scanned images during scanning. You can also make adjustments manually with the image quality adjustment tools in EPSON TWAIN Pro's Preview window. This section provides general information on optimizing images with these tools.

EPSON TWAIN Pro Preview window

Note for Macintosh users:
Most illustrations shown in this section are for Windows, so they may vary in appearance from what actually appears on your screen. The instructions are the same, except as noted.

Manually optimizing images

To optimize images manually, adjust the following EPSON TWAIN Pro settings in the order specified below:

Adjust the brightness and contrast

1. Adjust the Highlight and Shadow settings in the Image Controls dialog box. See "Adjusting the Highlight Setting" on page 1-7 and "Adjusting the Shadow Setting" on page 1-8.

2. Adjust the Gamma setting in the Image Controls dialog box. See "Adjusting the Gamma Setting" on page 1-9.

3. Adjust the tone curve with a predefined tone correction setting in the Tone Correction dialog box. See "Applying a Preset Tone Curve" on page 1-10.

Make color adjustments

4. Adjust the Gray Balance Intensity setting in the Color Adjustment dialog box. See "Adjusting the Gray Balance Intensity Setting" on page 1-13.

5. Adjust the Saturation setting in the Color Adjustment dialog box. See "Adjusting the Saturation Setting" on page 1-15.

6. Manually adjust the tone curve for individual colors in the Tone Correction dialog box. See "Using the Tone Curve" on page 1-15.

To make the following adjustments in EPSON TWAIN Pro, you need to display a preview image in the Preview window. See the following section for details.

Displaying a preview image

The EPSON TWAIN Pro Preview window shows you how your adjustments will affect the image as you make them. The Preview window is also the starting point for accessing the Image Controls, Tone Correction, and Color Adjustment dialog boxes that contain tools for optimizing your image.

Note:
See "Preview Window" on page 2-19 for Preview window options, and "Configuration Button" on page 2-42 for information about how to control preview image quality.

1. After selecting the **Document Source, Image Type**, and **Destination** in the main window, click **Preview** to start prescanning. If the Preview window is not open, it opens and begins prescanning. A preview image of the document appears on your screen.

    Note:
    Make sure the Fast Preview check box is clear in the Configuration dialog box to ensure a high-quality preview.

2. Click one of the buttons below to open the dialog box with the image optimization tools you need.

    Image Controls button

    Color Adjustment button

    Tone Correction button

Adjusting the Highlight Setting

Highlights are the brightest areas of an image.

1. In the Image Controls dialog box, click the eyedropper button under **Highlight**.
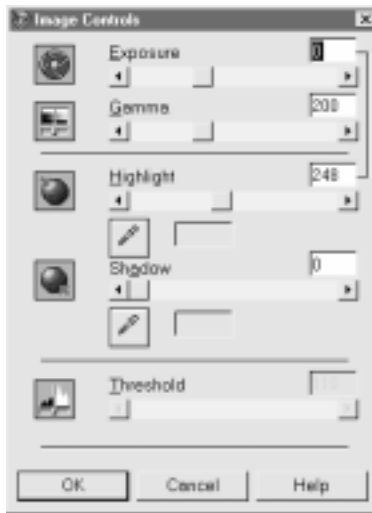
The pointer changes to an eyedropper, with movement restricted to within the Preview window.

2. Move the eyedropper to the location you want to select as the highlight point and click it.

    The brightness of the pixel at the point you click is set as the highlight level, and the other parts of the image are adjusted accordingly.

3. To change the highlight level (brightness) of the point you selected, move the **Highlight** slider left or right, or enter a value in the text box. You can enter a value between 61 and 490 for the highlight.

Note:
See "Image Controls" on page 2-30 for further information on
adjusting the highlight level.

Adjusting the Shadow Setting

Shadows, the darkest areas of an image, are the opposite of
highlights.

1. In the Image Controls dialog box, click the eyedropper button
    under **Shadow**.
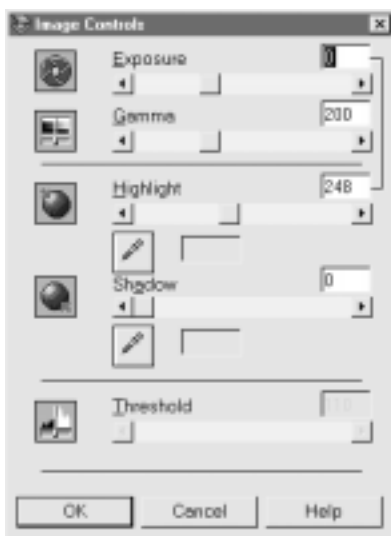
The pointer changes to an eyedropper, with movement
restricted to within the Preview window.

2. Move the eyedropper to the location you want to select as the
    shadow point, and then click.

The brightness of the pixel at the point you click is set as the shadow level, and the other parts of the image are adjusted accordingly.

3. To change the shadow level (darkness) of the point you selected, move the **Shadow** slider left or right, or enter a value in the text box. You can enter a value between 0 and 60 for the shadow.

    Note:
    See "Image Controls" on page 2-30 for further information on adjusting the shadow level.

Adjusting the Gamma Setting

Gamma is the difference in contrast between the light tones and dark tones of an image. Any change you make in the gamma level only affects the mid-tones of the image.
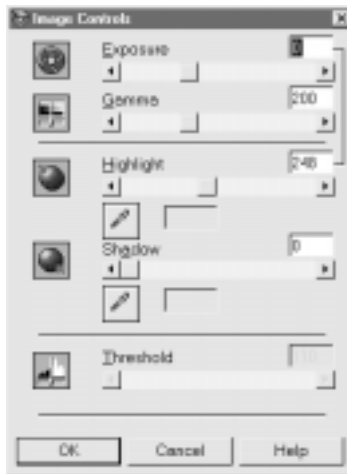
To change the gamma level of the image, move the **Gamma** slider left or right, or enter a value in the text box.

You can enter a value between 50 and 500 for the gamma.

Note:
See "Image Controls" on page 2-30 for further information on adjusting the gamma level.

Applying a Preset Tone Curve

You can finely adjust the contrast within an image by applying one of the preset tone curves. This allows more control over the image when used in conjunction with the Auto Exposure function or settings in the Preview Window. The Tone Curve Name list in the Tone Correction dialog box provides the six most common tone correction curves, described below.

Linear
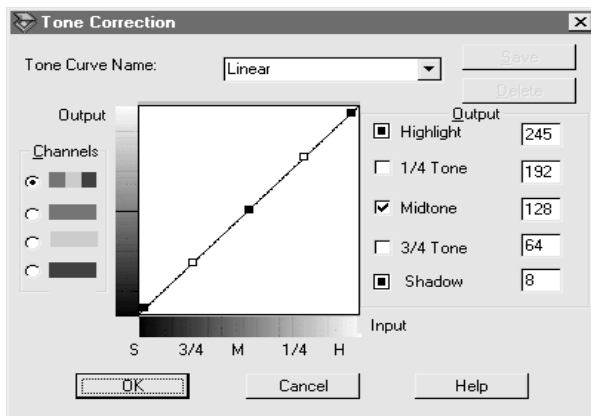
A linear tone curve has no tone correction. Use this setting if you are satisfied with the tone of the preview image.

Lighten
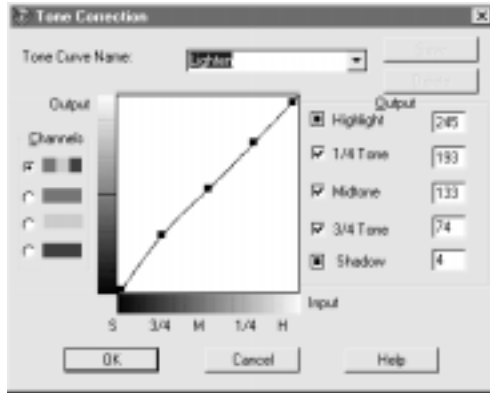
Adjusts darker images (like underexposed film) to make them slightly brighter.

Darken
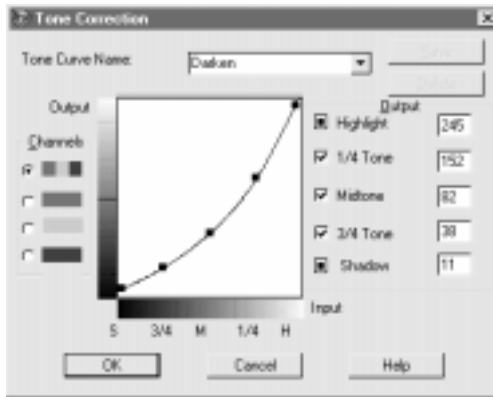
Adjusts brighter images (like overexposed film) to make them slightly darker.

Flat Contrast
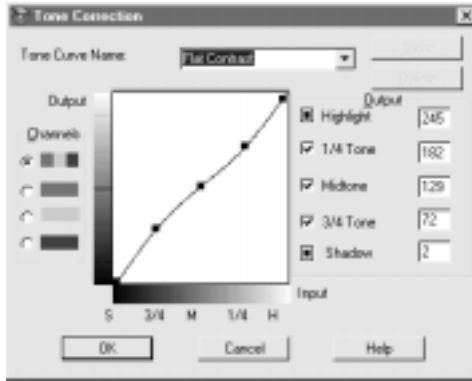
Flattens high contrast images to make them look more natural.

High Contrast
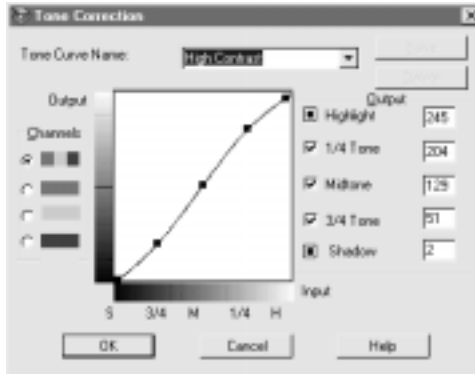
Increases the contrast of dull images.

Open Shadow
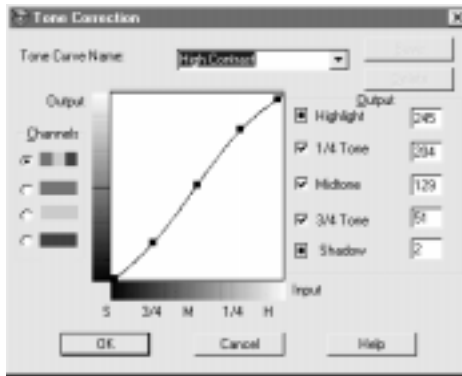
Improves details in the dark areas of images.

Note:
See "Using the Tone Curve" on page 1-15 and "Tone Correction" on page 2-33 for more information on tone correction.

Adjusting the Gray Balance Intensity Setting

Gray balance makes it possible to remove a cast (tint) from a specific color.

1. In the Color Adjustment dialog box, click the eyedropper button under **Gray Balance Intensity**.
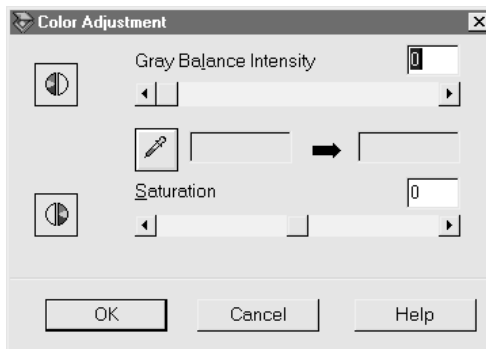
The pointer changes to an eyedropper, with movement restricted to within the Preview window.

2. Move the eyedropper to a location that contains the color whose gray balance intensity you want to adjust, and then click.

The color you selected appears in the two boxes below the **Gray Balance Intensity** slider.

3. To change the gray balance intensity level of the color you selected, move the slider left or right, or enter a value in the text box.

You can enter a value between 0 and 100. Changing the value causes the color in the right hand box to change accordingly. Your changes are also reflected in the image in the Preview window.

Note:
See "Color Adjustment" on page 2-35 for more information on adjusting the gray balance intensity level.

Adjusting the Saturation Setting

Saturation is the density of a color. Higher saturation makes the color appear richer, while lower saturation makes it appear paler.
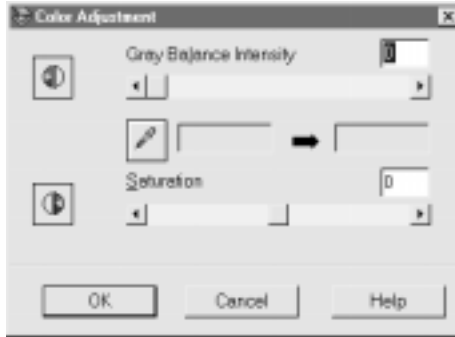
To change the saturation level of the image, move the **Saturation** slider left or right, or input a value in the text box.

You can enter a value between -100 (lowest color density) and 100 (highest color density).

Note:
See "Color Adjustment" on page 2-35 for more information on adjusting the saturation level.

Using the Tone Curve

The tone curve provides you with a versatile means for adjusting the intensity of the colors of the image being scanned. You can adjust the shadow, mid-tone, and highlight values, which helps to ensure well-balanced coloring of the image.

Note:
❏ *Use of the tone curve is recommended for fine adjustments after you have previewed the image and adjusted the highlights and the shadows using Auto Exposure and the Image Controls dialog box. Use of the tone curve to make initial settings is not recommended.*

❏ *The Tone Correction button is unavailable whenever* **Black & White** *is selected as the Pixel Depth and* **None** *is selected for the Halftone.*

The tone curve is located in the Tone Correction dialog box, which appears when you click the Tone Correction button in the EPSON TWAIN Pro's Preview Window. How to use each of the controls in the Tone Correction dialog box is described below.

 Tone Correction button
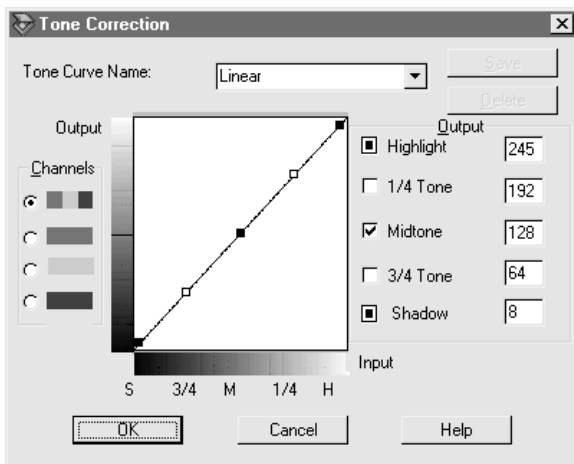
Tone Correction dialog box

Tone Curve Name list

Use this list box to select a preset tone curve. There are six preset tone curves shown below, and you can add your own curves to the list using the procedure in the next section, "Saving your own tone curve."

Curve Name	Highlight	1/4 Tone	Midtone	3/4 Tone	Shadow	Description
Linear	245	192	128	64	8	Default curve
Lighten	245	193	133	74	4	Lightens dark image
Darken	245	152	82	38	11	Darkens bright image
Flat Contrast	245	182	129	72	2	Reduces contrast
High Contrast	245	204	129	51	2	Increases contrast
Open Shadow	245	193	129	80	5	Lightens dark shadows

When you select a curve from the Tone Curve Name list, the settings in the Tone Correction dialog box change accordingly.

Channels

Click an option button under channels to select the color whose tone curve you want to adjust. When the master channel at the top is selected, your adjustments affect all three colors. Selecting one of the other channels allows you to adjust red, green, or blue only.

Tone curve editor

Moving the mouse pointer into the tone curve editor causes it to change to a finger. Use this pointer to drag any of the five points in the curve and change its shape. The x-axis of the curve is the brightness of the original (input values) while the y-axis is the brightness of the scanned image (output values).

To change the tone curve back to its default, select **Linear** in the Tone Curve Name list.

Output values

These are the current values for output data in accordance with the current locations of the points inside the tone curve editor. These values change when you drag points in the tone curve editor, or you can enter in values here to change the shape of the tone curve. Each value can be adjusted within the range of 0 to 255.

Note:
❏ *Each output value name has a check box to the left of it. Highlight and Shadow are always selected, but you can select or clear 1/4 Tone, Midtone, and 3/4 Tone by clicking their check boxes.*

❏ *When a value's check box is clear, its point on the tone curve editor automatically shifts to smooth out the tone curve when one of the other points is moved.*

❏ *When a value's check box is selected, it means that its point is fixed and it will not shift when other points are moved.*

Saving your own tone curve

Use the following procedure to assign a name to a tone curve you customized and to save it for later use:

1. Make the tone curve settings you want. This causes the name shown in the Tone Curve Name list to change to **User Defined**.

2. After customizing the tone curve, enter a name for the new curve (up to 32 characters) in the list box.

3. Click **Save** to save your new tone curve settings under the name you specified.

Deleting a customized tone curve

Use the following procedure to delete a custom tone curve. You cannot delete the six preset tone patterns.

1. Use the Tone Curve Name list to select the custom tone curve you want to delete.

2. Click **Delete**.

3. In the confirmation dialog box that appears, click **Yes** to delete the curve.

Closing the Tone Correction dialog box

You can close the Tone Correction dialog box by clicking either **OK** or **Cancel**.

❏ Clicking **OK** applies the current Tone Correction dialog box settings and closes the dialog box.

❏ Clicking **Cancel** closes the dialog box without applying the current dialog box settings.

Optimizing OCR Scanning

This section gives you suggestions and recommended settings in order to improve OCR (optical character recognition) scanning results.

Scanning text

Make sure you select **OCR** for both **Image Type** and **Destination** in the EPSON TWAIN Pro main window.

If the recognition rate is not satisfactory with the default settings, follow these steps to change settings:

Improving character recognition

1. In the EPSON TWAIN Pro main window, make sure **OCR** is selected in both the Image Type and Destination list boxes. Then click the **Image Type** button. The Image Type dialog box appears.

2. In the Image Type dialog box, select **None** for **B/W Option**, and then click **OK**.

3. In the EPSON TWAIN Pro window, click **Preview**. Then click the Image Controls button to display the Image Controls dialog box.

 Image Controls button

Image Controls dialog box

4. Use the **Threshold** slider to change the threshold value, monitoring the results of your changes in the Preview window. Adjusting the threshold value can make it easier for OCR to recognize characters.

If you still have problems...

1. In the EPSON TWAIN Pro window, increase the Resolution value to 400. Remember that scanning at higher resolution takes longer and may not greatly increase the recognition rate.

2. If you still have problems, try using the enhancement tools in your OCR software to make adjustments.

Text difficult to recognize

The quality of the text in your original document greatly effects OCR results.

The following types of originals can make recognition difficult and should be avoided if possible:

❏ Items that have been copied from other copies

❏ Faxes

❏ Text with tightly-spaced characters or line pitch

❏ Text that is in tables or underlined

❏ Cursive or italic fonts, and font sizes less than 8 points

Remember that OCR software cannot recognize handwritten characters.

Understanding EPSON TWAIN Pro Features

Overview

When you start EPSON TWAIN Pro or EPSON TWAIN Pro
Network through a TWAIN-compliant application, the following
window appears on the screen:

Note for Macintosh users:
Most illustrations shown in this section are for Windows, so they may
vary in appearance from what actually appears on your screen. The
instructions are the same, except as noted

Note for EPSON TWAIN Pro Network users:
Although most illustrations and explanations of settings and functions
in this guide are for EPSON TWAIN Pro, they also apply to EPSON
TWAIN Pro Network.

The following sections describe the features of EPSON TWAIN
Pro and EPSON TWAIN Pro Network.

Note:
Some settings may appear dimmed depending on your choice of settings
and the features supported by your scanner.

EPSON TWAIN Pro Main Window

The main window

The main window is the starting point to make detailed settings. You can select parameters for a setting or select special functions provided with EPSON TWAIN Pro to attain the highest quality scanned images.

Note:
❏ *Online help also provides you with information on settings. Click the* **?** *button to access online help.*

❏ *You cannot scan an image that exceeds the available memory or disk space. If you attempt to scan an image that is too large, an alert appears on the screen.*

❏ *Before you begin scanning, you should calibrate your screen. For details, see Chapter 3, "Calibrating Your System."*

❏ *After an image is scanned, be sure to save or export it.*

Document Sources

When scanning a reflective document placed on the document table of the scanner, leave the Document Source set to **Flatbed**. Other selections are available depending on what options are installed. These are the optional **Automatic Document Feeder**, and **TPU for Neg. Film,** or **TPU for Pos. Film**.

Note:
Uninstalled options are not displayed.

Flatbed:

Choose this setting to use the document table of the scanner.

ADF-Single-sided, ADF-Double-sided:

Select one of these settings when using the optional Automatic Document Feeder. If you are scanning single sided documents, select **ADF-Single-sided**, and if you are scanning double sided documents, select the **ADF-Double-sided** setting.

Multi-page support with the Automatic Document Feeder

If you select Auto Document Feeder as the Document Source and click the **Scan** button, the following dialog box appears.
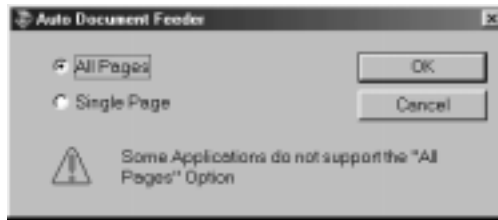
If you select **Single Page**, only one page is fed from the Automatic Document Feeder and scanned.

If you select **All Pages** (default), all the pages are fed from the Automatic Document Feeder and scanned. The All Pages option may not work with some applications.

TPU for Neg. Film, TPU for Pos. Film:
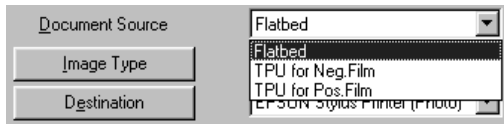
Select one of these settings when using the Transparency Unit. If you are scanning negative film, select **TPU for Neg. Film**, and if you are scanning positive film (or slides), select the **TPU for Pos. Film** setting.

Image Types

Use the Image Type list or button to select the type of image to be scanned.

Image Type	42-bit Color(HiFi) ▼
Destination	**42-bit Color(HiFi)** ▲
	24-bit Color (Std)
Resolution	24-bit Color De-screening
	14-bit Gray (HiFi)
	8-bit Gray (Std)
Source : W 30 99 H	Line Art ▼
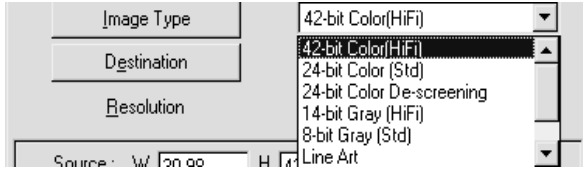
Image Type list

The Image Type list provides the following predefined settings. EPSON recommends you use the predefined settings first, then later improve the quality of the scanned image manually by making the detailed settings described in the following pages, if necessary. Click the arrows on the right to view all of the available settings.

42-bit Color (HiFi):

42-bit colors, best quality

Note:
This setting is available only with certain applications, such as Adobe® Photoshop®.

24-bit Color (Std):

24-bit colors, high quality

24-bit Color De-screening:

24-bit colors, high quality with de-screening to remove moiré patterns

Note:
A moiré is a cross-hatch pattern that appears on scanned images when scanning printed material. It is a result of interference that occurs due to the difference between the pitches of the scanning and the halftone screens.

14-bit Gray (HiFi):

14-bit gray, best quality

Note:
This setting is available only with certain applications, such as Adobe Photoshop.

8-bit Gray (Std):

256 grays, high quality

Line Art:

Black and white, draft quality

OCR:

Black and white, best quality, Text Enhancement Technology

Copy & Fax:

Black and white, hard halftone, draft quality, Auto Area Segmentation

Image Type button

The Image Type button allows you to customize the Image Type settings. If you want to make detailed settings manually, use this feature.

Click the **Image Type** button. The following dialog box appears.
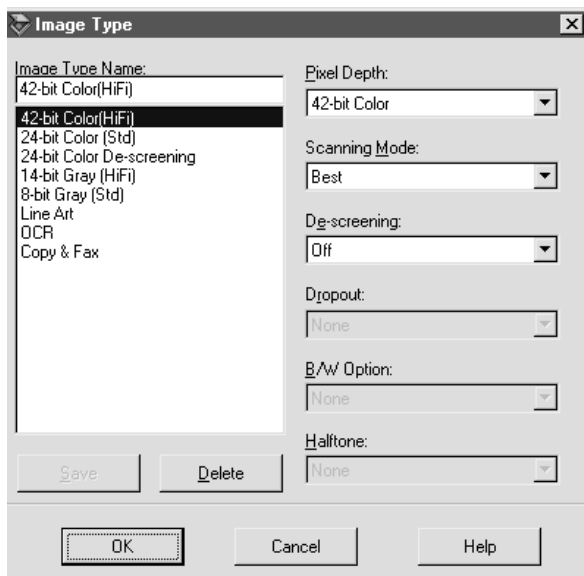
Image Type Name:

The names of predefined settings and any custom settings you have saved appear in the Image Type Name list.

Pixel Depth:

Select the scanning depth from:
42-bit Color, 24-bit Color, 14-bit Gray, 8-bit Gray, and Black & White.

Scanning Mode:

Use this setting to select between speed and quality. **Best** provides the best quality image, while **Draft** provides faster scanning with some loss of quality. Note that you can also change the scanning mode of the preview image using the procedure under "Configuration".

De-screening:

Select either **On** or **Off**. When **On** is selected, moiré patterns are automatically removed from scanned images, but scanning takes longer.

Note:
❏ *A moiré is a cross-hatch pattern that appears on scanned images when scanning printed material. It is a result of interference that occurs due to the difference between the pitches of the scanning and the halftone screens.*

❏ *This setting is available when the resolution is less than 800 dpi.*

❏ *When* **On** *is selected, it takes longer to scan.*

Dropout:

Select a color to subtract from a black and white scan of a colored original. Proper use of dropout can improve the quality of your black and white scans. Available dropout options are:
None, **Red**, **Green**, and **Blue**.

Note:
❏ *Dropout is available only when Pixel Depth is set to* **8-bit Gray** *or* **Black & White**.

❏ *Depending on the image you scan, you may need to adjust the Threshold setting in the Image Controls dialog box to enable this feature.*

B/W Options:

Select from:
Text Enhancement Technology, **Auto Area Segmentation**, or **None**.

Text Enhancement Technology
To improve recognition accuracy during OCR (Optical Character Recognition) scanning, select this option. This function eliminates the document background from scans.

Auto Area Segmentation
To make grayscale images clearer and text recognition more accurate, select this option. This function separates text from graphics.

Note:
❏ *The B/W Option setting is available only when* **Black & White** *is selected as the Pixel Depth setting.*

❏ *When you need neither TET nor AAS, select* **None***.*

❏ *Default is set to* **None***.*

Halftone:

Select a halftone or dither setting to reproduce images using special dot patterns:
Mode A (Hard Tone), **Mode B (Soft Tone)**, **Mode C (Net Screen)**, **Dither A (4 × 4 Bayer)**, **Dither B (4 × 4 Spiral)**, **Dither C (4 × 4 Net Screen)**, **Dither D (8 × 4 Net Screen)**, or **None**.

Note:
Halftone is available only when Pixel Depth is set to **Black & White***.*

To cancel the settings, click **Cancel**.

To save the settings you made as a group of custom settings, type a new name in the Image Type Name box, then click **Save**.

To delete an Image Type setting, select the setting name to be deleted in the Image Type Name menu, then click **Delete**.

To apply the settings you made, click **OK**. The Preview window displays the effects of the current settings except for **TET** (Text Enhancement Technology) and **AAS** (Auto Area Segmentation) settings.

Destinations

Select the destination, or output device, where the scanned image is to be printed or displayed using the Destination list or button.
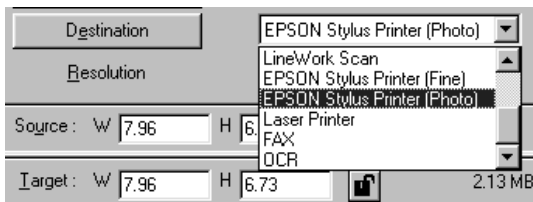
Destination list

The Destination list contains the following predefined settings and any custom settings you have saved in the Destination dialog box. Click the arrows on the right to view all the available settings.

Destination name	Resolution		Unsharp Mask
	Line drawings and halftone images	**Photos**	
Screen/ Web	96 dpi (for Windows) 72 dpi (for Macintosh)	96 dpi (for Windows) 72 dpi (for Macintosh)	on
Prepress 175 lpi	350 dpi	350 dpi	off
Prepress 150 lpi	300 dpi	300 dpi	off
Prepress 133 lpi	266 dpi	266 dpi	off
Prepress 120 lpi	240 dpi	240 dpi	off
LineWork Scan	1200 dpi	600 dpi	on
EPSON Stylus Printer (Fine)	360 dpi	150 dpi	on
EPSON Stylus Printer (Photo)	720 dpi	300 dpi	on
Laser Printer	600 dpi	200 dpi	on
Fax	200 dpi	200 dpi	off
OCR	300 dpi	300 dpi	off

If you are using an EPSON Stylus printer and are printing scanned images with the Economy, Normal, or Fine Print Quality settings in your printer software, selecting EPSON Stylus Printer (Fine) is recommended. If you are printing with the SuperFine or Photo Print Quality settings, select EPSON Stylus Printer (Photo).

Note:
The effects of the Destination settings cannot be viewed in the Preview window.

Destination button

The Destination button allows you to customize the Destination settings. To make your own settings, such as scanning resolution, click this button. The following dialog box appears.
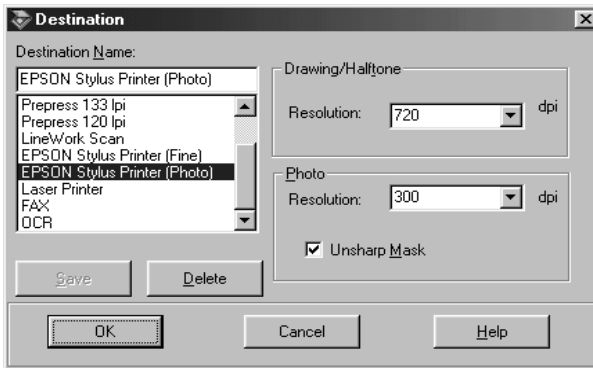
Destination Name:

Predefined and custom setting names appear in the Destination menu.

Resolution:

Specify a scanning resolution for line drawing and halftone images, or photos.

Note:

❏ *When the Pixel Depth setting in the Image Type dialog box is set to* **Black & White***, the Drawing/Halftone setting takes effect and the Photo setting becomes irrelevant. For other Pixel Depth settings, the Photo setting takes effect and the Drawing/Halftone setting becomes irrelevant.*

❏ *To print your scanned document when Resolution is set to* **Drawing/Halftone***, select the same resolution setting from the list as you select in the printer driver. To print your scanned document when Resolution is set to* **Photo***, select a resolution between 150 and 300 dpi. If you select a higher resolution, the* **Photo** *setting requires longer to print, but does not improve the output quality.*

❏ *The Resolution setting is closely related to the Image Size and Scale settings. If you change them arbitrarily, the resulting image may not be what you expected.*

❏ *The range of resolution values depends on your scanner.*

Unsharp Mask

You can select or deselect the Unsharp Mask setting. Selecting the check box improves image sharpness.

To apply the settings you made, click **OK**. To cancel the settings, click **Cancel**.

To save the settings you made, type a new name in the Destination Name box, and then click **Save**.

To delete a Destination setting, select the target setting name to be deleted in the Destination Name menu, then click **Delete**.

Changing Resolution

The resolution for the current scanning operation can be changed by selecting a resolution or typing in the value. This setting overrides the resolution setting you make in the Destination dialog box.

Resolution	300 ▼
Source : W 7.96	H 6.
Target : W 7.96	H 6.

(dropdown list: 300, 350, 360, 400, 600, 720)
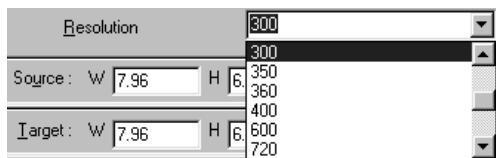
Source and Target image sizes

The Source fields indicate the size of the image that is displayed or selected in the Preview window.

Source : W 1.37	H 1.81	cm ▼

The Target fields indicate what size the image will be when it is output.

Target : W 1.37	H 1.81	🔓	101.09 KB

Note:
The image size setting is closely related to the Resolution. If you change either setting arbitrarily, the resulting image may not be what you expect.

Width and Height menu:

The width and height of an image are indicated in the selected unit of measure. You can type new values directly in the indicator fields, or you can change the image area in the Preview window by creating a marquee, or frame. Do this by dragging the mouse over the desired area. See "Preview Window" on page 2-19 for more information on marquees.

Units menu:

Select a unit of measurement. You can select either **pixels**, **inches**, or **cm**.
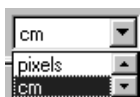
Storage size indicator:

The storage size of an image is indicated in KB or MB. As you change the image area in the Preview window, this value also changes.

Lock button:

🔒 locked

🔓 unlocked

The current size of width-to-height of the target image can be locked, allowing the ratio of width-to-height of the Source image to change according to the scale value, or the scale value to change according to the ratio of width-to-height of the Source image. This is especially useful in cases where the size of an image does not fit the size of the paper on which you want to print the image, but you want to keep the image's original proportions. Enter the size of the paper in the Width and Height fields of the Target box and then click the lock button. The scale value is automatically changed, maintaining the current ratio of width-to-height to fit the paper.

Scale slider:

An image can be reduced or enlarged by moving the Scale slider. You can also click the left or right arrow to change the image size in 1% increments.

The range of possible reduction or enlargement varies depending on the current resolution setting.

Scale indicator:

The percentage of enlargement or reduction is shown in the Scale indicator field. You can type a new value directly into this field, or use the Scale slider to determine the value.

Preview Window

Before you scan and save an image, you can preview it in the Preview window. The Preview feature displays your image in the Preview window and allows you to see the effects of your settings before scanning. You can also use the Preview feature to determine the width and height of the scanning image and the file size of the image to be saved. See the section on Image Size in this chapter.

Note:
You cannot preview an image that exceeds available memory or disk space.

To preview an image, click **Preview** in the EPSON TWAIN Pro main dialog box.

The window shown below appears.
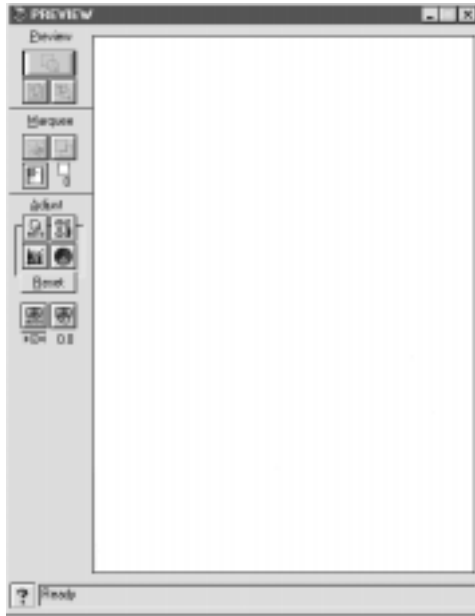
preview window

You can see the effects on the preview image of any of the
following settings.

❏ Pixel Depth, Halftone, and Dropout in the Image Type dialog
box

❏ Unsharp Mask in the Destination dialog box

❏ Exposure, Gamma, Highlight, Shadow, and Threshold in the
Image Controls dialog box

❏ Tone Correction in the Tone Correction dialog box

❏ Gray Balance Intensity, and Saturation in the Color Adjustment dialog box

❏ Focus position on the Preview window when zoom preview is carried out

Note:
Although the image in the Preview window changes as you make settings, the settings do not affect the real image until you scan or rescan the image.

For more information on image settings, see "Image Controls" on page 2-30, "Tone Correction" on page 2-33, "Color Adjustment" on page 2-35, and "Configuration Button" on page 2-42.

Preview Buttons

Zoom preview button

To preview a part of the image that is already in the Preview window, click and drag the mouse to create a marquee over the area you want to see in detail, then click the zoom preview button. See "Marquees and Marquee Buttons" on page 2-23 for information about marquees.

Return to full preview button

Clicking the return to full preview button restores the image to a full preview. This button is available only when the marquee is zoomed as described above.

Return to zoom preview button

Clicking the return to zoom preview button restores the image to the previous zoom. This button is available only when a marquee has been previously zoomed. This restores the zoom preview from memory, which is quicker than rescanning the same zoomed area by clicking the zoom preview button again.

Marquees and Marquee Buttons

There are buttons available on the preview window to help you manage the marquees.

A marquee is a frame around an image, or a part of an image. Marquees are often used in scanning and image-editing software to select only the most important part of an image.

Making and modifying marquees

Move the pointer over the image in the Preview window. The pointer becomes a set of cross-hairs. Drag (move the mouse while holding down the mouse button) the cross-hairs over any area of the image, and a dotted frame appears. The point where you first clicked is anchored, but the rest of the frame is sizable and movable. After you finish creating a marquee, you can resize and move it as described below.

Multiple marquees

You can make multiple marquees in one image to scan the most important parts while ignoring the rest. It is also useful to set several items on the document table and scan all of them in one time. Marquees can be different sizes, and they can overlap. Extra marquees can be made anywhere except on the frame of another marquee. You can make settings on each marquee.

You can begin a marquee anywhere the pointer appears as cross-hairs. To distinguish the active marquee from other marquees, look at the marquee frames. The active marquee has moving dotted line of the frame as shown below. If you created multiple marquees and want to make a inactive marquee active, just point the cursor at the edge of the marquee and click. The marquee becomes active.

Resizing marquees

When you move the pointer over the edge of the active marquee, the pointer will change to a double-headed arrow as shown below. You can then resize the marquee to the direction of the arrow is pointing, up, down, sideways, or diagonally, by dragging the arrow. The double-headed arrows only appear on the active marquee.

If you drag an arrow while pressing the **Shift** key, the marquee will be resized proportionally.

Moving marquees

To move an active marquee, move the pointer in the frame of the marquee, and when the pointer changes into a hand, drag the marquee to move it.

If you drag the marquee while pressing the **Shift** key, the marquee will be limited to vertical or horizontal movement.

Note:
If you want to create a marquee inside the active marquee, first make a marquee outside the active marquee. The newly created marquee becomes the active marquee and you can move it inside the other marquee.

Delete marquee button

Clicking the delete marquee button removes the active marquee.

Note:
You can also delete the active marquee by pressing the **Delete** *key on your keyboard.*

Duplicate marquee button

Clicking the duplicate marquee button creates another marquee the same size as the active marquee. Use this button to make multiple marquees.

Clicking the duplicate marquee button while holding down the keys noted in the table below causes the duplicate marquee(s) to appear in a specific direction next to the original marquee.

	Horizontal	**Vertical**
Windows	Ctrl key	Alt key
Macintosh	Command key	option key

Auto locate button

Click the **Auto Locate** button to make the scanner automatically locate and select the target image. The image appears without white borders in the Preview window.

entire preview area   located image
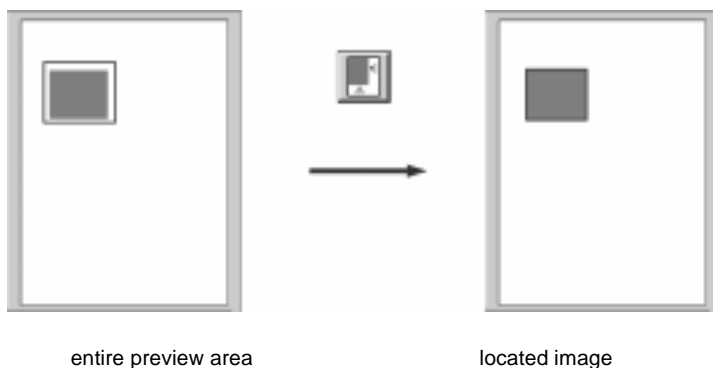
Note:
The Auto Locate feature is automatically activated when scanning without previewing.

If a document contains more than one image, select a target image by placing the mouse pointer over the image and clicking the **Auto Locate** button. The selected target image is located automatically.

target image and other image   located and
                                               non-located images
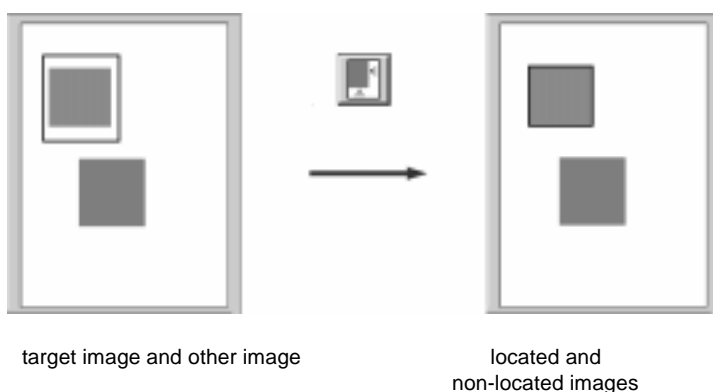
Note:
Create a marquee only on the target image. If the marquee covers other images, the Auto Locate feature is disabled.

Marquee number indicator

This shows the number of marquees in the Preview window. To create more marquees, see "Duplicate marquee button" on page 2-26.

Adjust Buttons

Before you scan an image, you can make adjustments manually with the powerful image quality adjustment tools on the Preview window. The following adjust buttons are available.

      Auto Exposure button

      Image Controls button

      Tone Correction button

      Color Adjustment button

      Auto Focus button

      Manual Focus button

Auto Exposure

Click the **Auto Exposure** button on the Preview window to automatically optimize the exposure for an image. The Gamma, Highlight and Shadow settings in the Image Controls dialog box are automatically set.

Note:
❏ *The Auto Exposure button appears dimmed and is not available when the Pixel Depth is set to* **Black & White** *and* **AAS** *is not selected in the Image Type dialog box.*

❏ *The Auto Exposure feature is automatically activated when scanning without previewing.*

Image Controls

Click the **Image Controls** button on the Preview window to view
the following dialog box.

Note:
❏ *The Image Controls button appears dimmed and is not available
    when* **TET** *(Text Enhancement Technology) is selected in the Image
    Type dialog box.*

❏ *The Image Controls settings are optimized automatically when you
    scan without previewing.*

❏ *If Pixel Depth is set to* **Black & White** *and Halftone is set to* **None**
    *in the Image Type dialog box, all the settings except Threshold
    appear dimmed and cannot be selected.*

❏ *You can see the effects of the Image Controls settings in the Preview
    window.*

Exposure:

The Exposure setting lightens or darkens an image. You can
select from -10 (darkest) to 20 (brightest) by moving the slider.

The Exposure and Highlight controls are related. When the Exposure setting is changed, the Highlight value is automatically set.

Gamma:

The Gamma control allows you to adjust the mid-tones in an image. You can select from 50 (darkest) to 500 (brightest) by moving the slider.

Highlight:

The Highlight control allows you to adjust the brightness level of the brightest parts of an image. You can select from 61 to 490 by moving the slider.

Click the eyedropper button beneath the slider, and the mouse pointer changes to an eyedropper. Move the eyedropper over the preview image, and click a bright area. The eyedropper "picks up" the color from that area, and uses it as the highlight for the entire image. This effect appears immediately in the preview image. Click **Cancel** to restore the original image.

Shadow:

The Shadow control allows you to adjust the darkness level of the darkest parts of an image. You can select from 0 to 60 by moving the slider.

Click the eyedropper button beneath the slider, and the mouse pointer changes to an eyedropper. Move the eyedropper over the preview image, and click a dark area. The eyedropper "picks up" the color from that area, and uses it as the shadow for the entire image. This effect appears immediately in the preview image. Click **Cancel** to restore the original image.

Threshold:

Available only when Pixel Depth is set to **Black & White** and Halftone is set to **None** in the Image Type dialog box. The scanner scans gray shades as either black or white using this setting.

You can select from 0 (lightest) to 255 (darkest) by moving the slider.

Tone Correction

Click the **Tone Correction** button in the Preview window to view the following dialog box.
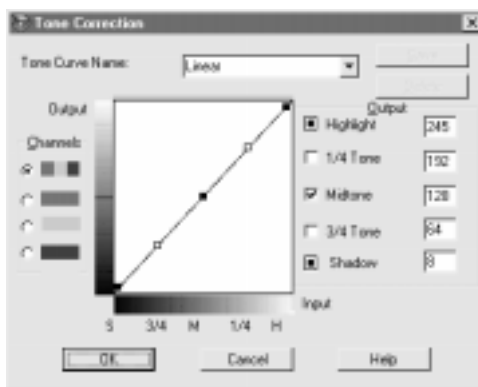
Note:
❏ *The default Tone Correction settings are the Linear.*

❏ *The Tone Correction button appears dimmed and is not available when Pixel Depth is set to* **Black & White***, Halftone is set to* **None***, and* **TET** *(Text Enhancement Technology) is selected in the Image Type dialog box.*

❏ *You can see the effects of the Tone Correction settings in the Preview window.*

The tone value represents the contrast in the tonal relationship between an original image and its reproduction on a monitor or printer.

Tone Curve Name list:

Select a tone correction setting from this list. The custom settings you have saved appear in this list.

Tone Curve editor:

The editor allows you to customize tone correction. Drag points on the tone curve to adjust the tone value. You can edit up to five tonal elements.

Output options:

If you select the check box for a specific point, such as 1/4 Tone or Midtone, you can move that point and it will remain where you leave it; it will not be affected by the movement of other points on the curve. If the check box is cleared, the point will be affected by the movement of other points.

Channels options:

You can select the combined red, green, and blue (RGB) channel to modify all colors, or select these colors separately.

OK/Save/Delete/Cancel buttons:

To accept the defining Tone Correction or close the dialog box, click **OK**.

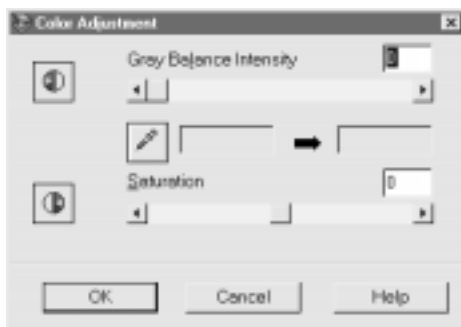After you correct tone, type a name for your custom settings in the tone correction list and click **Save**.

To delete a setting, select the name of the setting you want to delete in the tone correction list and click **Delete**.

To cancel the operation, click **Cancel**.

Color Adjustment

Click the **Color Adjustment** button in the Preview window to view the following dialog box.

Note:
❑ *If Image Type setting is not* **24-bit Color (Std)** *or* **24-bit Color De-screening**, *or Pixel Depth is set to* **8-bit Gray** *or* **Black & White**, *the Color Adjustment button appears dimmed and these settings cannot be selected.*

❑ *You can see the effects of the Color Adjustment settings in the Preview window.*

Gray Balance Intensity:

Gray Balance Intensity removes unwanted color casts and tints by balancing color saturation.

Click the eyedropper button beneath the slider. The mouse pointer changes to an eyedropper. Click the color you want to represent gray. The eyedropper "picks up" the color and displays it in the box beside the eyedropper button. You can then correct the cast level for that color from 0 to 100 by moving the slider. The corrected color appears in the box on the right, and the effect shows up immediately in the preview image. Click **Cancel** to restore the original image.

Saturation:

Saturation is the property that defines color depth. Select a saturation level from -100 (less color) to 100 (more color) by moving the slider.

Reset Button

Use the Reset Button to return any image control settings you made back to their default settings. If you did not alter any image control settings, this button appears dimmed and is not available.
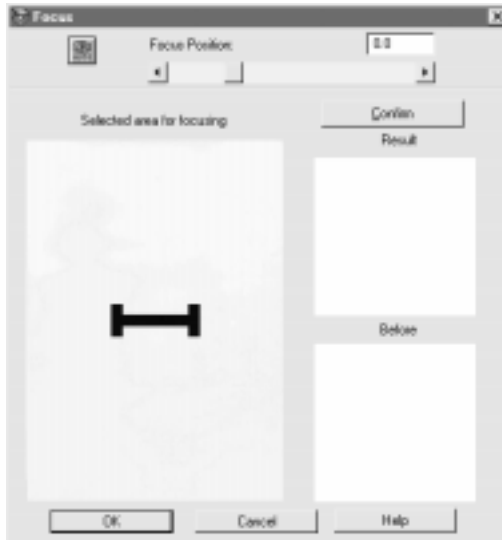
Auto Focus

Click the **Auto Focus** button on the Preview window to set the focus position.

Manual Focus

Click the **Manual Focus** button on the Preview window to determine where the focus should be. This may help improve the quality of your image. When you click this button, the following window appears.

Auto Focus:

Clicking this button adjust the focus position automatically. This works exactly the same way the **Auto Focus** button in the Adjust dialog box works.

Focus Position:

You can select from-3.0 (Lowest) to 9.0 (highest) by moving the slider, clicking the left or right arrow, or typing a value from -3.0 to 9.0 in increments of 0.1 in the Focus Position box. By adjusting the focus position, you can reduce the occurrence of moire patterns when scanning.

Note:
❏ *If TPU (for Neg. Film or for Pos. Film) is selected as the Document Source, the value of the focus position is automatically set to 2.5. If Flatbed or ADF (Single-sided or Double-sided) is selected, the value is automatically set to 0.*

❏ *If you set the film to be scanned using film holders, you do not need to change the focus setting. If you set the film directly on the scanner's document table, it is recommended to change the focus position to 0.0.*

Selected area for focusing window:

This window shows a preview image of the active marquee. If there is no marquee in the Preview window, the focus marquee window shows a full preview image. To change the image in the focus marquee window, change the marquee or the image in the Preview window.

Focus Line:

The focus line appears at the center of the focus marquee window (default). If you move the cursor over the focus line, the cursor will change to a "hand" cursor. You can then move the focus line by clicking and dragging the "hand" cursor to a new part of the image.

Confirm:

Click this button to compare the new image that you just modified image (shown in the Result window) with the unmodified image (shown in the Before window).

Result window:

This window shows the image whose focus line position you just modified.

Before window:

This window shows the image with the focus line in the default position. The focus line determines what point of the image is used.

Settings Button

Click the **Settings** button on the main window to view the following dialog box. You can view all the settings for the current preview image in this dialog box. Also, you can save all of the currently selected settings as a group of custom settings with a name you specify. Later, you can apply any custom settings you have saved. Note that only user defined settings related to the Document Source currently selected will appear in the User defined settings field.

Depending on your scanner model, the preset settings for using film holders with positive films may appear in the User defined settings field when the optional Transparency Unit is installed.

To save the currently selected settings, type a new name in the **User defined settings** field, then click **Save**.

To apply saved settings, select a setting name from the list, then click **OK**. The preview image will reflect the settings you saved.
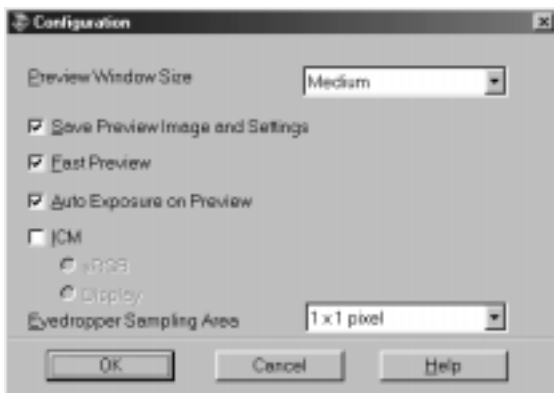
To restore the previous settings, click **Cancel**.

To delete a setting, select the setting name in the list, then click **Delete**.

Configuration Button

Click the **Configuration** button on the main window to view the following dialog box. You can make settings that affect the Preview window.

Windows

Macintosh

Preview Window Size:

Select the size of the Preview window. Your choices are Large, Medium, and Small.

Save Preview Image and Settings:

Select this check box to automatically save the preview image and all the image settings when you exit EPSON TWAIN (quit scanning). The next time you restart EPSON TWAIN, the image and settings will reappear.

Fast Preview:

Enables high-speed loading of the preview image. If this is selected, the preview image is scanned in Draft mode. If this is not selected, the preview image is scanned in Best mode, and you can get accurate values for the Highlight, Shadow, and Gray Balance Intensity by sampling with the eyedropper in the preview image.

Do not select the check box when quality is more important than speed.

Auto Exposure on Preview:

Displays the preview image with automatically optimized exposure settings. The result is the same as if you clicked the **Auto Exposure** button.

ICM (for Windows 2000, 98, and 95 Users):

Depending on your Windows version, this setting may not be available or may have options. Select ICM to reproduce the colors in your image using the Windows ICM color management system.

For Windows 2000 and 98 users:
When the sRGB option is selected, the sRGB profile is used to reproduce colors. When the Display option is selected, the color profile selected for your monitor in the Display Properties dialog box is used to reproduce colors.

Note:
❏ *If your printer and monitor do not support ICM, be sure this check box is cleared.*

❏ *See "Using ICM (For Windows 2000, 98, and 95 Users)" on page 3-8 for more details.*

ColorSync (for Macintosh):

Reproduces the colors in your image using ColorSync color management system. ColorSync uses a special color matching scheme to make sure the colors in your output match the colors in the original image. This setting appears only in Macintosh.

Note:
If your printer and monitor do not support ColorSync, leave this check box clear.

Eyedropper Sampling Area:

Allows you to select one of the three following size settings for the Eyedropper Sampling Area: 1×1 pixel, 3×3 pixel, and 5×5 pixel. The Eyedropper feature can sample the average Highlight, Shadow, and Gray Balance Intensity values of the target area.

Scan Button

Clicking the **Scan** button scans the image or active marquee in the Preview window. The scanned image is transferred to the application software you used to open EPSON TWAIN Pro so that you can work with the image from within that application.

While scanning, a progress indicator appears. If necessary, click the **Cancel** button to cancel the operation.

Note:
❏ *You cannot scan an image whose size exceeds available memory or disk space. If you attempt to scan an image that is too large, an error message appears on the screen.*

❏ *Before you begin scanning, you should calibrate your display monitor. For more information, see Chapter 3, "Calibrating Your System."*

❏ *After an image is scanned, be sure to save it.*

Scan All Button

Clicking the **Scan All** button scans all of the marquees as separate images, one at a time. This button is available only when there are multiple marquees.

Chapter 3

Calibrating Your System

Overview

When you install EPSON TWAIN Pro, the EPSON Screen Calibration utility is automatically installed.

EPSON Screen Calibration calibrates your monitor to ensure the tone and contrast on your screen match the original image. Be sure to calibrate your screen before using your scanner.

For more information regarding color and output device calibration, see the *Color Guide*.

Calibrating Your Screen

You need to calibrate your screen when you first install the scanner software, and anytime you switch to a different monitor.

For Windows 2000 and 98 users

1. Double click the **Scanners and Cameras** icon in Control Panel. The Scanners and Cameras Properties dialog box appears. Click the **Properties** button.
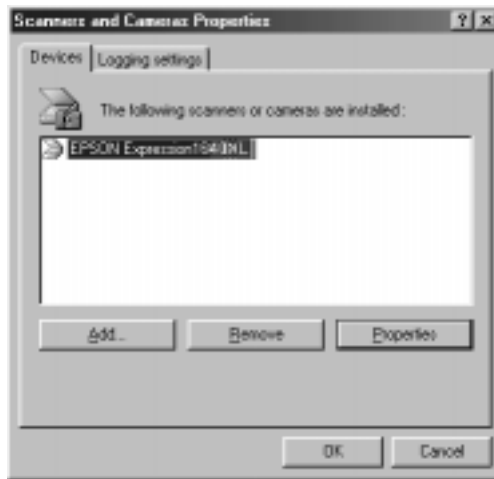
2. Click the **Utility** tab, then click the **Screen Calibration Utility** icon. The Screen Calibration dialog box appears.
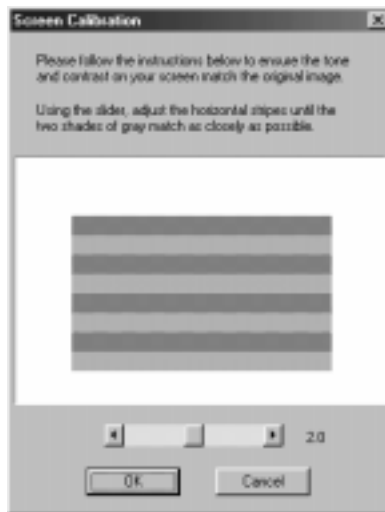
The gray stripes will not blend together perfectly; however, try to make the different tones match as closely as possible.

3. Click **OK** to finish calibrating your scanner and monitor.

The setting is automatically saved as the Screen profile in the Calibration list in EPSON TWAIN's Destination dialog box. The screen profile contains calibration information for the preview image as well as the scanned image.

For Windows 95 and NT 4.0 users:

1. Double-click the **EPSON TWAIN Pro** icon in the Control Panel window. The EPSON TWAIN Pro setup dialog box appears.

2. Click **Screen Calibration Utility**. The following screen
    appears:
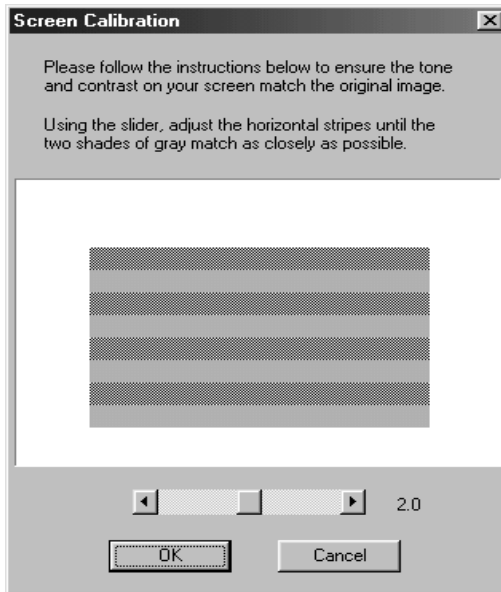
3. Look at the screen and move the slider to the right or left until
    the two tones almost match.

4. Click **OK** to finish calibrating your scanner and monitor.

Note:
*The gray stripes will not blend together perfectly; however, you should
try to make the different tones match as closely as possible.*

For Macintosh users

1. Click the **EPSON Screen Calibration** icon in the EPSON Scanner folder to view the Screen Calibration dialog box.

2. Look at the screen from a distance and move the slider right or left until the two tones almost match.

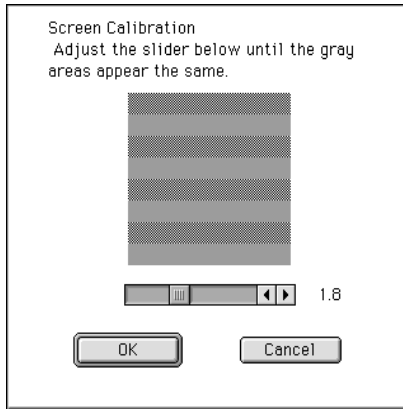3. Click **OK** to finish calibrating your scanner and monitor.

Note:
The gray stripes will not blend together perfectly; however, you should try to make the different tones match as closely as possible.

Using ICM (For Windows 2000, 98, and 95 Users)

If you use Windows 2000, 98 or 95 and your output devices (printer and monitor) support the ICM color management system, you can use the ICM calibration method.

For Windows 2000 and 98 users

Note:
If your output devices do not support sRGB, leave the check box empty.

Follow the steps below:

1. Run PageManager for EPSON or TWAIN-compliant software and select **Acquire** or similar command from the File menu to start EPSON TWAIN Pro.

2. Click **Configuration**. Select **ICM** in the Configuration dialog box.

3. Select either the sRGB or Display option.

   When the sRGB option is selected, the sRGB profile is used to reproduce colors. When the Display option is selected, the color profile selected for your monitor in the Display properties dialog box is used to reproduce colors.

4. Make any other settings you want.

5. Click **Scan**.

For Windows 95 users

Note:
If your output devices do not support ICM, leave the check box empty.

Follow the steps below:

1. Run PageManager for EPSON or TWAIN-compliant software and select **Acquire** or similar command from the File menu to start EPSON TWAIN Pro.

2. Click **Configuration**. Select **ICM** in the Configuration dialog box.

3. Make any other settings you want.

4. Click **Scan**. The scanner scans an image using the ICM profile.

Using ColorSync (For Macintosh Users)

If your output devices (printer and monitor) support the Apple ColorSync color management system, you can use the ColorSync calibration method.

Note:
If your output devices do not support ColorSync, leave the check box empty.

Follow the basic steps below:

1. Run PageManager for EPSON or TWAIN-compliant software and select **Acquire** or a similar command to start EPSON TWAIN Pro.

2. Click **Configuration**. Select the **ColorSync** check box in the Configuration dialog box.

3. Make any other settings you want.

4. Click **Scan**. The scanner scans an image using the ColorSync profile.

When the scanned image is printed or displayed with an output device calibrated for the scanner, the image reproduced is identical to the original.

Chapter 4

Maintenance and Troubleshooting

Maintenance

Cleaning the scanner

To keep your scanner operating at its best, you should clean it periodically, as described below.

1. Unplug the power cord.

2. Clean the outer case with mild detergent and water.

3. If the glass of the document table gets dirty, clean it with a soft dry cloth. If the glass is soiled with grease or some other hard-to-remove substance, use a small amount of glass cleaner and a soft cloth to remove it. Wipe off all remaining liquid.

Be sure that there is no dust on the glass of the document table. Dust can cause spots in your scanned image.

Warning:
❏ *Be careful not to scratch or damage the glass of the document table, and do not use a hard or abrasive brush to clean it. A damaged glass surface can decrease scanning quality.*

❏ *Never use alcohol, thinner, or corrosive solvent to clean the scanner. These chemicals can damage the scanner components as well as the case.*

❏ *Be careful not to spill liquid into the scanner mechanism or electronic components. This could permanently damage the mechanism and circuitry.*

❏ *Do not spray lubricants inside the scanner.*

❏ *Never open the scanner case.*

Replacing the fluorescent lamp

The luminosity of the fluorescent lamp declines over time. If the lamp breaks or becomes too dim to operate normally, the scanner stops working and both the **READY** and **ERROR** lights flash rapidly. When this happens, the lamp assembly must be replaced. For details, contact your dealer.

> **Caution:**
> *Never open the case of the scanner. If repairs or adjustments are necessary, consult your dealer.*

Transporting the Scanner and the Transparency Unit

When transporting the scanner or the Transparency Unit a long distance, or storing them for an extended period, lock the scanner carriage and the Transparency Unit's lamp assembly to prevent damage. Follow the procedures below.

For the scanner

1. Turn on the scanner and wait until the carriage moves left to the home position.

2. Turn off the scanner.

3. Turn the transportation lock to the locked position by using a coin or similar disc and secure the carriage.

For the optional Transparency Unit

1. With the Transparency Unit attached, turn on the scanner and wait until the unit's lamp assembly moves to its home position. Turn off the scanner and remove the Transparency Unit.

2. Install the shipping screw in its original shipping hole.

Problems and Solutions

This section divides problems into seven categories:

See the table in "Error indicator" on page 4-6 first, then go to the appropriate section for your problem and follow the recommended steps.

Note:
If some settings appear dimmed in EPSON TWAIN Pro, they cannot be selected because of the capability of your scanner or your choice of other settings.

If you cannot solve a problem after reading and following the information in this section, contact your dealer or a qualified customer support person for assistance.

Error indicator

When an error occurs, the scanner stops operating and the **ERROR** and **READY** lights indicate the error type as described below.

ERROR Light	READY Light	Error Type
On	On	Command error
Flashing	Off	Interface error
Flashing	Flashing	Fatal error
Off	Off	Option error

Command error

Rescan the document. The scanner returns to normal when it receives correct commands. Normally you do not need to reset the scanner when this type of error occurs.

Interface error

Check the interface connection and then press the **RESET** button or ⏻ **OPERATE** button to turn the scanner off and then back on again to reset it.

Fatal error

❏ Check the fluorescent lamp, and replace it if needed.

❏ Make sure that the transportation lock is released.

❏ Check that the scanner is malfunctioning.

❏ Check that the transportation lock lever is released and check any installed options for problems. Next, turn the scanner off and then back on again. If this does not correct the problem, consult your dealer.

Option error

Check the option and correct the cause of the problems such as;

❏ paper jam

❏ an empty document feeder

❏ an open cover

Operating problems

Problems you may have while using the scanner often involve the operation of your software and computer. Operation problems usually occur because of:

❏ Incorrect setup of the interface.

❏ Inappropriate selection of the scanner functions.

❏ Incorrect setup of your computer or software.

❏ Incorrect operation of your software.

See the documentation that came with your computer and software for possible solutions.

The **OPERATE** *light does not come on*

❏ Make sure the scanner is turned on. Press the ⏻ **OPERATE** button.

❏ Make sure the power cord is connected to the scanner and plugged into a power outlet.

The scanner does not scan

❏ Make sure the scanner is ready for scanning. Wait until the **READY** light stops flashing and remains on.

❏ Make sure your interface port and software settings are correct. Also make sure that your computer's interface board is installed properly.

❏ **For SCSI interface Users**
Make sure the scanner's SCSI ID and terminator are set correctly. Also if you have other expansion boards in your computer, make sure that their interrupt settings are not interfering with your SCSI board. See your computer's documentation for details.

❏ **For USB interface users**
Try connecting the scanner directly to the computer's USB port, or use an EPSON USB cable.
Try connecting your scanner to a different port on your hub, or a different hub, if one is available.

❏ **For Macintosh and IEEE 1394 interface users**
Make sure that the following Extensions are selected in the Extensions Manager.

EPSON FW Scanner Enabler
EPSON FW Scanner Expert
EPSON FW Scanner Lib

Quality problems

The entire image is distorted or blurred

❏ Make sure the document is flat against the document table.

❏ Make sure you do not accidentally move the document during scanning.

❏ Make sure the scanner is on a flat, stable surface.

Part of the image is distorted or blurred

make sure the document is uniformly flat against the document table. A document that is wrinkled or warped may not scan well.

> **Caution:**
> *Do not place heavy objects on the document table.*

Edge of the document are not scanned

Position the document so the area you want to scan is within the edge guide limits of the document table.

Colors are patchy or distorted at the edge of the image

❏ A document that is very thick or warped at the edges can cause discoloration. Cover the edges of the document with paper to block outside light.

❏ Make sure the document is flat against the document table.

The image is faint or out of focus.

❏ Make sure the document is flat against the document table.

❏ Adjust your software's Exposure setting. See "Image Controls" on page 2-30.

❏ Adjust your software's Gamma setting. See "Adjusting the Gamma Setting" on page 1-9.

The image is too dark.

❏ Check your software's Brightness setting.

❏ Check the brightness and contrast settings of your computer display.

Straight lines in the image come out jagged

Make sure the document orientation is perfectly straight on the document table. Align vertical and horizontal lines with the scales at the top and side of the document table.

The image does not look the same as the original

❏ Try different image setting combinations on your scanner software.

❏ Your software may not have sufficient color matching and color management features, or these components may not be installed correctly. See the documentation that comes with your software and computer.

❏ If you are importing an image file, make sure the file format is one your software can read. Also, make sure the image settings of your software are appropriate for the type of image you want to scan.

A line of dots is always missing from the scanned image

❏ See your printer manual. Print head malfunction is indicated when a line is missing on printouts only.

❏ Scanner sensor malfunction is indicated when a line is missing on both screen images and printouts. Contact your dealer.

Moiré (cross-hatch) patterns appear in the scanned image

❏ Change the Image Type settings. Turn the De-screening setting **On** in the Image Type dialog box.

❏ Place a transparency sheet between the document and document table.

❏ Reposition the document slightly.

❏ Make the Image Size setting slightly smaller.

❏ Change the focus position setting.

Colors differ from the original.

❏ Calibrate the screen. See "Calibrating Your Screen" on page 3-3.

❏ Change the Image Type and Destination settings. See "Image Types" on page 2-7 and "Destinations" on page 2-12 to make sure your settings are correct.

❏ Printed colors will not exactly match the colors on your monitor, since printers and monitors use different color systems: monitors use RGB (red, green, and blue), while printers typically use CMYK (cyan, magenta, yellow, and black).

Colors on your monitor are different from those in the original image

❏ Check the image settings of your scanner software, especially data format (bits, pixel, color), gamma correction, and color correction. Try different combinations of these settings.

❏ Check the color matching and color management capabilities of your computer, display adapter, and software. Some computers can change the color palette to adjust the colors on your screen.

❏ Exact color matching is very difficult. Check your software and monitor documentation for information on color matching and calibration. Also see your *Color Guide*.

Printed colors are different from those in the original image

Exact color matching is very difficult. Check your software or contact your printer company for information on color matching and calibration.

The printed image is larger or smaller than the original

The image size settings of your software determine the size of the printed image. Do not use the size of the monitor image to judge the printed size.

Scanned images cannot be printed or come out garbled when printed

❏ Make sure your printer is properly connected to the computer, correctly set up, and maintained. See your printer manual for details.

❏ Check that your software is properly installed and set up for your printer.

The colors of negative film preview images look strange

❏ Make sure the EPSON TWAIN Pro **Document Source** setting is **TPU for Neg. Film**.

❏ The dark area around the film, such as the frame of the film holder, is perceived as white, which alters the exposure of the scanning area and causes scans to appear darker. See the correct color by clicking and dragging the mouse over an area, and then clicking the zoom preview button.

Software setup problems

You cannot install EPSON TWAIN Pro

❏ Check if your computer and operating system meet the system requirements. See your scanner manual.

❏ Make sure your computer has enough memory to run the application.

The scanner does not appear in the Port list of the EPSON TWAIN Pro dialog box in the Control Panel when you connect your scanner using the SCSI interface to your PC running Windows other than Windows 98 or 2000

❏ Turn off the computer and scanner and check the connection between your hardware.

❏ Change the SCSI ID number to one that is not being used by any other SCSI devices.

❏ When the scanner is connected in a daisy chain, check the connections of all the devices in the chain, and make sure that the scanner's terminator switch is set appropriately for its position in the chain.

The Scanner Status does not indicate "Device Ready" after you click Test in the EPSON TWAIN Pro dialog box (Windows 95 and NT 4.0) or the Scanner's Properties dialog box (Windows 98 and Windows 2000) in the Control Panel

❏ Make sure the interface cable meets the requirements of your interface board. See the manual that comes with the interface board.

❏ Turn off the scanner and computer and check the connection between the scanner and computer.

❏ Make sure the SCSI interface board is installed correctly.

❏ Make sure the power on sequence is correct.

❏ Make sure the SCSI driver is properly installed.

❏ Change the scanner's SCSI ID number to one that is not being used by any other SCSI device.

❏ When the scanner is connected in a daisy chain, check the connections of all the devices in the chain, and make sure that the scanner's terminator switch is set appropriately for its position in the chain.

Scanning problems

Image is dark, with little or no detail.

❏ Calibrate the screen as described in "Calibrating Your Screen" on page 3-3.

❏ Change the Destination setting. Select **Screen/Web** as the "Destination". Selecting a printer may cause on-screen colors to be different from the colors of the original, however colors will be reproduced correctly when it is printed.

You cannot scan an image or you only get a few dots for the scanned image

❏ Make sure you have placed a document on the document table of the scanner.

❏ Change the Threshold setting. When **OCR** is selected as the Image Type, change Text Enhancement Technology to **None** from the B/W Option in the Image Type dialog box. Then change the Threshold setting in the Image Controls dialog box.
Or change OCR to **Line Art**, then change the Threshold setting in the Image Control dialog box. See "Image Controls" on page 2-30.

Scanned image is too large.

Change the Destination setting. Select **Screen/Web** as described in "Destinations" on page 2-12. If you select a printer as the Destination setting, the print size will be correct, although the image may appear enlarged on the screen of some applications.

Poor character recognition during OCR scanning.

❏ Change the Image Type setting. Select **OCR** as described in "Image Types" on page 2-7.

❏ Try adjusting the Threshold setting in the Image Controls dialog box.

❏ Select **Text Enhancement Technology** from B/W Option in the Image Type dialog box to eliminate background noise.

❏ See "Optimizing Image Scanning" on page 1-4 for more information.

Software operation problems

You cannot start EPSON TWAIN Pro.

❏ Make sure the scanner is turned on.

❏ Make sure the interface cable meets the requirements of your interface board. See the manual that comes with the interface board.

❏ Turn off the scanner and computer and check the connection between the scanner and the computer.

❏ Make sure the interface board is installed correctly.

❏ Make sure that EPSON TWAIN Pro is selected in your application.

❏ **For Windows 2000 and 98 users**
Check if your scanner name appears under Imaging Device hardware type without a ? or ! mark in the Device Manager menu. To view this menu, right-click the **My Computer** icon on the Desktop, click **Properties**, then click the **Device Manager** tab. If your scanner appears with a ? or ! mark, or appears as an Unknown devices hardware type, click **Remove** while your scanner is connected and turned on to remove it from the Device Manager menu. Then reinstall EPSON TWAIN Pro.

Pressing the Start button does not start Scanning.

❏ **For Windows 2000 and 98**
Click the **Events** tab in your scanner's Properties dialog box and make sure the **Disable device events** check box is clear. And make sure the Start button is selected as the **Scanner events**, and at least one scanner event recognizable application in the **Send to this application** box is selected.

❏ **For Windows 95, NT 4.0, and Macintosh**
Make sure the Scanner Monitor software is running and check the Scanner Monitor's Launch Application path is set correctly.

You can't select optional equipment (Auto Document Feeder or Transparency Unit).

Make sure the optional equipment is installed correctly. See your scanner manual.

Paper jams

Remove the jammed paper. See your scanner manual.

Changing the SCSI ID number or SCSI board

If you are using your scanner with Windows 98 or 2000 and you want to change the scanner's SCSI ID number or replace the SCSI board with a new one, follow the steps below.

1. Click the **Start** menu, point to **Settings** and click **Control Panel**, then double-click the **Scanners and Cameras** icon.
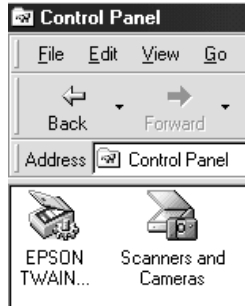
2. Select your scanner in the installed devices list, then click **Remove**.
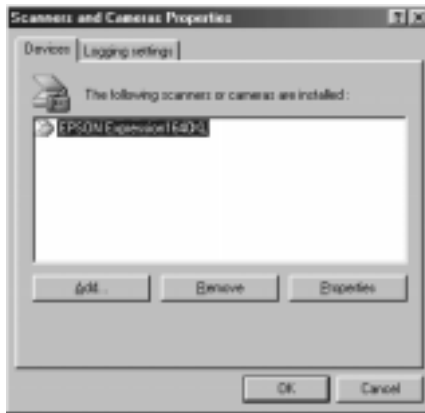
3. Click **OK** and close the dialog box.

4. Shut down Windows 98 or 2000 and turn off your PC and scanner.

5. Change the SCSI ID number, or replace the SCSI board. See your scanner manual.

6. Turn on your scanner and then your PC.

7. Follow the instructions on the screen.

Note:
If the EPSON Scanners Driver Disk is requested, insert the Scanner Software CD in the CD-ROM drive and make sure to specify the correct drive letter, the **EPSON** *folder, the folder of your preferred language, and the* **Win98** *or* **Win2000** *folder as the location respectively.*

Changing USB connections ports

When you want to change the scanner to a different USB port (on your computer or hub), for example when you are adding other USB devices, follow the procedure below.

1. Connect the scanner to your computer.

2. Turn on the scanner and then your computer.

   Note:
   ❑ *Before turning on your computer, if you have any other scanners, in addition to EPSON Expression 1640XL, or cameras listed in the Control Panel's* **Scanner and Cameras Properties** *dialog box, be sure to connect them to your computer or hub and turn them on.*

   ❑ *If you do not follow these steps, your scanner or computer may not operate correctly.*

3. Click the **Start** menu, point to **Settings** and click **Control Panel,** then double-click the **Scanners and Cameras** icon.

4. Select **EPSON Expression1640XL** and click **Remove**.

   Note:
   ❑ *Be sure you have selected the correct device to remove. Since there is no* **Cancel** *button, there is no way to stop removal of a device once you click the* **Remove** *button.*

❏ *If other devices listed in the Scanners and Cameras Properties dialog box are not connected to the computer when you remove the scanner, you may not be able to properly remove them at a later time. Be sure to connect and turn on all the devices listed in the Scanners and Cameras Properties dialog box before turning on your computer and removing the scanner.*

5. Click **OK** to close the dialog box, then close the Control Panel.

6. Shut down Windows98 or Windows 2000 and turn off your computer, but leave the scanner on.

7. Connect the USB cable to the new USB port.

8. Turn on your computer.

9. Follow the instructions on the screen to reinstall EPSON TWAIN Pro.

Recovering from scanner software installation problems on Windows 2000 and Windows 98

If you cancelled the plug-and play driver installation before the procedure was completed, EPSON TWAIN Pro may be incorrectly installed.

Follow the steps below to check the installation.

Note for Windows 2000 users:
The screen shots shown in this section are for Windows 98, so they may vary in appearance from the actual dialog boxes that appear on your screen. The instructions are the same, however, except as noted.

1. Plug the interface cable into your scanner and the computer.

2. Turn your scanner and then computer on.

3. Right-click the **My computer** icon on your desktop, then click **Properties**.

❏ **For Windows 2000 users:**
In the System Properties dialog box, select the **Hardware** tab then click **Device Manager**.

❏ **For Windows 98 users:**
Click the **Device Manager** tab.

4. If your EPSON TWAIN Pro is correctly installed, **EPSON Expression 1640XL** should appear under Imaging Device when you click the plus (+) sign next to Imaging Device.

If **EPSON Expression 1640XL** appears under Other Devices with a question (?) mark or under Imaging Device with an exclamation (!) mark, the EPSON TWAIN Pro file is not installed correctly.

If **EPSON Expression 1640XL** appears under Other Devices with a ?

If **EPSON Expression 1640XL** appears under Imaging Device with

If **EPSON Expression 1640XL** appears under Other Devices with a question (?) mark, see "If EPSON Expression 1640XL appears under other Devices" on page 4-21, if **EPSON Expression 1640XL** appears under Imaging Device with an exclamation (!) mark, "If EPSON Expression 1640XL appears under Imaging Device" on page 4-21.

### If EPSON Expression 1640XL appears under other Devices

Note:
Make sure your scanner is on and connected to your computer. If your scanner is off or not connected to your computer, you cannot reinstall the driver properly.

1. For Windows 2000 users, right-click **? EPSON Expression 1640XL** and select **Uninstall.**

   For Windows 98 users, click **? EPSON Expression 1640XL**, then click **Remove** and **OK**.
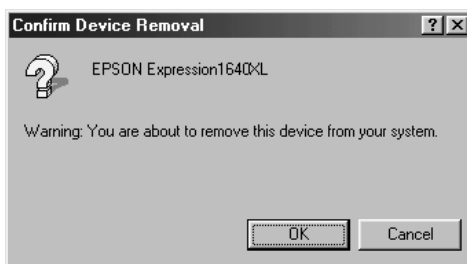
2. Click **Close** to close the System Properties window.

3. Turn off your computer.

4. Make sure your scanner is on and restart your computer.

5. When the message prompts you to install the driver appears, install the driver again. See your Setup Guide

If EPSON Expression 1640XL appears under Imaging Device

Note:
Make sure your scanner is on and connected to your computer. If your scanner is off or not connected to your computer, you cannot reinstall the driver properly.

1. For Windows 2000 users, right-click **! EPSON Expression 1640XL** and select **Uninstall.**

For Windows 98 users, click **! EPSON Expression 1640XL**, then click **Remove** and **OK**.
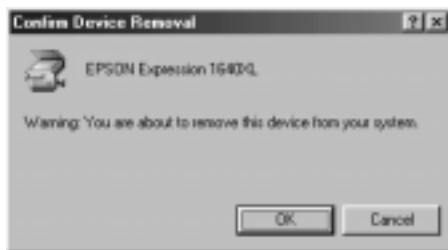
2. Click **Close** to close the System Properties window.

3. Turn off your computer.

4. Make sure your scanner is on and restart your computer.

5. When the message prompts you to insert the scanner software CD appears, insert the scanner software CD in the CD-ROM drive, then click OK.

   If the following dialog appears, click ▼, then browse and select or type in the CD-ROM drive letter, **EPSON** folder, the folder of your preferred language, and **Win2000** or **Win98** folder as the location, as shown below, then click **OK**.
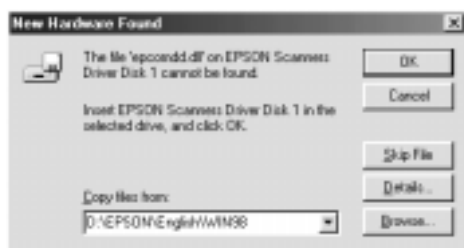
6. The Screen Calibration window appears. Follow the instruction on the screen.

Sizing up your system

Your scanner is sufficient for most scanning needs, but if you are not satisfied with the quality of the images on your monitor or with the speed of image processing, read this section. While it does not contain specific recommendations, it describes various possibilities for improving your scanning system. For further information, seek advice from your dealer or an experienced scanner user.

RAM and hard disk size

Scanned images use much more memory than text files, so you may need more RAM (Random Access Memory) in your computer and a larger hard disk than you have used previously.

Accelerator boards

In addition to memory, processing speed is important because large files take longer to process than small ones. Therefore, you may want to add an accelerator board to your computer.

Video cards

A video card that is sufficient for text may not be good enough for displaying graphic images, especially in color. If all your scanned images look coarse on your monitor, you may want to upgrade your video card. You will need 24-bit color, also called true color or millions of colors, to make the highest quality image reproductions.

Monitors

The resolution of your monitor affects the quality of the image you see. Consider a high resolution monitor if you do precise color work, but also be sure you have a high quality video card.

File compression software

Many different programs are available to make image files smaller for storage or transmission. For example, some compression software can store a 3 MB image file on a 1.44 MB floppy disk, and compress images and restore them with no loss of data or quality; others compress images more, but the restored file is not exactly the same as the original. The difference between the original and restored files is, however, almost unnoticeable.

Appendix A
Technical Specifications

Scanning

Scanner type:	Flatbed, color
Photoelectric device:	Color CCD line sensor
Effective pixels:	19520×27520 pixels at 1600 dpi, 100%
Document size:	310 mm $\times$ 437 mm (12.2 inches $\times$ 17.2 inches) A3 or US letter size (The reading area can be specified from your software.)
Scanning resolution:	1600 dpi (main scan) 3200 dpi with Micro Step (sub scan)
Output resolution:	50 dpi to 9600 dpi (50 to 4800 dpi in 1 dpi increments, 7200 dpi, and 9600 dpi. 7200 dpi and 9600 dpi performed with zoom function)
Color separation:	RGB color filters on CCD
Reading sequence:	
Monochrome	One-pass scanning
Color page sequence	Three-pass scanning (R, G, B) (This sequence is not supported by EPSON TWAIN Pro)
Color byte sequence	One-pass scanning (R, G, B)
Color line sequence	One-pass scanning (R, G, B)
Zoom:	50% to 200% in 1% increments
Image data:	14 bits per pixel per color internal 1 to 14 bits per pixel per color external

Brightness:	7 levels (In EPSON TWAIN Pro, Gamma correction controls Brightness)
Line Art settings:	Fixed threshold Text Enhancement Technology (enable/disable selectable)
Halftoning process:	AAS (Auto Area Segmentation) Enable/disable selectable 3 halftoning modes (A, B, and C) and 4 dither patterns (A, B, C, and D) for bi-level and quad-level data (2 downloadable dither patterns)
Gamma correction:	2 types for CRT display 3 types for printer 1 type for user-defined
Color correction:	1 type for CRT display 3 types for printer output (available in color byte sequence mode and color line sequence mode) 1 type for user-defined (Only user-defined Color correction is available in EPSON TWAIN Pro)
Interface:	SCSI (50 pin half pitch connectors), USB (Type B Receptacle Connector), and optional IEEE 1394 Serial Bus Interface
Light source:	Xenon gas fluorescent lamp
Reliability:	100,000 cycles of carriage movement (main unit MCBF)
Dimensions:	Width: 656 mm (25.8 inches) Depth: 458 mm (18 inches) Height: 176 mm (6.9 inches)
Weight:	Approx. 22 kg (46.2 lb)

Electrical

	100 to 120 V AC	220 to 240 V AC
Input voltage range	AC 90 to 132 V	AC 198 to 264 V
Rated frequency	50 to 60 Hz	
Rated current	1.2 A	0.7 A
Power consumption	Approx. 45 W (operating without option unit) Approx. 55 W (operating with option unit) Approx. 10 W (standby without option unit)	

Note:
Check the label on the back of the scanner for voltage information.

Environmental

Temperature:

    Operation   5°C to 35°C (41°F to 95°F)

    Storage   -25°C to 60°C (-13°F to 140°F)

Humidity:

    Operation   10% to 80%, without condensation

    Storage   10% to 85%, without condensation

Operating conditions: Ordinary office or home conditions. Extreme dust should be avoided. Operation under direct sunlight or near a strong light source should be avoided.

Note:
Specifications are subject to change without notice.

Safety Approvals

Safety standards	UL 1950
	CSA C22.2 No. 950
	EN 60950
EMC	FCC part 15 Subpart B Class B
	CSA C108.8 Class B
	EN 55022 (CISPR Pub 22) Class B
	AS/NZS 3548 Class B

CE marking

Low Voltage Directive 73/23/EEC	EN 60950
EMC Directive 89/336/EEC	EN 55022 Class B
	EN 61000-3-2
	EN 61000-3-3
	EN 50082-1
	IEC 60801-2
	IEC 60801-3
	IEC 60801-4

SCSI Interface

Interface type:	ANSI X3T9.2/375R Revision 10L (SCSI 2)

Functions:	BUS FREE phase
	ARBITRATION phase
	SELECTION/RESELECTION phase
	COMMAND phase
	    (Logical Unit Number is fixed to 0
	    and command link function is not
	    supported.)
	DATA phase
	    Data in phase
	    Data out phase
	STATUS phase
	MESSAGE phase
	    MESSAGE IN phase
	    MESSAGE OUT phase
	ATTENTION condition
	RESET condition

Logic level:	TTL compatible
Electrical standard:	ANSI X3T9.2/375R Revision 10L (SCSI 2)
ID Setting:	Selectable from 0 to 7
Terminator:	Internal terminator selectable (enable/disable)
Connector type:	Two half pitch 50-pin connectors

Connector pin arrangement:
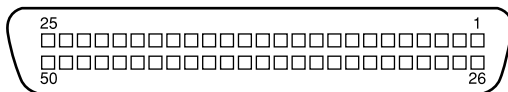
USB Interface

Interface type: Universal Serial Bus Specification
Revision 1.0

Configuration:

Element	Description
Device	Full Speed mode (12 Mbit/s) Class: Vendor-specific Vendor ID: 0x04B8 (SEIKO EPSON Corp.) Product ID: 0x01xx
Configuration	Characteristics: Self-powered Remote wake up feature: Not supported Maximum power consumption from VBUS: 2 mA (5 V)
Interface	No alternate setting Number of endpoints used by this interface (excluding endpoint 0): 2 Class: Vendor specific
Endpoint 1	Bulk IN transfer Maximum data transfer size: 64 byte
Endpoint 2	Bulk OUT transfer Maximum data transfer size: 64 byte
String Descriptor	Language ID: US English 1: iManufacturer: "EPSON" 2: iProduct: "Expression 1640XL"

Electrical standard: Full Speed mode (12 Mbit/s) of Universal
Serial Bus Serial Bus Specification
Revision 1.0.

Connector type: One receptacle (Type B)

Option Interface Connector

Interface type: For use with the optional Automatic
                                        Document Feeder (B81321✻) and
                                        Transparency Unit (B81320✻) only.

Electrical specifications:

   Output voltage   DC 21.6 to 26.4V
                                       DC 4.75 to 5.25V

Initialization Methods

The scanner can be initialized (returned to a fixed set of conditions) in the following ways:

SCSI

Hardware initialization	The scanner is turned on.
	The scanner receives a SCSI Reset signal from the SCSI interface.
Software initialization	Software sends the ESC @ (initialize the scanner) command.
	The scanner receives a SCSI Bus Device Message.

USB

Hardware initialization	The scanner is turned on.
	The USB cable is unplugged from the USB port on the scanner.
Software initialization	Software sends the ESC @ (initialize the scanner) command.
	The scanner receives a Bus Reset from the USB interface.

Transparency Unit

The specifications below apply to the optional Transparency Unit
(B81320✻).

Electrical Specifications:

Supplied Voltage:	DC 24 V	DC 5 V
Rated Current:	1.3 A	0.3 A

Reliability:	100,000 cycles for the MCBF
Document:	35 mm strip film 35 mm slide 120/220 size (6×9 cm) strip film 4×5 inch film Transparencies up to 11.4×16.5 inch film
Manuscript:	Up to 11.4×16.5 inches
Readable area:	290×420 mm

Dimensions:
    Width:
    Depth:
    Height:
	
	324 mm (12.8 inches)
	540 mm (21.3 inches)
	92 mm (3.6 inches)

Weight:	Approx. 6 kg (11 lb)

Automatic Document Feeder

The specifications below apply to the optional Automatic Document Feeder (B81321✻).

Electrical specifications:

Supplied Voltage:	DC 24 V	DC 5 V
Rated Current:	1.3 A	0.3 A

General specifications:

Paper supply:	1 to N, Face up load
Paper out:	Face down eject
Paper setting quantity:	100 pcs (55 g/m² paper, maximum total thickness under 12 mm)
Reliability:	100,000 sheets (Load/Eject MCBF)
Dimensions:	
Width:	605 mm (23.8 inches)
Depth:	488 mm (19.2 inches)
Height:	134 mm (5.3 inches)
Weight:	Approx. 13 kg (28.7 lb)

IEEE 1394 Scanner I/F Card

Interface type:	IEEE 1394-1995 compatible
Data transfer method:	Half-duplex Data/Strobe differential serial
Synchronization method:	Clock synchronization with DS-Link
Encoding/decoding:	DS-Link
Logic level:	3.3 V
Compatible connectors:	IEEE 1394-1995 compatible

Connector pin signal layout:

Pin number	Signal name	Function
1	VP	Cable power supply
2	VG	Cable ground
3	TPB*	Strobe during receipt, data during transmission (differential pair)
4	TPB	
5	TPA*	Data during receipt, strobe during transmission (differential pair)
6	TPA	

Power class:	Power class code 100 No power supply from external sources Fitted with a repeat function with bus power

Appendix B

Contacting Customer Support

If your scanner is not operating properly and you cannot solve your problem using the troubleshooting information in this guide or online help, contact customer support services for assistance.

We will be able to help you more quickly if you are able to give the exact information indicated below.

Serial number of your scanner:
(The serial number label is on the back of the scanner.)

Brand and model of your computer:

Scanner software version:
(Click the About button on the Help menu in your application for the version number.)

Version of Windows (2000, 95, 98, NT 4.0, and so on):

Software application(s) you normally use with your scanner and their version number(s):

You will find the telephone number and further important information for your country in the Service and Support brochure provided with your scanner.

Glossary

additive primary colors
The colors of red, green and blue (RGB) - which give the perception of white when combined equally. These are the colors of the color system used by monitors and scanners.

application
A software program that helps you carry out a particular task, such as word processing, image editing, or financial planning.

bi-level data
Image data that is composed of 1 bit per pixel. A pixel is represented by a single bit of digital data that can be expressed as only 1 (light) or 0 (dark).

bit
Short for binary digit. The smallest unit of data in computer processing. A bit can represent one of two values: on, represented by a 1, or off, represented by a 0.

bit/pixel
The unit that indicates the number of bits allocated for a pixel. The larger the bit value, the more detail of a pixel will be reproduced.

brightness
A scanner function to lighten or darken the output image data.

byte
A unit of information consisting of eight bits. A byte can represent a control code or character.

carriage
A component of the scanner that contains the optical sensor and light source for scanning.

color correction
A method of adjusting the color image data for a particular type of device so that the reproduction results are as close as possible to the original colors.

color separation
A process of converting full-color images into a limited number of primary colors. Additive primary colors (red, green, and blue) are used by the scanner, and the subtractive primary colors (cyan, magenta, and yellow) plus black are used for printing press separation.

daisy chain
A SCSI bus arrangement that allows several devices to be connected simultaneously in a line to a single computer. See SCSI.

default
A set of values used when no other selections have been made. These are sometimes called factory defaults if the original values have not been changed since the scanner left the factory.

dithering
A process in which software or an output device simulates continuous tones with groups of dots.

document
The item, such as a sheet of paper or a book, that is placed on the document table for the scanner to read.

dpi
Short for dots per inch. A unit of measurement for resolution. The higher the value, the higher the resolution.

dropout color
A color the scanner does not recognize and ignores. You can select and deselect dropout colors in the scanner software.

ESC/I
Abbreviation for EPSON Standard Code for Image scanners. A system of commands that allows you to control image scanners from your software.

ESC/P
Abbreviation for EPSON Standard Code for Printers. A system of commands that allows you to control printers from your software.

gamma
Gamma is a value that expresses the relationship between the input and output of a device. By adjusting the gamma, the brightness of the mid-tones of an image can be changed without affecting the shadows and highlights.

grayscale
Images represented with various shades of gray in addition to black and white.

halftoning
A method of reproducing images with patterns of dots to improve the quality of the output.

home position
The position at the rear (nearest the cover hinge position) of the scanner where the carriage rests before a scanning operation.

imagesetter
A device that uses computer files to produce high-resolution text and graphics output on film or paper. These are usually found in service bureaus and printing companies.

impact dot printer
A printer that transfers ink onto the paper by striking an ink ribbon with a number of small pins.

ink jet printer
A printer that transfers ink onto the paper by spraying the ink through a number of small nozzles.

interface
A piece of hardware, a method, or a standard used for connection between or among computer devices.

line sequence
A type of color scanning that separates primary colors line by line. The carriage makes only one pass.

moiré
A moiré is a cross-hatch pattern that appears on scanned images when scanning printed material. It is a result of interference that occurs due to the difference between the pitches of the scanning and the halftone screens.

monochrome
Black and white images, or images represented only by the intensity of luminosity.

OCR
Optical Character Recognition.
The technology that allows computers to "read" text from physical objects. OCR requires a graphical representation of text to interpret, which usually comes from a scanned image.

page sequence
The type of color scanning in which the entire image is scanned once for each separate color.

pixel
Short for picture element. Each image is composed of a number of pixels. Pixels are also counted in units of dots.

plain bi-level
Bi-level image data without the halftoning process.

port
An interface channel through which data is transmitted between devices.

primary colors
Basic colors. See *additive primary colors* and *subtractive primary colors*.

resolution
Indication of how finely an image is resolved into pixels. Can be measured in dots per inch (dpi), pixels per inch (ppi), or samples per inch (spi).

scan
An operation performed by the sensor and the carriage. The image is divided into pixels by scanning.

scanning area
The physical size of the image that can be scanned by the scanner.

SCSI
Small Computer System Interface. This is one method used to connect your computer to peripherals such as scanners, hard disk drives, CD-ROM drives, and others.

SCSI ID
The numbers that all devices in a SCSI connection (see daisy chain) use to identify each other. If the same ID number is used by two devices in the same daisy chain, the devices cannot operate properly.

subtractive primary colors
The colors of cyan, magenta, and yellow (CMY) which produce black when mixed in certain amounts. In printing, black is often added to give more definition as mixing of actual inks cannot produce pure black.

terminator
A device that stops electronic signals, and prevents them from proceeding or returning to other devices. This is necessary to stop a signal from continuously reflecting between devices.

threshold
A reference point that is used to determine whether data will be processed as "on" or "off". In the case of color image data, "on" means that a certain color will appear in a pixel or dot, and "off" means that color will not appear there.

tone correction
A method of adjusting the tone curve so that the reproduction results on different types of output devices have gradations similar to the original image.

tone curve
The graph that shows the contrast ratio between the input (original image) and output (image data) in image processing.

unsharp mask
Originally a photographic process in which a sharply focussed and a slightly out-of-focus image are combined to produce a sharper image. This process is simulated by software to produce the same effect.

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