

EPSON EXPRESSION™ 1680

EPSON EXPRESSION™ 1680 Pro

Color Image Scanner

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Glossary

Introduction

About This Guide

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

- ❑ Chapter 1 explains how to optimize the quality of scanned images and how to improve optical character recognition when scanning text.
- ❑ Chapter 2 provides a complete description of EPSON TWAIN Pro and TWAIN Pro Network features. Refer to Chapter 2 when making detailed scanning settings.
- ❑ Chapter 3 explains how to modify the operation of your scanner's  Start button.
- ❑ Chapter 4 explains how to install and use the options available for your scanner.
- ❑ Chapter 5 contains information on maintaining your scanner and troubleshooting scanner problems. If your software does not operate properly or scanned images are not what you expect, see this chapter.

Finding More Information

Setup Guide

Explains how to set up the scanner and install the scanner software and options. Also gives basic scanning instructions, including how to make scanner software settings and how to use the Start Button feature.

Online help for EPSON TWAIN Pro and EPSON TWAIN Pro Network

Online help provides you with detailed information on EPSON TWAIN Pro and EPSON TWAIN Pro Network. To access online help, click the Help button in EPSON TWAIN Pro or EPSON TWAIN Pro Network.

Information on PageManager and other software

For more information on Presto! PageManager for EPSON and the other applications provided on the scanner software CD-ROM, see the documentation provided for that application on the CD-ROM.


Chapter 1

Optimizing Scanning

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Recommended Adjustment Order

The Adjust tools in EPSON TWAIN Pro's Preview window offer you a powerful means of improving image quality, but the order in which you use these tools can greatly affect your results.

For optimum image enhancement, first click the  Auto Exposure button to automatically adjust the Gamma, Highlight, and Shadow settings, then make any further adjustments in the order explained below.

Adjust the brightness and contrast

1. Adjust the Highlight and Shadow settings in the Image Controls dialog box. See "Making the Highlight setting" on page 1-3 and "Making the Shadow setting" on page 1-4.
2. Adjust the Gamma setting in the Image Controls dialog box. See "Making the Gamma setting" on page 1-5.
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 1-6.

Make color adjustments


4. Adjust the Gray Balance Intensity setting in the Color Adjustment dialog box. See "Making the Gray Balance Intensity setting" on page 1-7.
5. Adjust the Saturation setting in the Color Adjustment dialog box. See "Making the Saturation setting" on page 1-9.
6. Manually adjust the tone curve for individual colors in the Tone Correction dialog box. See "Making tone curve settings" on page 1-9.

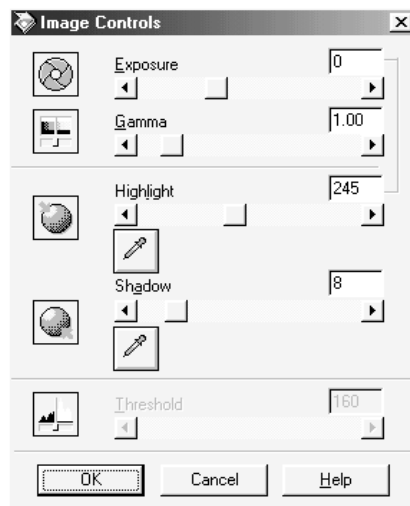
Adjusting Brightness and Contrast

Adjust brightness and contrast before adjusting image color. Brightness and contrast settings should be made in the order they appear in this section.

Making the Highlight setting

Highlights are the brightest areas of an image. Follow these steps to adjust the Highlight setting.

1. Click the  Image Controls button in the Preview window.
2. Click the eyedropper button under Highlight.



The pointer changes to an eyedropper, with movement restricted to within the Preview window.


3. 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.

4. To change the highlight level of the point you selected, move the Highlight slider left or right, or enter a value between 61 and 490 in the text box.

Making the Shadow setting

Shadows are the darkest areas of an image. Follow these steps to adjust the Shadow setting.

1. Click the  Image Controls button in the Preview window.
2. Click the eyedropper button under Shadow.



The pointer changes to an eyedropper, with movement restricted to within the Preview window.

3. 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.

4. To change the shadow level of the point you selected, move the Shadow slider left or right, or enter a value between 0 and 60 in the text box.

Making the Gamma setting

Gamma is the difference in contrast between the light tones and dark tones of an image. Changes in the gamma level only affect mid-tones, and can be effective for bringing out details normally hidden in shadow or highlights.

Follow these steps to adjust the Gamma setting.


1. Click the  Image Controls button in the Preview window.

2. Move the Gamma slider left or right, or enter a value between 0.5 and 5.0 in the text box.



Applying a preset tone curve

The Tone Correction feature provides preset tone correction curves that let you adjust the contrast within an image. This gives you more control over the image when used in conjunction with the settings in the Image Controls dialog box.

Click the  Tone Correction button in the Preview window, then select a preset tone curve from the Tone Curve Name list. The preset tone curves are described below.

Linear

A linear tone curve has no tone correction. Use this setting if you are satisfied with the tone of the previewed 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 “Tone Correction” on page -41 for more information on tone correction.

Adjusting Color

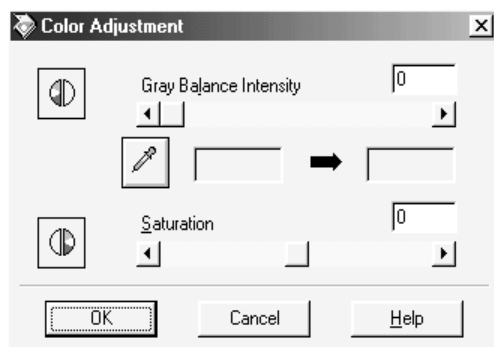
Color adjustments should be made after adjusting settings related to brightness and contrast. Color settings should be made in the order they appear in this section.

Making the Gray Balance Intensity setting

This setting allows you to remove a cast (tint) from a specific color.

1. Click the  Color Adjustment button in the Preview window.

2. 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.

3. 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.

4. 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:

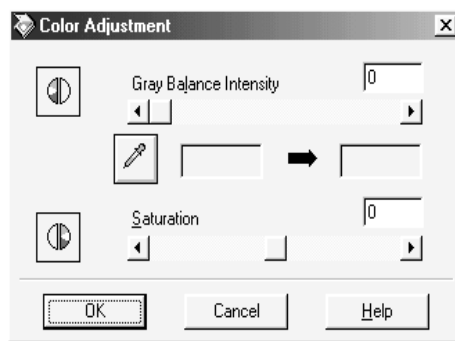
See "Color Adjustment" on page -43 for more information on adjusting the gray balance intensity level.

Making the Saturation setting

Saturation is the density of a color. Higher saturation makes the color appear richer, while lower saturation makes it appear paler.

Follow these steps to adjust the Saturation setting.

1. Click the  Color Adjustment button in the Preview window.
2. Move the Saturation slider left or right, or input a value between -100 (lowest color density) and 100 (highest color density).




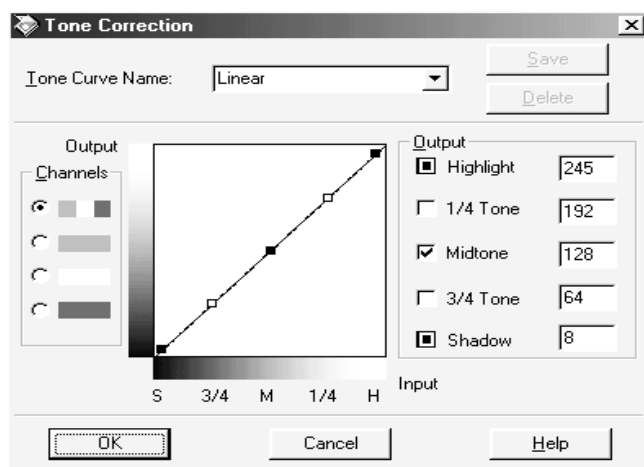
Making tone curve settings

After you have made the other color settings described in this section, you can use the tone curve to fine-tune the intensity of colors in your image.

Note:

The Tone Correction feature is unavailable whenever Black & White is selected as the Pixel Depth setting and None is selected as the Halftone setting.

Click the  Tone Correction button in the Preview window, select the Channels button for the color you want to adjust, then use the tone curve editor and Output options as explained below.



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 from the Tone Curve Name list.

To add your settings to the Tone Curve Name list, type a name for the settings in the list, then click Save.

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 a 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.*

Improving Text Scanning for OCR

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

Follow these steps to improve character recognition performance.

1. In the EPSON TWAIN Pro main dialog box, 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. Select None from the B/W Option list, and then click OK.
3. Click Preview, then click the  Image Controls button to display the Image Controls dialog box.



4. Use the Threshold slider to change the threshold value, monitoring the results of your changes in the Preview window. Depending on the lightness, darkness, and complexity of the background on which the text is printed, increasing or decreasing the threshold value can make it easier for OCR software to recognize characters.

If you still have problems...

1. In the EPSON TWAIN Pro main dialog box, try increasing the Resolution value to 400. Be aware 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.

Potential text recognition problems

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 most OCR software cannot recognize handwritten characters.

Chapter 2

Understanding EPSON TWAIN Pro Features

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Using the EPSON TWAIN Pro Main Dialog Box

The EPSON TWAIN Pro or EPSON TWAIN Pro Network main dialog box allows you to make a variety of settings to attain the highest quality scanned images. The main dialog box settings and controls are described in detail in this section.

Note for Macintosh users:

The screens shown in this section are for Windows, and may differ slightly from the Macintosh version of EPSON TWAIN Pro or EPSON TWAIN Pro Network. However, the method for making settings is the same unless otherwise noted.

Note for EPSON TWAIN Pro Network users:

Although the screens shown in this guide are for EPSON TWAIN Pro, they also apply to EPSON TWAIN Pro Network.



Note:

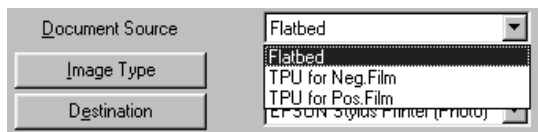
If you attempt to scan an image that exceeds your computer's available memory or disk space, an alert appears on the screen.

Selecting a Document Source

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 whether an optional Automatic Document Feeder or Transparency Unit is installed.

Note:

Uninstalled options are not displayed.



Flatbed

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

Auto Document Feeder

Choose this setting to use the optional Automatic Document Feeder.

Note:

Some applications do not support feeding and scanning more than one sheet at a time.

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.

Selecting an Image Type

Use the Image Type list to select from a variety of predefined and user-defined settings, or use the Image Type button to make detailed changes to settings and to save custom settings.

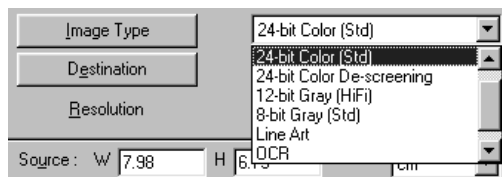


Image Type list

The Image Type list provides the predefined settings described below. There is a predefined setting to suit most image types, so EPSON recommends using the predefined settings first. If you later want to make fine adjustments to the Image Type setting, use the Image Type button. See “Image Type button” on page 2-7 for details.

48-bit Color(HiFi)

48-bit colors, best quality output when scanning colored documents

Note:

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

24-bit Color(Std)

24-bit colors, high quality output when scanning colored documents

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.

16-bit Gray(HiFi)

16-bit gray, best quality output when scanning gray documents

Note:

This setting only has an effect with certain applications, such as Adobe Photoshop.

8-bit Gray(Std)

256 grays, high quality, and de-screening is selectable (default is no de-screening)

Line Art

Black and white, draft quality

OCR

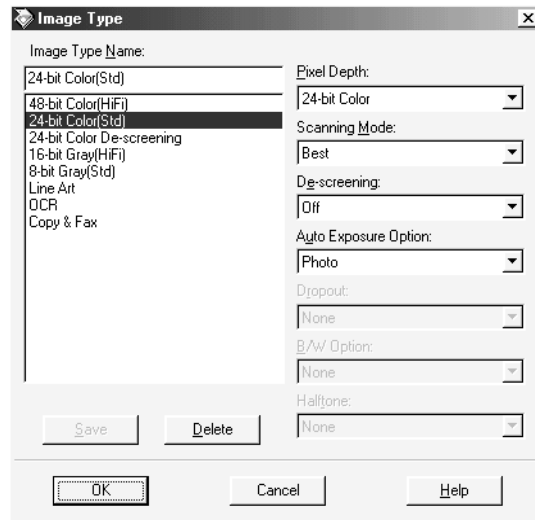
Black and white, best quality

Copy & Fax

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

Image Type button

The Image Type button opens the Image Type dialog box, where you can customize the Image Type settings described in this section.



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 a custom Image Type setting, select the setting name then click **Delete**.

To apply the settings you made, click **OK**. You can see the effects of all settings except B/W Option in the Preview window. Click the Preview button in the main dialog box to open this window.

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 pixel depth from:

48-bit Color, 24-bit Color, 16-bit Gray, 8-bit Gray, and Black & White.

Note:

- ❑ *Depending on the model of your scanner, the 48-bit Color setting may be 42 or 36 bits, and the 16-bit Gray setting may be 14 or 12 bits.*
- ❑ *The Pixel Depth setting determines which values are displayed in the Densitometer window. For more information, see “Using the Densitometer” on page -29.*

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 previewed image using the Configuration dialog box. See “Making Configuration Settings” on page 2-18 for details.

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.

Auto Exposure Option

Allows you to specify the kinds of adjustments made by the Auto Exposure feature. When scanning photographs or documents that contain high quality images, select Photo. Select Document when scanning printed text.

Note:

You can see the adjustments made by the Auto Exposure feature in the Preview window. For details on using the Auto Exposure feature, see “Auto Exposure” on page -38.

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 may need to adjust the Threshold setting in the Image Controls dialog box before making the Dropout setting to achieve the desired effect. For more information on the Threshold setting, see “Image Controls” on page -39.*

B/W Options

These options are useful when scanning text or grayscale images.

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 Text Enhancement Technology nor Auto Area Segmentation, select None.

Halftone

Select a halftone or dither setting to reproduce images using special dot patterns:

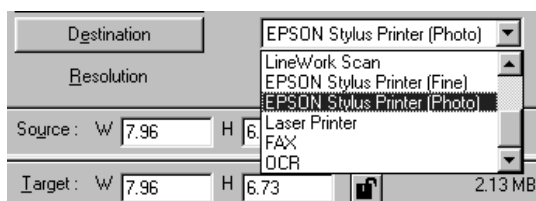
Mode A (Hard Tone), Mode B (Soft Tone), Mode C (Net Screen), Dither A (4 × 4 Bayer), Dither B (4 × 4 Spiral), Dither C (4 × 4 Net Screen), Dither D (8 × 4 Net Screen), or None.

Note:

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

Selecting a Destination

The Destination setting allows you to specify the application or the output device for which the scanned image is intended. Use the Destination list to select a predefined or user-defined destination, or use the Destination button to customize Destination settings.



Destination list

Select a predefined or custom setting from this list. The predefined settings have the Resolution and Unsharp Mask values shown in the following table.

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)	medium
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	medium
EPSON StylusPrinter (Fine)	360 dpi	150 dpi	medium
EPSON StylusPrinter (Photo)	720 dpi	300 dpi	medium
Laser Printer	600 dpi	200 dpi	medium
Fax	200 dpi	200 dpi	off
OCR	300 dpi	300 dpi	off

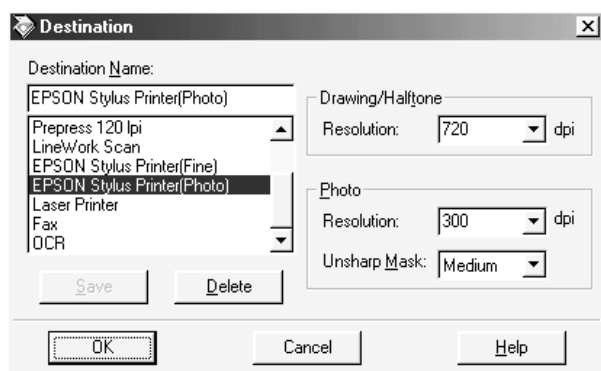
If you are using an EPSON Stylus printer and are printing scanned images with the Economy, Normal, or Fine Print Quality settings in your printer software, selecting EPSON Stylus Printer (Fine) is recommended. If you are printing with the SuperFine or Photo Print Quality settings, select EPSON Stylus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

Note:

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

Destination button

The Destination button opens the Destination dialog box, where you can change Resolution and Unsharp Mask settings and add your custom settings to the Destination list, as described below.



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

To apply your settings, click **OK**. To cancel the settings, click **Cancel**.

Destination Name

Predefined and custom setting names appear in the Destination Name list. Select a setting from the list, or save new custom settings by typing a name in the Destination Name box, then clicking **Save**.

Resolution

Specify a scanning resolution for line drawings and halftone images, and for photos. You can select one of the dpi settings available in the list box, or you can type your own setting in increments of 1 dpi up to 6400 dpi. The maximum resolution available is 12800 dpi.

Note:

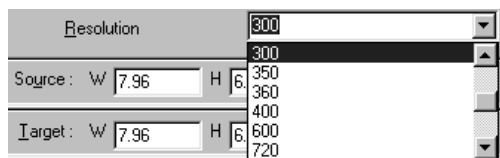
- ❑ *When the Pixel Depth setting in the Image Type dialog box is set to Black & White, the Drawing/Halftone settings take effect. For other Pixel Depth settings, the Photo settings take effect.*
- ❑ *When making Drawing/Halftone settings for printer destinations, make the Resolution setting the same as the resolution specified in the printer driver. When making Photo settings for printer destinations, specify a Resolution setting between 150 and 300 dpi. Selecting a resolution higher than 300 dpi slows down printing without improving 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.*

Unsharp Mask

The Unsharp Mask feature improves the sharpness of the scanned image. You can choose between four Unsharp Mask settings: Off, Low, Medium, and High. Selecting High improves image sharpness the most, but may cause your software to work more slowly. You can see the effects of your settings in the Preview window.

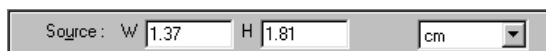
Setting the Resolution

You can change the resolution for the current scanning operation in the main dialog box by selecting a resolution from the list or by typing in a value up to 6400 dpi. The maximum resolution you can select is 12800 dpi. Changes made here override the resolution setting in the Destination dialog box.

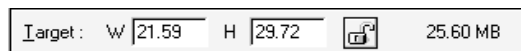


Specifying Source and Target Image Sizes

The Source values indicate the size of the area that is displayed or selected in the Preview window.



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



Note:

The Source and Target size settings are closely related to the Resolution setting. If you change these settings arbitrarily, the resulting image may not be what you expect.

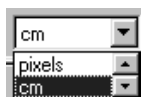
Width (W) and height (H) values

The Source and Target width and height values are indicated in the selected unit of measure. When the Preview window is open, you change these values by typing new values in the fields and pressing the Tab key, or by resizing the marquee, or frame, surrounding a portion of the image in the Preview window. See “Using Marquees” on page -31 for more information.

When the Preview window is closed, The Source values cannot be adjusted, and you can only adjust the Target values by using the Scale slider.

Units

Select pixels, inches, or cm as the unit of measure.



Storage size indicator

The storage size of an image is indicated in KB or MB. As you change Target values, this value also changes.

Lock button



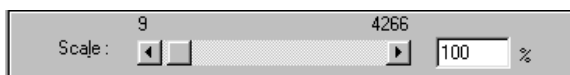
locked



unlocked

Clicking the lock button allows you to scale a selected portion of an image to fit a fixed Target size. This is especially useful when printing. In this case, enter the printable area of the paper in the Source width and height fields, and then click the lock button to fix the Target size. When you resize the active marquee, the selected area is automatically scaled to fit the Target size.

Scale

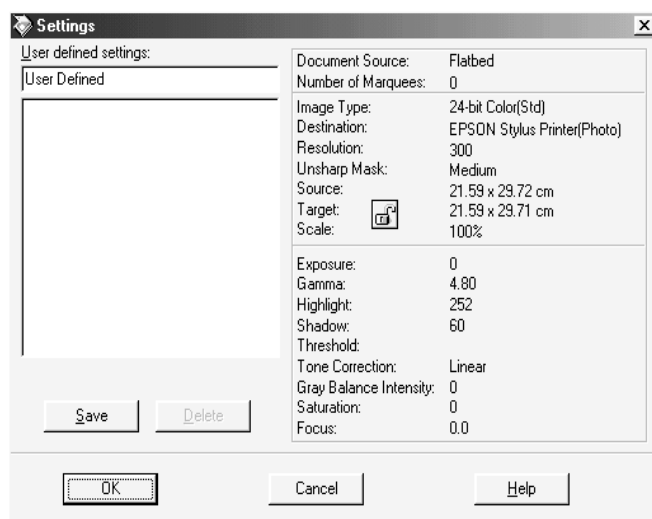


Use the Scale settings to reduce or enlarge Target size proportionally. The range of possible reduction or enlargement depends on the current Resolution setting.

Move the slider or click the left or right arrows to change the Target size in 1% increments. You can also type a value in the Scale field and press the Tab key.

Using the Settings Dialog Box

Clicking the Settings button opens the Settings dialog box, where you can view all current settings, save the current settings with a new name, and apply previously-saved custom settings. This button is only available when the Preview window is open.



Note:

- ❑ Depending on your scanner model, the preset settings for using film holders may appear in the User defined settings list when the optional Transparency Unit is installed.
- ❑ Only custom settings related to the currently selected Document Source appear in the User defined settings list.

To save the current settings, type a new name in the User defined settings box, then click **Save**. To delete a setting from the list, select the setting name in the list, then click **Delete**.

To apply saved settings, select a setting name from the list, then click **OK**.

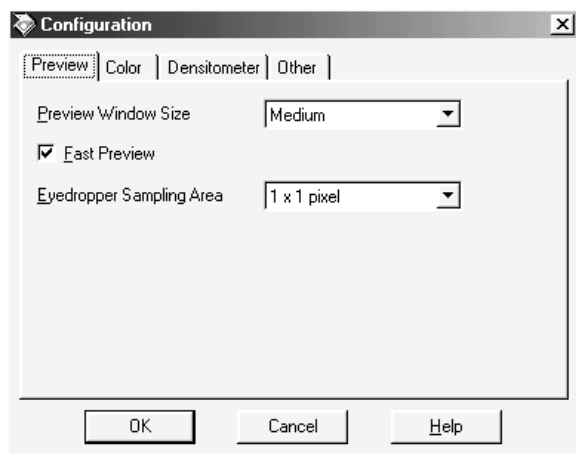
To restore the previous settings, click Cancel.

Making Configuration Settings

Click the Configuration button to open the Configuration dialog box, where you can make a variety of configuration settings related to the Preview window and the previewed image, color adjustment, and the Densitometer.

Preview menu

This menu allows you to make basic settings that affect the properties of the Preview window.



Preview Window Size

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

Fast Preview

Enables high-speed loading of the previewed image. If this is selected, the document is scanned quickly at draft quality. If this is not selected, the previewed image is scanned at a high quality, and you can get accurate values for the Highlight, Shadow, and Gray Balance Intensity by sampling with the eyedropper in the previewed image.

Do not select this setting when quality is more important than speed.

Eyedropper Sampling Area

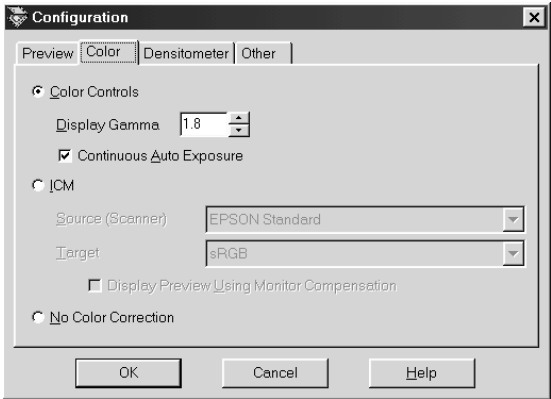
This setting allows you to specify the area in pixels that is sampled when using the eyedropper to make the Highlight, Shadow, and Gray Balance Intensity settings. You can choose from the following settings: 1 x 1 pixel, 3 x 3 pixels, and 5 x 5 pixels.

Note:

If you select the 3 x 3 pixels or 5 x 5 pixels setting, an average of the color values of the sampled pixels is used when adjusting the Highlight, Shadow, or Gray Balance setting.

Color menu

Click the Color tab to display the Color menu.



This menu allows you to make a variety of settings related to color adjustment and color management. Choose the appropriate setting from the list below.

Setting	When to Select
Color Controls (default setting)	When not using a color management system with EPSON TWAIN Pro
ICM (for Windows), or ColorSync (for Macintosh)	To use color management system profiles with EPSON TWAIN Pro
No Color Correction	To make a color profile using a color calibration device


Note:
Depending on the version of Windows you are using, some settings may not be available. See below for details.

Color Controls


The Color Controls setting allows you to make settings that affect the gamma for your monitor and the way the Auto Exposure feature works.

Display Gamma

You can change the gamma value for your monitor by typing a value in the Display Gamma box, or by clicking the arrows next to the box. You can choose between values of 1.0 to 3.0 in increments of 0.1. The default setting is 1.8.

The Display Gamma setting also determines how clicking the  Auto Exposure button affects the Gamma setting.

Continuous Auto Exposure

Select this check box to make the Auto Exposure feature work whenever you click the Preview button, modify the size of the preview with the zoom feature, make a marquee, or modify the size or change the location of a marquee. If this check box is clear, the Auto Exposure feature will only work when you click the  Auto Exposure button in the Preview window.

Note:

This feature is only available when Color Controls is selected.

ICM (for Windows) or ColorSync (for Macintosh)

Select this setting to reproduce the colors in your image using the available color management system for your computer: ICM for Windows, or ColorSync for Macintosh. Selecting this setting enables you to choose a color profile for your scanner in the Source (Scanner) list box, and a color profile for your monitor or output device (such as printer) in the Target list box. After the image is scanned, it is converted according to these settings before it is sent to the application.

Note:

- ❑ *The ICM and ColorSync settings are provided for experienced users. If you are not familiar with color management systems, select Color Controls to avoid unexpected results.*

- ❑ *If your printer and monitor do not support the available color management system, select Color Controls. See your printer and monitor documentation to check if they support ICM or ColorSync.*
- ❑ *When ICM or ColorSync is selected, the Continuous Auto Exposure setting is unavailable.*
- ❑ *If ICM or ColorSync is selected, whenever the Auto Exposure function is used, the Shadow setting in the Image Controls dialog box is automatically set to 8, and the Gamma setting is set to 1.0.*
- ❑ *ICM is not available in Windows NT 4.0.*
- ❑ *In Windows 95, you can select the ICM setting, but the Source (Scanner) and the Target settings are not available.*
- ❑ *If you select ICM or ColorSync in EPSON TWAIN Pro when using Adobe® Photoshop® 5.0 or 5.5, be sure to clear the Display Using Monitor Compensation check box in Photoshop's RGB Setup Dialog box.*

Source (Scanner)

Choose a color profile for the scanner you are using from this list box. EPSON recommends selecting EPSON Standard when using an EPSON scanner.

Note:

This setting is not available in Windows 95 and NT 4.0.

Target

In this list box you can choose a color profile that matches either your monitor or other output device, such as your printer, or you can choose one of the RGB color space profiles that matches those available in Adobe Photoshop.

To use the same color profile that is currently being used by your computer monitor, select Monitor RGB. To choose a different profile for your monitor or printer, select from the monitor and printer profiles in the list.

To choose a color profile that matches the RGB color space you are using in Adobe Photoshop, select that color space from the list. For more information on color management in Adobe Photoshop, see the Adobe Photoshop's documentation.

Note:

- ☐ *If you made a color profile to calibrate your monitor using the Adobe Gamma utility, that profile appears in the Target list box.*
- ☐ *The default Target setting in Windows is sRGB, and for Macintosh the default Target setting is Monitor RGB.*
- ☐ *This setting is not available in Windows 95 or NT 4.0.*

Display Preview Using Monitor Compensation

This feature is helpful if you have chosen a color profile in the Target menu that matches the current RGB color space in Adobe Photoshop 5.0 or 5.5. In this case, make sure that the Display Using Monitor Compensation check box in Photoshop's RGB Setup dialog box is selected, then select EPSON TWAIN Pro's Display Preview Using Monitor Compensation check box to ensure that the colors in the Preview window image match the colors of the image once it is scanned and viewed in Photoshop.

Note:

- ☐ *Do not select this check box unless using Adobe Photoshop version 5.0 or later, or Adobe® Illustrator® 9.0.*
- ☐ *This setting is not available for TWAIN Pro Network or in Windows 95 and NT 4.0.*

No Color Correction

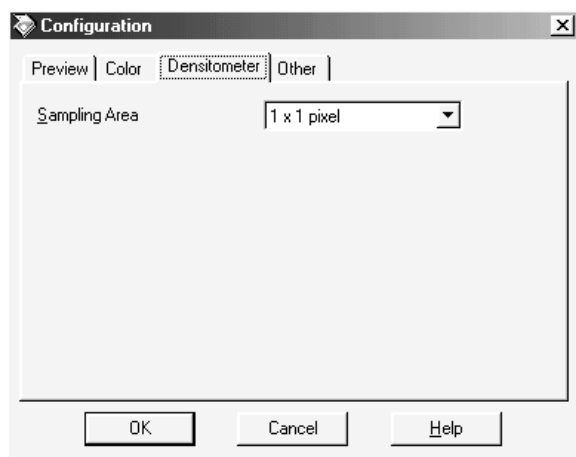
This setting allows you to scan images without the adjusting the quality of the image at all. Select this setting for best results when making your own color profile using a color calibration device.

Note:

This setting is not available in Windows 95 and NT 4.0.

Densitometer menu

Click the Densitometer tab to display the Densitometer menu.



Sampling Area

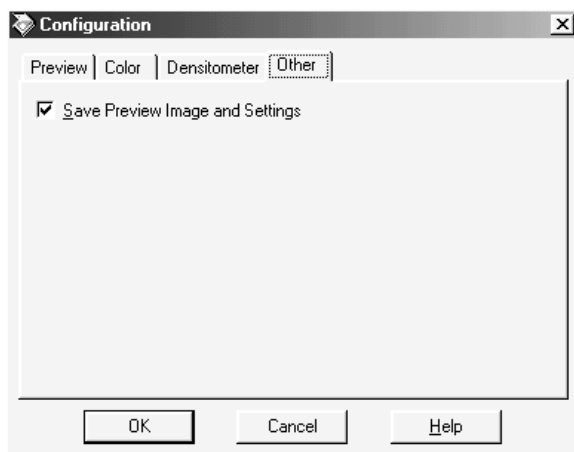
This setting allows you to set the area in pixels that the Densitometer samples. You can choose between 1 x 1 pixel, 3 x 3 pixels, or 5 x 5 pixels.

Note:

You can change the sampling area while viewing the Densitometer window by pressing your computer's Ctrl and E keys.

Other menu

Click the Other tab to display the Other menu.



Save Preview Image and Settings

When this check box is selected, the image that was shown in the Preview window the last time EPSON TWAIN Pro was used will appear with its associated settings the next time you start EPSON TWAIN Pro. This feature is useful when scanning the same document more than once, and is especially useful when using different TWAIN-compliant applications to scan the same document.

Note:

When this check box is selected, the document shown in the Preview window when EPSON TWAIN Pro starts may be different than the document currently on the document table. Before scanning, make sure the correct document is set on the scanner.

Using the Scan Button

Clicking the Scan button while the Preview window is open scans the areas in active and selected marquees using the settings you made with the Adjust tools.

If you click the Scan button when the Preview window is not open, the scanner automatically locates the image, adjusts the exposure, then scans the image. In this case, any settings you may have made when the Preview window was open are ignored.

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

After the scan is finished, the scanned image is transferred to the application you used to open EPSON TWAIN Pro so that you can work with the image from within that application.

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

Note when scanning over a network:

If the network connection is terminated before the scanned image is transferred, you may need to specify a longer interval for the Timeout Setting.

Using the Preview Button

Clicking the Preview button opens the Preview window, where you can view and adjust the quality of your image before scanning. For details on using the Preview window, see “Using the Preview Window” on page -27.

Using the Preview Window

Before you scan an image, you can use the Preview window to see the effects of most EPSON TWAIN Pro and EPSON TWAIN Pro Network settings, and to make additional image adjustments. You can also use marquees (frames) to scan only selected portions of an image. In addition, the Preview window gives you access to the Densitometer, which you can use to sample a range of pixels in the previewed image.

Note:

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

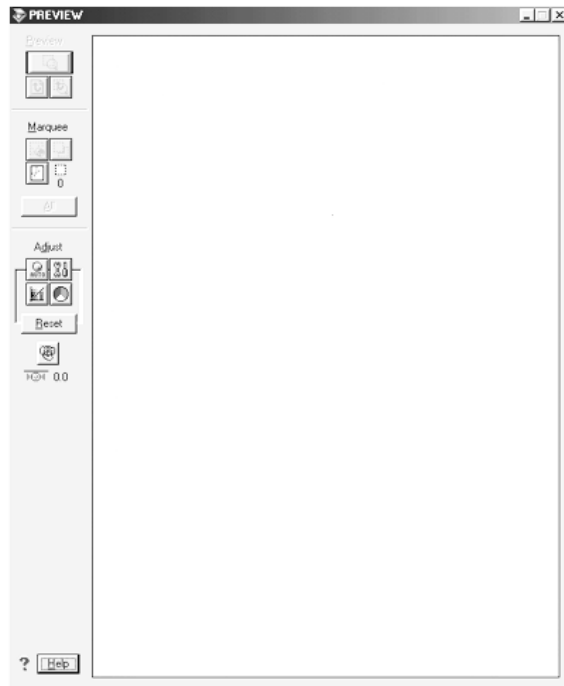
Note for Macintosh users:

The screens shown in this section are for Windows, and may differ slightly from the Macintosh version of EPSON TWAIN Pro or EPSON TWAIN Pro Network. However, the method for making settings is the same unless otherwise noted.

Note for EPSON TWAIN Pro Network users:

Although the screens shown in this guide are for EPSON TWAIN Pro, they also apply to EPSON TWAIN Pro Network.

To open the Preview window and the Densitometer, click Preview in the EPSON TWAIN Pro main dialog box.



The Preview window displays the effects of the following settings.

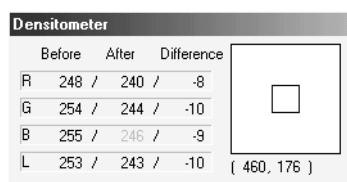
- ☐ Image Type: Pixel Depth, Dropout, and Halftone
- ☐ Destination: Unsharp Mask
- ☐ Image Controls
- ☐ Tone Correction
- ☐ Color Adjustment

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.

Using the Densitometer

The Densitometer shows the RGB and luminosity (L) values of a selected pixel or group of pixels, and indicates the difference between these values before and after making adjustments to the previewed image.



	Before	After	Difference
R	248 /	240 /	-8
G	254 /	244 /	-10
B	255 /	246 /	-9
L	253 /	243 /	-10

(460, 176)

To use the Densitometer, place the cursor over an area of the image in the Preview window to sample a pixel or group of pixels. A close-up of the area being sampled appears on the right side of the Densitometer window, and the values of the sampled pixel or group of pixels are displayed on the left side of the window.

The values that appear in the Densitometer window depend on the Pixel Depth setting in the Image Type dialog box. If Pixel Depth is set to one of the color settings, both RGB and luminosity values are shown. If Pixel Depth is set to one of the gray settings, only the luminosity value is shown. If Pixel Depth is set to Black & White, then RGB and luminosity values are replaced with a Bit value.

Note:

- ❑ The luminosity value is calculated by the following formula:
 $0.2R+0.6G+0.2B$.

- ❑ *For more information on the Pixel Depth setting, see “Image Type button” on page 2-7.*

Specifying the number of pixels to be sampled

You can choose to sample one pixel at a time, 3×3 pixels at a time, or 5×5 pixels at a time. To change the number of pixels being sampled, press the Ctrl and E keys on your keyboard. The square in the center of the close-up changes size to indicate the amount of pixels being sampled.

Note:


- ❑ *The values shown for a group of pixels are an average of each pixel's values.*
- ❑ *In the Configuration dialog box, you can specify the default number of pixels to be sampled when the Densitometer opens. See “Densitometer menu” on page 2-24 for instructions.*

Using the Preview Buttons



The Preview buttons let you zoom in on selected portions of the previewed image.


Zoom button

To enlarge a selected portion of the previewed image, click and drag the mouse over the portion to be enlarged, then click the  Zoom button. For more information on selecting portions of images, see “Using Marquees” on page -31.


Note:

The Zoom button is unavailable when one or more marquees are selected in addition to the active marquee.

Return button

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

Restore Zoom button

Clicking the  Restore Zoom button restores the image to the previous zoom from memory, which is quicker than clicking the Zoom button again. This button is available only when the image has been previously zoomed.

Using Marquees

A marquee is a frame that you draw around a portion of a previewed image to select it. You can use one marquee to select an area you want to enlarge using the Preview buttons, or you can use one or several marquees to adjust and to scan selected portions of an image.

Making and modifying marquees

To create a marquee, move the pointer over the image in the Preview window. The pointer becomes a set of cross-hairs. Hold down the mouse button and drag the cross-hairs over an area of the image, then release the mouse button to create the marquee.

The frame around the marquee appears as a moving dotted line, indicating that it is active, which means that it can be resized.



Only one marquee can be active at a time, and if you make several marquees, the last marquee you make becomes the active marquee. To make a different marquee active, click anywhere inside the marquee.

Note:

- ☐ *To create a new marquee inside the active marquee, make the new marquee outside the active marquee first, then move it inside.*
- ☐ *You cannot make multiple marquees when Auto Document Feeder is selected as the Document Source.*

Follow the instructions below to select multiple marquees, and to resize and move marquees.

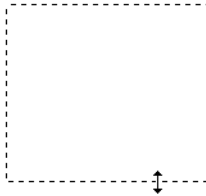
Selecting multiple marquees

If you select several marquees at once, you can apply image adjustments to all of the selected areas, and you can scan each of the selected areas individually with a single click of the Scan button.

To select several marquees at once, click each marquee while holding down the Ctrl key (for Windows) or the Shift key (for Macintosh) on your keyboard. The frames around selected marquees become static dotted lines, and the last marquee you click becomes the active marquee. To cancel the selection of a marquee, click it again while holding down the Ctrl key (Windows) or the Shift key (Macintosh).

Resizing marquees

When you move the cross-hairs over the edge of the active marquee, the cross-hairs will change to a double-headed arrow as shown below. (You may need to click the marquee first to make it active). Drag the arrow to resize the marquee. To resize the marquee proportionally, press the Shift key while dragging the arrow.

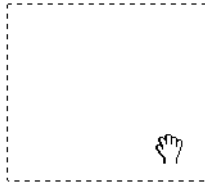


Note:

You cannot resize an active marquee if any other marquees are selected. To cancel the selection of a marquee, click the marquee while holding down the Ctrl button (for Windows) or the Shift button (for Macintosh) on your keyboard.

Moving marquees

To move the active marquee, move the cross-hairs inside the marquee until the cross-hairs change into a hand, then drag the marquee to move it. To move more than one marquee at a time, first select the marquees by clicking them while holding down the Ctrl key on your keyboard. To move the marquee or group of marquees in a straight line vertically or horizontally, press the Shift key while dragging an active or selected marquee.




Using the Marquee tools




The Marquee tools described below help you to work with marquees and to automatically place marquees around images in the Preview window.

Delete button

Clicking the  Delete button removes the active and selected marquees. To delete all marquees at once, first click the All button, then click this button.

Note:
When the Preview window is active, you can also delete the active and selected marquees by pressing the Delete key on your keyboard.


Duplicate button

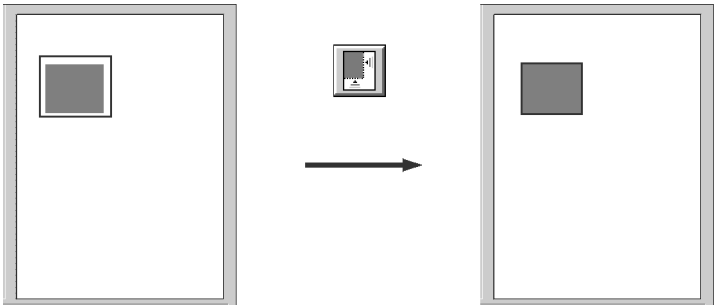
Clicking the  Duplicate button creates another marquee the same size as the active marquee. Clicking this button while holding down the keys noted in the table below causes the duplicate marquee to appear in the specified orientation relative to the original marquee.

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

Note:
This button is unavailable when one or more marquees are selected in addition to the active marquee.


Auto Locate button

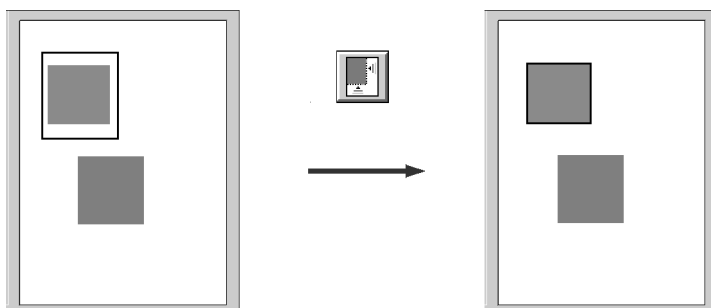
Click the  Auto Locate button to automatically frame a previewed image with a marquee, thus eliminating unnecessary borders.



Note:

- ❑ *The Auto Locate feature is automatically activated when scanning without previewing.*
- ❑ *The Auto Locate feature is unavailable when TPU for Neg. Film or TPU for Pos. Film is selected as the Document Source setting.*

If the previewed image consists of several images separated by white space, clicking the  Auto Locate button places a single marquee around all of the images. If any of the images are already surrounded by active or selected marquees, clicking this button adjusts the marquees to match the size of the images.



Marquee number indicator



This indicates the number of marquees in the Preview window.

All button

Click this button to select all marquees in the Preview window. This feature is useful when you want to scan all the selected areas, or when you want to delete all marquees.

Using the Adjust Buttons



The Adjust buttons described in this section offer you a powerful means of improving image quality. All adjustments you make with these tools are shown in the previewed image. For further information on using these buttons to optimize scanning, see “Recommended Adjustment Order” on page 1-2.



Auto Exposure



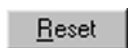
Image Controls



Tone Correction



Color Adjustment




Reset



Focus


Auto Exposure

Click the  Auto Exposure button to optimize the exposure for the entire image, or for areas surrounded by active or selected marquees. This feature adjusts the Gamma, Highlight, and Shadow settings automatically.

Note:

- ❑ *Select Continuous Auto Exposure on the Color menu of the Configuration dialog box to set the Auto Exposure feature to work whenever you click the Preview button, modify the size of the previewed image with the zoom feature, make a marquee, or change the size or location of a marquee. See “Color menu” on page 2-20 for more information.*
- ❑ *The Auto Exposure feature is not available when the Pixel Depth is set to Black & White and Auto Area Segmentation is not selected in the Image Type dialog box.*
- ❑ *The Auto Exposure feature overrides any Gamma, Highlight, or Shadow settings made in the Image Controls dialog box. Be sure to use Auto Exposure before making any of these settings.*
- ❑ *The Auto Exposure feature is automatically activated when scanning without previewing.*

Image Controls

Click the  Image Controls button to open the Image Controls dialog box. This dialog box allows you to make a wide range of image adjustments, as described below.



Note:

- ☐ *The Image Controls settings are not available when Text Enhancement Technology is selected in the Image Type dialog box.*
- ☐ *The Image Controls button is unavailable when one or more marquees are selected in addition to the active marquee.*
- ☐ *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 settings except Threshold are not available.*
- ☐ *The Gamma, Highlight, and Shadow settings are overridden by the Auto Exposure feature. Be sure to use the Auto Exposure feature before making these settings. See “Auto Exposure” on page -38 for more information on using this feature.*

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 settings are related. When the Exposure setting is changed, the Highlight value also changes automatically.

Gamma

The Gamma setting allows you to adjust the mid-tones in an image. You can select from 0.5 (darkest) to 5.0 (brightest) by moving the slider.

For further information on using the Gamma setting to optimize scanning, see “Making the Gamma setting” on page 1-5.

Highlight

The Highlight setting 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 previewed 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. Click Cancel to restore the original image.

For further information on using the Highlight setting to optimize scanning, see “Making the Highlight setting” on page 1-3.

Shadow

The Shadow setting 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 previewed 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. Click Cancel to restore the original image.


For further information on using the Shadow setting to optimize scanning, see “Making the Shadow setting” on page 1-4.

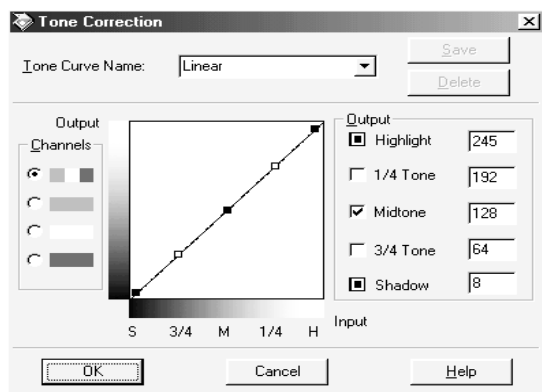
Threshold

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, and is useful for optical character reading (OCR).

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

Tone Correction

Clicking the  Tone Correction button opens the Tone Correction dialog box. The settings described in this section allow you to adjust the tonal relationship between the original image and its reproduction on a monitor or printer.



Note:

- ☐ *The Tone Correction button is unavailable when one or more marquees are selected in addition to the active marquee.*
- ☐ *The Linear setting is the default Tone Correction setting.*
- ☐ *The Tone Correction feature is not available when Pixel Depth is set to Black & White, Halftone is set to None, and Text Enhancement Technology is selected in the Image Type dialog box.*

To save your Tone Correction settings, type a new name in the Tone Curve Name box and click **Save**. To delete a setting from the Tone Curve Name list, select the setting and click **Delete**.

To apply your Tone Correction settings, click **OK**. To restore the original settings, click **Cancel**.

For further information on using Tone Correction to optimize scanning, see “Making tone curve settings” on page 1-9.

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 each of these colors separately.

Note:


If Pixel Depth is set to Black & White or 8-bit Gray in the Image Type dialog box, you can only select the combined RGB channel option.

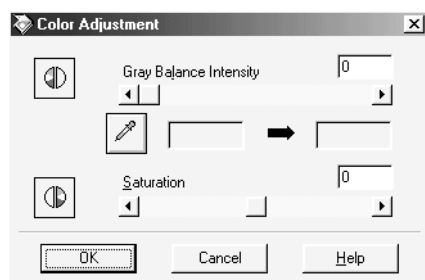
Tone Curve Name list

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

For further information on using the Tone Curve Name list to optimize scanning, see “Applying a preset tone curve” on page 1-6.

Color Adjustment

Click the  Color Adjustment button in the Preview window to open the Color Adjustment dialog box, where you can make Gray Balance Intensity and Saturation settings.



Note:

- ☐ *The Color Adjustment button is unavailable when one or more marquees are selected in addition to the active marquee.*
- ☐ *If Image Type setting is not Color Photo or Color Photo De-screening, or Pixel Depth is set to 8-bit Gray or Black & White, the Color Adjustment feature is not available.*

Gray Balance Intensity

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

Click the eyedropper button beneath the slider. The mouse pointer changes to an eyedropper. Then click the color you want to represent as 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 previewed image. Click Cancel to restore the original image.

Note:

You can use the Auto Exposure feature to automatically adjust Gray Balance Intensity when Document is selected as the Auto Exposure Option in the Image Type dialog box. To change the Auto Exposure Option setting, see “Auto Exposure Option” on page 2-8.


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

Click the Reset button to return any Adjust button settings you made to their default settings. If you did not alter any settings, this button is not available.

Focus

Click the  Focus button to set the focus position to either 2.5 or 0.0. The current setting is indicated under the button.

If TPU for Neg. Film or TPU for Pos. Film is selected as the Document Source, the value of the focus position is automatically set to 2.5. If you are using film holders, you do not need to change the focus setting. If you set the film directly on the scanner's document table, EPSON recommends changing the focus position to 0.0.


If Flatbed, or Auto Document Feeder is selected, the value is automatically set to 0.0. EPSON does not recommend changing the setting unless you want to have the scanned images out of focus or you are scanning an object that is not flat.

Chapter 3

Setting Up the Start Button


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Making Windows Millennium Edition, 98, and 2000 Settings ..	3-2
Making PageManager Settings	3-4

Overview of Start Button Features

When your scanner is connected directly to your computer, you can set up the scanner's  Start button to operate in the following ways:

- ❑ Open an application of your choice
(for Windows Millennium Edition, 98, and 2000 users only)
- ❑ Scan and send the scanned document to a specified application
(if you have installed Presto! PageManager for EPSON from the scanner software CD-ROM)



Note:

If you are using your scanner over a network, you cannot use the scanner's  Start button in the ways described above.

If you are using Windows Millennium Edition, 98, or 2000, read "Making Windows Millennium Edition, 98, and 2000 Settings" on page 3-2 first.

If you are using Windows 95 or NT 4.0, or a Macintosh computer, read "Making PageManager Settings" on page 3-4.

Making Windows Millennium Edition, 98, and 2000 Settings


This section explains how to make settings that control which application opens when you press the scanner's  Start button. You can specify one application to open automatically when you press the  Start button, or you can have a window open allowing you to choose from a list of applications. Follow the steps below to make these settings.


Note:


These settings do not apply to Windows 95 or NT 4.0, or to Macintosh computers.

1. Click Start, point to Settings, and select Control Panel.
2. Double-click the Scanners and Cameras icon. The Scanners and Cameras Properties dialog box appears.
3. Select your scanner from the list of installed scanners and cameras, click the Properties button, then click the Events tab.




4. In the Scanner events list, make sure Start Button is selected.
5. To have an application open automatically when you press the  Start button, select the check box next to that application in the Send to this application window, and clear the check boxes of all the other applications.


To have your document scanned and sent to an application with one press of the  Start button, select Presto! PageManager for EPSON, complete the steps in this section, then proceed to “Making PageManager Settings” on page 3-4.

If you want to choose from a list of applications when you press the  Start button, select the check boxes of the applications you want.

Note:


- ☐ *Depending on the application, EPSON TWAIN Pro may also open when you press the  Start button.*
- ☐ *Some applications do not support linkage to scanners and digital cameras. Linkage is available only with the applications that appear in the Send to this application list.*


6. To save your settings, click OK, then click OK again.

If you did not select Presto! PageManager for EPSON, or if you selected multiple applications, close all applications and try pressing the  Start button on the scanner to confirm that everything is set up correctly.

If you selected Presto! PageManager for EPSON only, see the next section to make settings for scanning and sending the scanned document to a specified application.

Making PageManager Settings

This section explains how to set up Presto! PageManager for EPSON to scan and send a document to a specified application with one press of your scanner's  Start button.

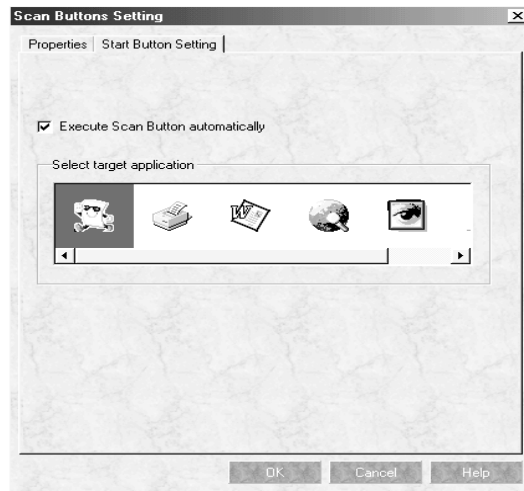
Note for Windows Millennium Edition, 98, and 2000 users:
Before setting up PageManager, make sure that your system is set to automatically start up PageManager when you press the  Start button. For instructions, see "Making Windows Millennium Edition, 98, and 2000 Settings" on page 3-2.

1. Start Presto! PageManager for EPSON.

Note:

If the EPSON TWAIN Pro main dialog box appears on your screen, close it.

2. From the File menu, select Scan Buttons Setting.
3. In the Scan Buttons Setting dialog box, click the Start Button Settings tab.





4. In the Select target application window, click the icon of the application or device to which you want to send scanned data.

Note:

If the application or device you want to select does not appear in the Select target application window, you can add its icon to the window. For instructions, see your PageManager documentation.

5. Make sure the Execute Scan Button automatically check box is selected, then click OK.

The selected application or device is now assigned to the scanner's  Start button. Close all applications and try pressing the  Start button on the scanner to confirm that everything is set up correctly.

Chapter 4

Options

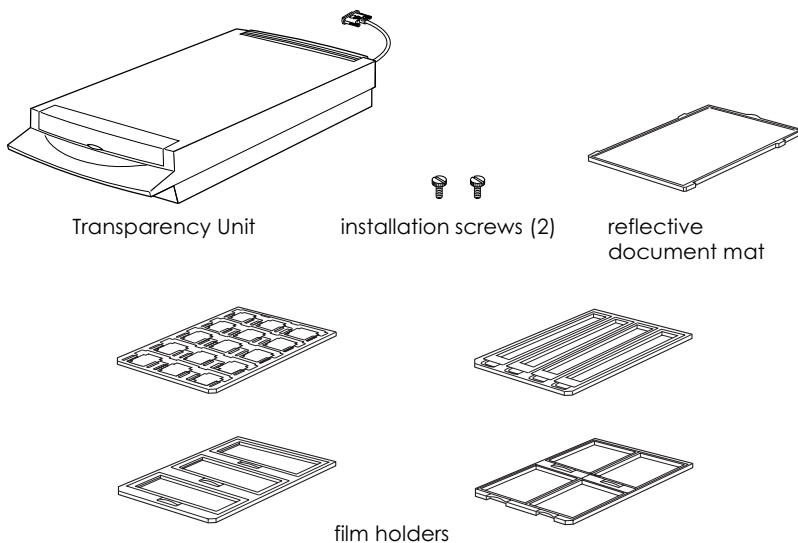
Using the Transparency Unit	4-2
Unpacking the Transparency Unit	4-2
Removing the shipping screw	4-3
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Using the Transparency Unit

The optional Transparency Unit (B81318*) makes it possible to scan transparencies and slides. Once you install the Transparency Unit, you can leave it in place even when you scan other types of documents.

Unpacking the Transparency Unit

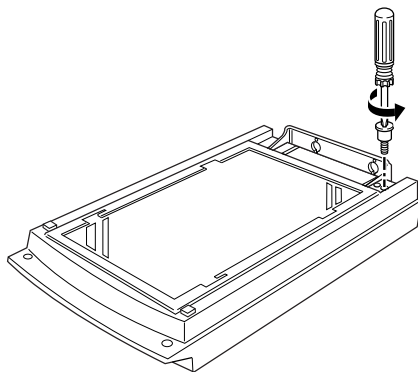
Make sure that all the items shown below are included and have not been damaged during shipping. Contact your EPSON dealer if any item is missing or damaged.



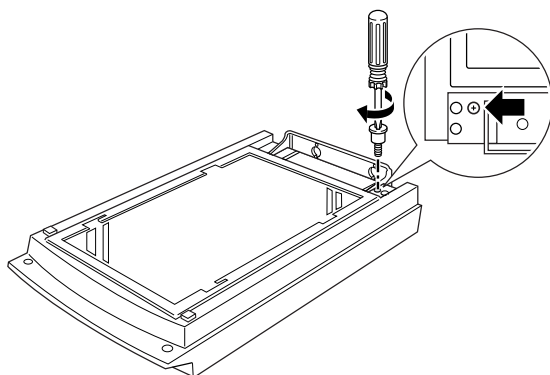
Removing the shipping screw

A shipping screw is installed on the Transparency Unit to prevent damage during shipping. Be sure to use the following procedure to remove this screw before attempting to use the unit.

1. Turn over the Transparency Unit so its glass side is facing up.
2. Remove the shipping screw as shown below.



3. Screw the shipping screw into the storage hole as shown.



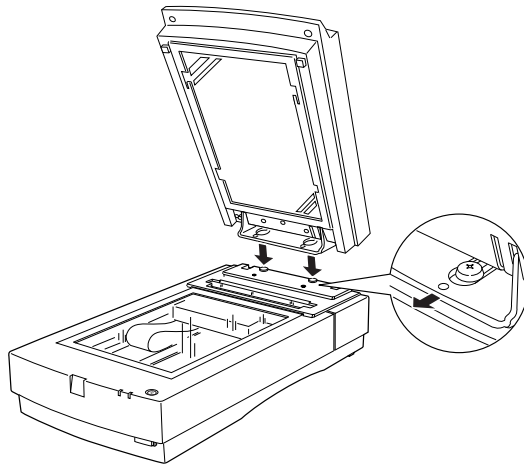
Note:

Before transporting the scanner, remove the Transparency Unit and return the shipping screw to its original shipping hole. See "Transporting the scanner and the Transparency Unit" on page 5-3 for details.

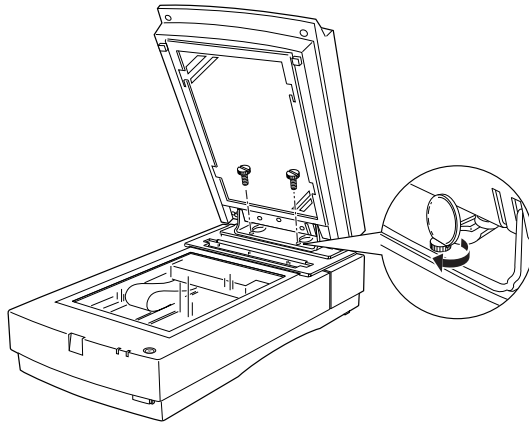
Installing the Transparency Unit

Follow the steps below to install the Transparency Unit on the scanner.

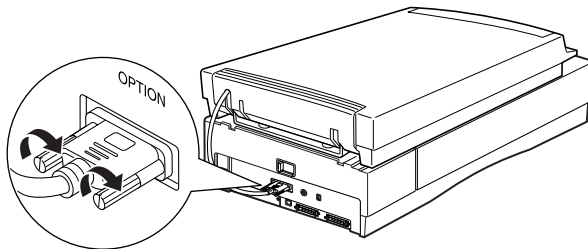
1. Make sure the scanner is turned off, and unplug the power cord.
2. Remove the document cover from the scanner by lifting straight up on its back edge.
3. Slide the mounting slots on the Transparency Unit under the two installation screws attached to the scanner.



4. Insert the two installation screws provided with the Transparency Unit into the holes as shown below, and then tighten the screws with a coin.

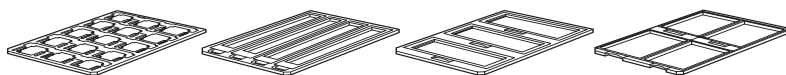


5. Close the Transparency Unit.
6. Connect the Transparency Unit's connector to the option connector on the scanner.



Preparing transparencies for scanning

Four film holders for scanning various types of transparencies are included with this unit.



For instructions on loading your transparencies into the film holders and positioning them on the scanner, go to the section listed below that matches the type of transparency you want to load.

Note:

Be sure to wipe the Transparency Unit glass, the scanner's document table, and the narrow window near the mounting bracket with a soft cloth before scanning transparencies.

For instructions on scanning normal paper documents, see "Scanning normal reflective documents" on page 4-17.

35-mm film strips... page 4-7

Mounted slides... page 4-9

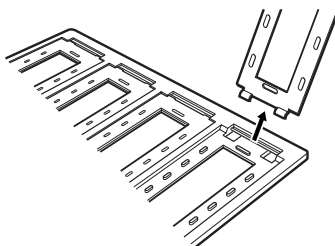
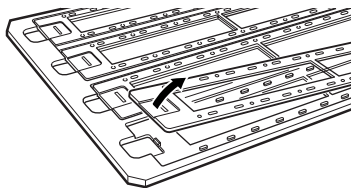
120/220 film... page 4-11

4 × 5 inch film... page 4-13

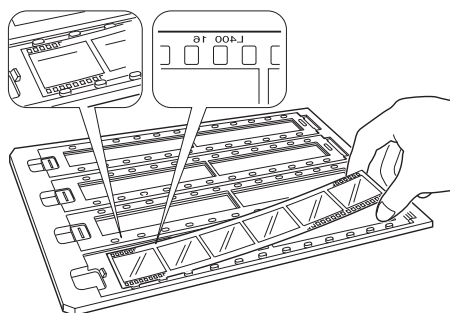
Non-standard film sizes... page 4-16

35-mm film strips

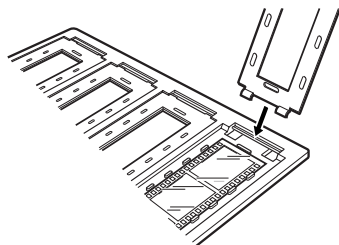
1. Place the 35-mm film strip holder on a flat surface, and remove a strip cover.



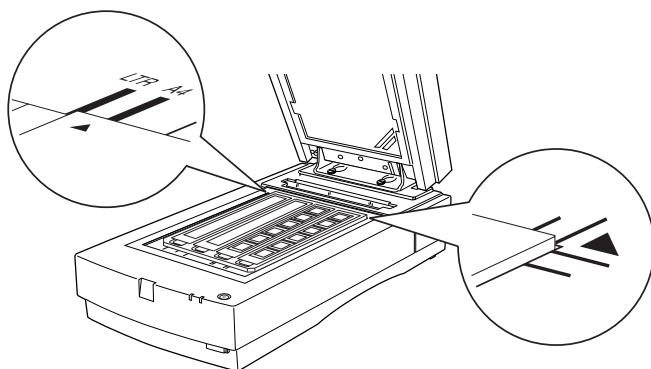
2. Insert a strip of film in the film strip holder, making sure the glossy (smooth) side of the film is facing down.



3. Replace the strip cover that you removed in step 1. Repeat steps 1 through 3 for all the film strips you scan.



4. Open the Transparency Unit, then place the film strip holder on the document table and align it as shown below.

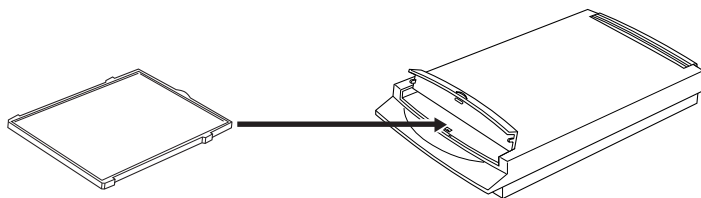


5. If the reflective document mat is installed on the Transparency Unit, remove it, then close the Transparency Unit.

Note:

- ❑ *Make sure the Transparency Unit is completely closed. Otherwise an option error will occur and scanning will be cancelled.*

- ❑ *When scanning transparencies, store the reflective document mat in the Transparency Unit pocket.*



Caution:

Do not put anything but the reflective document mat into the Transparency Unit pocket.

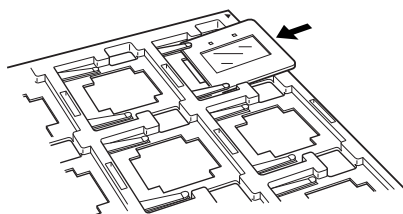
You are now ready to scan the film strips using your scanner software.

Note:

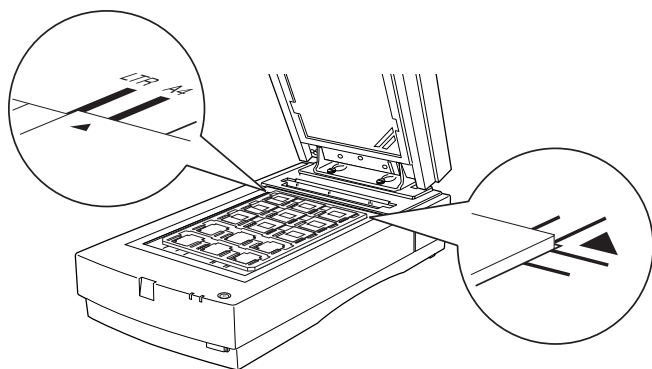
- ❑ *Make sure to select TPU for Neg. film or TPU for Pos. film as the Document Source setting in EPSON TWAIN Pro.*
- ❑ *When TPU for Neg. film or TPU for Pos. film is selected as the Document Source setting, the focus position is automatically set to 2.5 to accommodate the use of the film holders.*

Mounted slides

1. Load slides in the 35-mm slide holder face down, as shown below. Repeat this step for all the slides you scan.



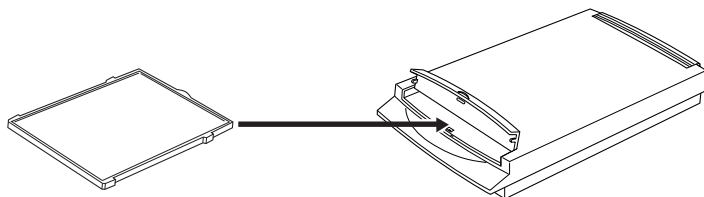
2. Open the Transparency Unit, then place the slide holder on the document table. Align the slide holder as shown below.



3. If the reflective document mat is installed on the Transparency Unit, remove it, then close the Transparency Unit.

Note:

- ❑ *Make sure the Transparency Unit is completely closed. Otherwise an option error will occur and scanning will be cancelled.*
- ❑ *When scanning transparencies, store the reflective document mat in the Transparency Unit pocket.*



Caution:

Do not put anything but the reflective document mat into the Transparency Unit pocket.

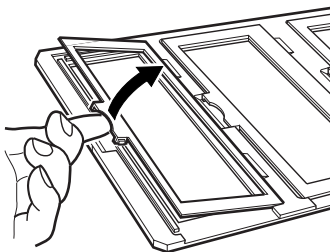
You are now ready to scan the slides using your scanner software.

Note:

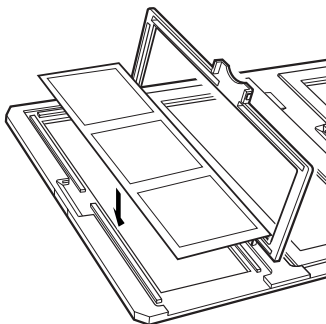
- ❑ *Make sure to select TPU for Neg. film or TPU for Pos. film as the Document Source setting in EPSON TWAIN Pro.*
- ❑ *When TPU for Neg. film or TPU for Pos. film is selected as the Document Source setting, the focus position is automatically set to 2.5 to accommodate the use of the film holders.*

120/220 film

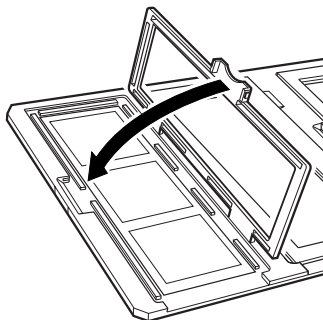
1. Place the 120/220 film holder on a flat surface, and open a strip cover.



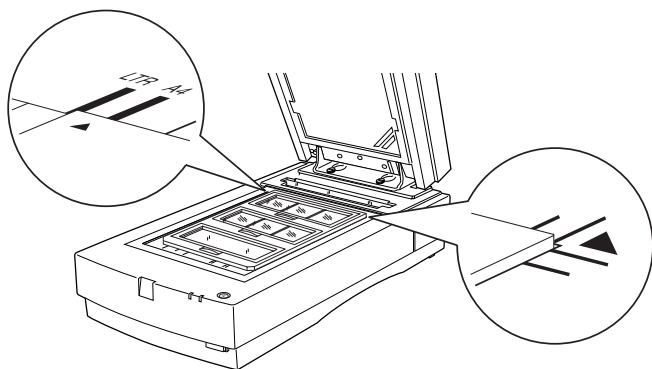
2. Insert the film in the film holder, making sure the glossy (smooth) side of the film is facing down.



3. Close the cover. Repeat steps 1 through 3 for all the film you scan.



4. Open the Transparency Unit, then place the film holder on the document table and align it as shown below.

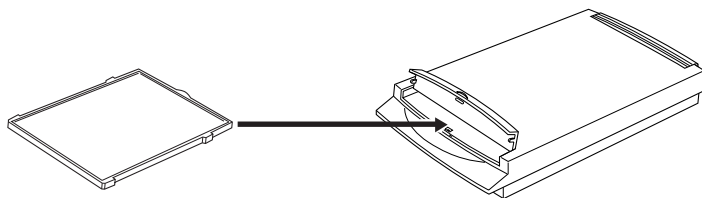


5. If the reflective document mat is installed on the Transparency Unit, remove it, then close the Transparency Unit.

Note:

- ❑ *Make sure the Transparency Unit is completely closed. Otherwise an option error will occur and scanning will be cancelled.*

- ❑ *When scanning transparencies, store the reflective document mat in the Transparency Unit pocket.*



Caution:

Do not put anything but the reflective document mat into the Transparency Unit pocket.

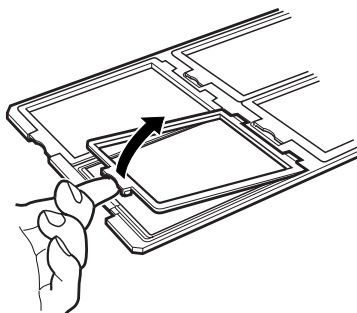
You are now ready to scan the film using your scanner software.

Note:

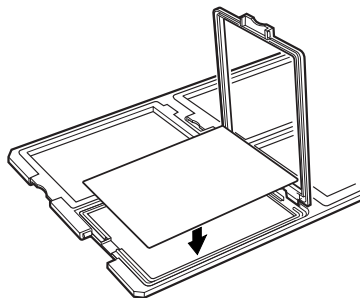
- ❑ *Make sure to select TPU for Neg. film or TPU for Pos. film as the Document Source setting in EPSON TWAIN Pro.*
- ❑ *When TPU for Neg. film or TPU for Pos. film is selected as the Document Source setting, the focus position is automatically set to 2.5 to accommodate the use of the film holders.*

4 x 5 inch film

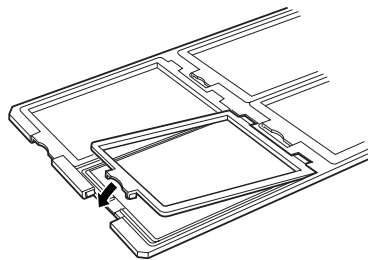
1. Place the 4 × 5 inch film holder on a flat surface, and open a cover.



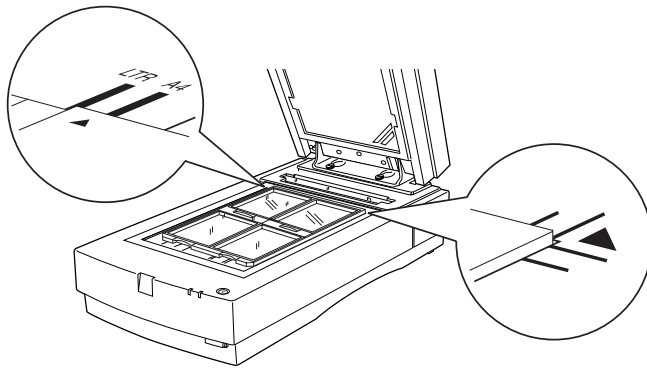
2. Insert the film in the film holder, making sure the glossy (smooth) side of the film is facing down.



3. Close the cover. Repeat steps 1 through 3 for all the film you scan.



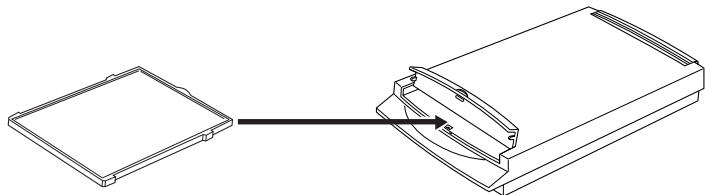
4. Open the Transparency Unit, then place the film holder on the document table and align it as shown below.



5. If the reflective document mat is installed on the Transparency Unit, remove it, then close the Transparency Unit.

Note:

- ❑ *Make sure the Transparency Unit is completely closed. Otherwise an option error will occur and scanning will be cancelled.*
- ❑ *When scanning transparencies, store the reflective document mat in the Transparency Unit pocket.*



Caution:

Do not put anything but the reflective document mat into the Transparency Unit pocket.

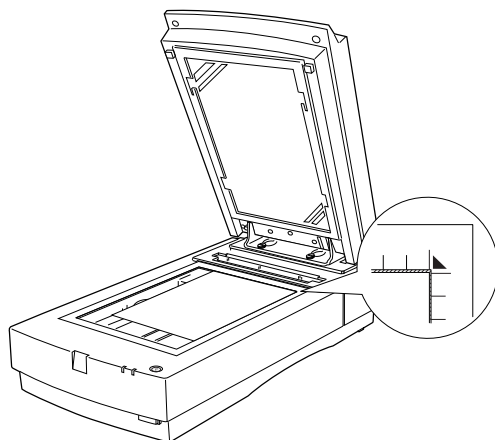
You are now ready to scan the film using your scanner software.

Note:

- ❑ *Make sure to select TPU for Neg. film or TPU for Pos. film as the Document Source setting in EPSON TWAIN Pro.*
- ❑ *When TPU for Neg. film or TPU for Pos. film is selected as the Document Source setting, the focus position is automatically set to 2.5 to accommodate the use of the film holders.*

Non-standard film sizes

1. Open the Transparency Unit, then place the film directly onto the scanner's glass document table, making sure the glossy (smooth) side of the film is facing down.



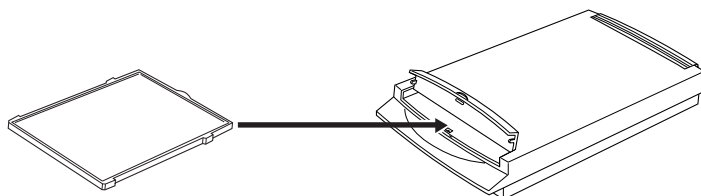
Note:

An area approximately 1.6 mm from the horizontal and 1 mm from the vertical edges of the document table glass will not be scanned.

2. If the reflective document mat is installed on the Transparency Unit, remove it, then close the Transparency Unit.

Note:

- ❑ *Make sure the Transparency Unit is completely closed. Otherwise an option error will occur and scanning will be cancelled.*
- ❑ *When scanning transparencies, store the reflective document mat in the Transparency Unit pocket.*



Caution:

Do not put anything but the reflective document mat into the Transparency Unit pocket.

You are now ready to scan the film using your scanner software.

Note:

When placing film directly on the document table, make sure to select TPU for Neg. film or TPU for Pos. film as the Document Source setting, and 0.0 as the focus position in EPSON TWAIN Pro.

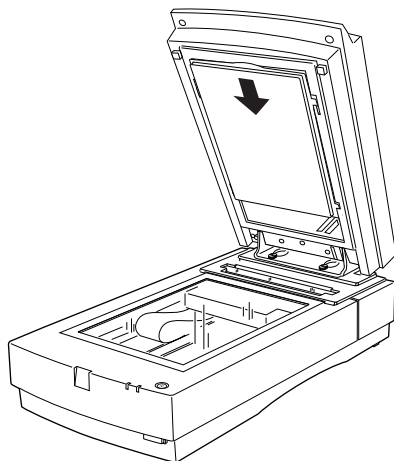
Scanning normal reflective documents

When scanning normal reflective documents, you should always use the reflective document mat included with the Transparency Unit. Also, make sure you remove the transparency guide from the scanner's document table.

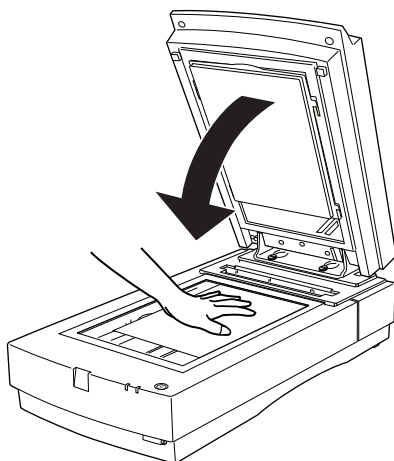
Install the reflective document mat as described below.

1. Open the Transparency Unit.

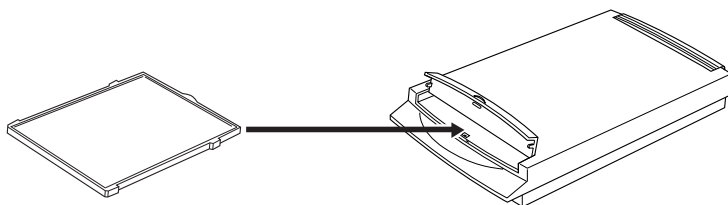
2. Insert the tabs on the reflective paper document mat into the slots on the Transparency Unit and slide the mat into place.



3. Position the reflective document and close the unit.



To remove the reflective document mat, slide it up and out of the slots on the Transparency Unit. Be sure to store the reflective document mat in the Transparency Unit pocket when not in use.



Caution:

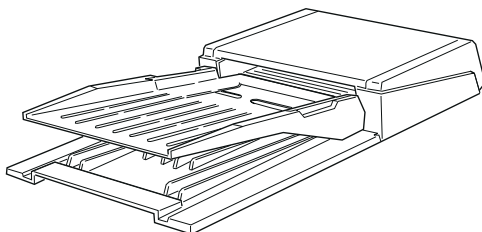
Do not put anything but the reflective document mat into the Transparency Unit pocket.

Using the Automatic Document Feeder

The Automatic Document Feeder (B81316*) allows you to automatically load multiple-page documents into your scanner. This document feeder is particularly useful for OCR (optical character recognition) scanning, or for creating an image database.

Unpacking the Automatic Document Feeder

When you unpack your Automatic Document Feeder, make sure you have all the parts shown below and that none are damaged. If you find any missing or damaged items, contact your EPSON dealer immediately.



Automatic Document Feeder

Installing the Automatic Document Feeder

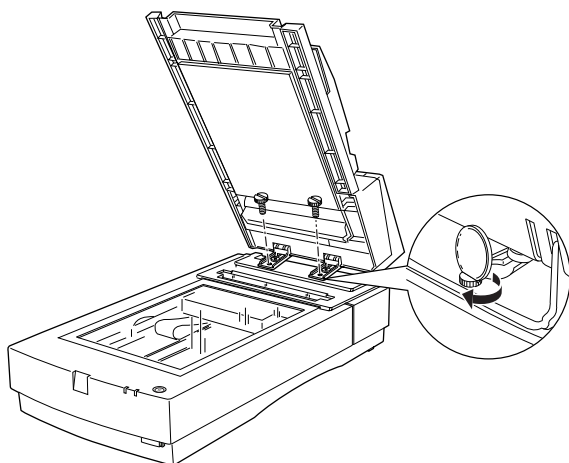
Follow the steps below to install the Automatic Document Feeder on your EPSON scanner.

1. Make sure your scanner is turned off, and unplug the scanner's power cord.
2. Remove your scanner's document cover by holding the cover behind the hinge and lifting the back of the cover straight up.

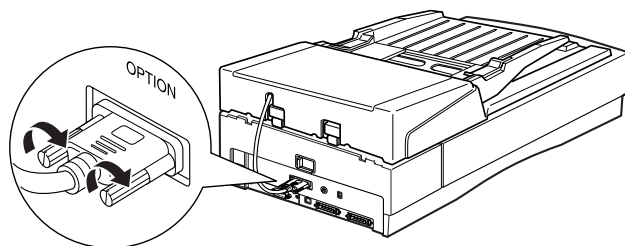
3. The scanner comes with two installation screws attached; slide the mounting slots on the Automatic Document Feeder forward, underneath these two screws. Do not remove the protective materials from the Automatic Document Feeder's mounting hardware yet.



4. Insert the installation screws included with your Automatic Document Feeder into the holes in the scanner, then use a coin to tighten them.



5. Remove the protective materials from the Automatic Document Feeder's mounting hardware.
6. Close the Automatic Document Feeder.
7. Attach the Automatic Document Feeder's connector to the scanner's option interface.



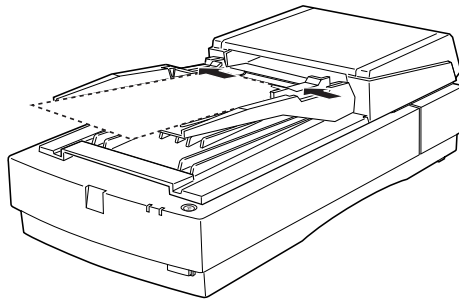
Loading documents into the Automatic Document Feeder

Your Automatic Document Feeder can automatically load up to 30 sheets of the following paper sizes (based on a paper weight of 17 lbs and a stack thickness of 6.0 mm or less):

Checks	76 × 127 mm (3 × 5 inches)
B5	182 × 257 mm (7.17 × 10.1 inches)
A4	210 × 297 mm (8.27 × 11.69 inches)
Letter	215.9 × 279.4 mm (8.5 × 11 inches)
Legal	215.9 × 355.6 mm (8.5 × 14 inches)

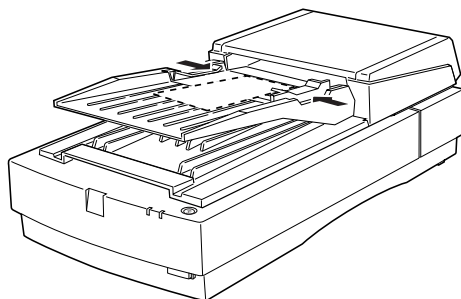
Follow the steps below to load documents into the Automatic Document Feeder.

1. Slide the left edge guide all the way to the left and place your document in the feeder tray. Then move the right edge guide so it is flush with the right edge of your document.

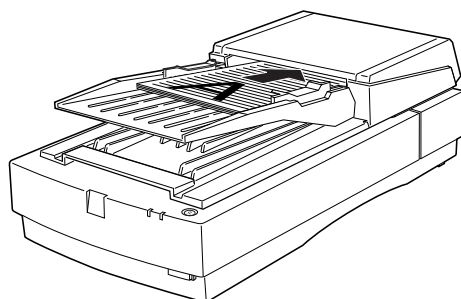


Note:

For checks, move the left edge guide to the center until it stops, then place your checks in the tray and move the right edge flush against them.



2. Insert the document stack into the Automatic Document Feeder until it meets resistance. Make sure that the side you want to scan is facing up.



Note:

To avoid paper jams, be sure to remove all documents from the Document Table before scanning.

Documents are fed into the lower tray after scanning is finished.

Loading documents manually

You can load documents manually even when the Automatic Document Feeder is installed.

To load manually, lift the Automatic Document Feeder and place the document on the scanning table. Then lower the Automatic Document Feeder and scan the document.

Note:

- ❑ *Opening the Automatic Document Feeder or its cover while it is operating results in an option error and paper feeding stops.*
- ❑ *Always close the Automatic Document Feeder and its cover before using it.*

Scanning from the Automatic Document Feeder

The scanning instructions are divided into two sections; read “Scanning the full document area” on page 4-25 to scan an entire document or image, or read “Scanning only part of the document area” on page 4-26 to scan only a certain part of an image or document.

Scanning the full document area

You do not need to use the preview feature when scanning a full document or image. The scanner automatically find and scans the whole image. Follow the steps below to scan an image or document.

Note:

The steps below describe the scanning procedure when using Presto! PageManager for EPSON. The procedure may vary slightly when using another application.

1. Load the document in the Automatic Document Feeder as described in “Loading documents into the Automatic Document Feeder” on page 4-23.
2. Start Presto! PageManager for EPSON.
3. Select EPSON TWAIN Pro from the File menu’s Select Source option if necessary.
4. Select Acquire from the File menu. The EPSON TWAIN Pro main dialog box appears.
5. Select Auto Document Feeder from the Document Source list, then make appropriate settings for the type of document you are scanning.
6. Click Scan. The Auto Document Feeder feeds the first sheet and scanning begins.

After the entire document is scanned, a window with thumbnail images will appear in PageManager. In this window you can select and change the orientation of the scanned images.

Scanning only part of the document area

To scan just a part of an image, follow the steps below.

Note:

The steps below describe the scanning procedure when using Presto! PageManager for EPSON. The procedure may vary slightly when using another application.

1. Load only the first page of the document in the Automatic Document Feeder as described in “Loading documents into the Automatic Document Feeder” on page 4-23.

Note:

Only set one page of the document at this time. If you set multiple pages at this time, the second page will be fed right after the first page is scanned and may become stuck in the middle of the document path as if the paper is jammed. In this case, you have to remove the second page from the document path and load it again.

2. Start Presto! PageManager for EPSON and select **Acquire** from the **File** menu. EPSON TWAIN Pro's main dialog box appears.
3. Click the **Preview** button. The first sheet of the document is fed into the scanner, then ejected after being previewed.
4. Draw a marquee around the part of the image you want to scan by dragging the mouse pointer over that area.
5. Load the ejected first page and all remaining pages of the document in the Automatic Document Feeder.
6. Make EPSON TWAIN Pro settings as needed for your document type and click the **Scan** button. The Auto Document Feeder feeds the first sheet and scanning begins.

After scanning the entire stack of documents, a window with thumbnail images appears in PageManager. In this window you can select and change the orientation of the scanned images.

Document specifications

Size:	Width: 3 to 8.5 inches (76 to 215.9 mm) Length: 5 to 14 inches (127 to 355.6 mm)
Thickness:	0.07 to 0.16 mm
Weight:	52.3 to 127.9 g/m ²

Paper quality:	High-quality bond or thermal paper
Document type:	Documents printed with impact printers, laser printers, or facsimile machines

Document conditions

Make sure of the following before feeding a document:

- ☐ Ink on the document is dry.
- ☐ The document has no holes, is not ripped or wrinkled, and has nothing attached to it.
- ☐ The document has no staples or other objects attached that might damage the feeder mechanism.
- ☐ The document has no folds closer than 8 mm from its edge.
- ☐ The document is neither bound nor a multipart form.
- ☐ The document has no rear carbon coating.
- ☐ The document has no cut out areas.

Other precautions

Do not feed photographic sheets or particularly valuable original artwork into this Automatic Document Feeder; misfeeding a document may result in accidental wrinkling or damage.

When you are scanning high-quality color or halftone documents, it is recommended you open the Automatic Document Feeder and scan documents individually.

Using the IEEE 1394 Scanner I/F Card

The optional IEEE 1394 Scanner I/F Card (B80834*) offers high-speed data transfer and flexible connectivity for your scanner. It supports a peak data transfer rate of 400 Mbps. You can connect or disconnect the interface cables without having to turn off the scanner or your computer. You can connect multiple IEEE 1394 devices simultaneously in either a daisy-chain or tree configuration.

System requirements

For Windows

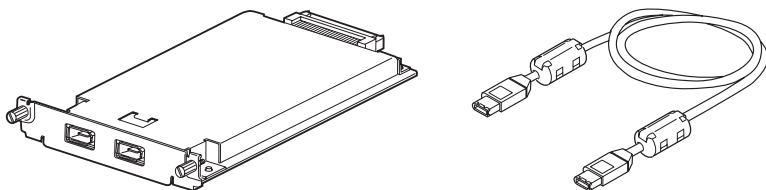
- Hardware: PC with built-in IEEE 1394 port,
or PC with an IEEE 1394 PCI board installed
- OS: Microsoft® Windows® Millennium Edition or
2000

For Macintosh

- Hardware: Macintosh equipped with built-in IEEE 1394
(FireWire) port, or with an IEEE 1394 (FireWire)
PCI card, supported by Apple® Computer.
- OS: Mac OS 8.6 with FireWire 2.1 or later.

Installing the IEEE 1394 Scanner I/F Card in your scanner

To use your scanner as an IEEE 1394 device, you need to install the optional IEEE 1394 Scanner I/F Card.



1. Turn off the scanner. Unplug any power cords, then disconnect all cables from the back panel of your scanner.

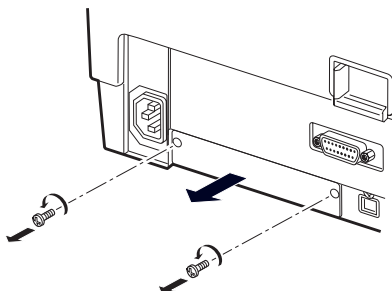
2. Use a cross-head screwdriver to remove the two screws securing the shield plate to the optional interface slot; then remove the plate. Be sure to keep both screws; you may need to use them again if you re-install the shield plate.



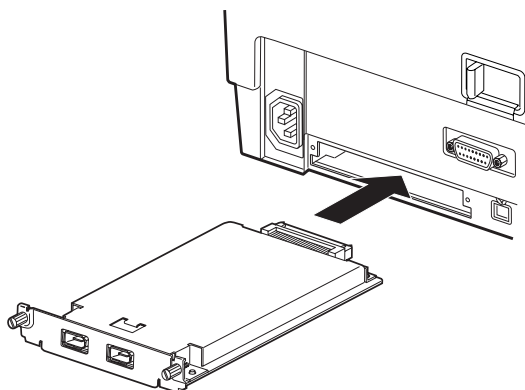
Caution:

Static electricity can damage electronic components.

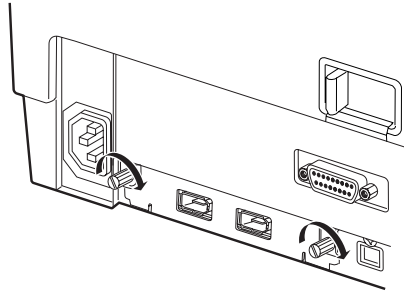
Discharge static electricity by touching the metal frame of your scanner before handling the interface board.



3. Insert the Scanner I/F Card along the side guide rails into the expansion slot in the optional interface slot.



4. Secure it with the retaining screws.



5. Reconnect all cables.

Understanding IEEE 1394 connections

The Scanner I/F Card is equipped with two cable connectors. One is used to connect the card to the computer, and the other is used to connect other IEEE 1394 devices in a daisy chain or tree configuration. Use the cable supplied when making the connection. The cable can be connected without switching off the power supply to the computer or the scanner because it complies with the IEEE 1394 standard. Cables can be connected whether the scanner or computer are on or off.



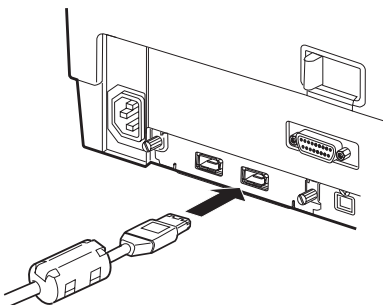
Caution:

Do not connect or disconnect IEEE 1394 cables when the scanner is in use.

Connecting the scanner

To connect the scanner to your computer or other IEEE 1394 device:

1. Connect one end of the cable to any available IEEE 1394 port on the Scanner I/F Card.



2. Connect the other end of the cable to the IEEE 1394 port on your computer. If other IEEE 1394 devices are already connected to the computer's IEEE 1394 port, connect the scanner to an available IEEE 1394 port on the last device in the chain.

Note:

The cable supplied with the IEEE 1394 Scanner I/F Card has 2 six pin connectors at each end. If IEEE 1394 devices with four pin connectors are used in a daisy chain or tree, you will need to use a 6:4 converter cable.

Chapter 5

Maintenance and Troubleshooting

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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 stained with grease or some other hard-to-remove material, use a small amount of glass cleaner and a soft cloth to remove it. Wipe off all remaining liquid.

Make sure that no dust builds up on the glass of the document table. Dust can cause spots in your scanned image.



Caution:

- ❑ *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 the 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 rapidly flash. When this happens, the lamp assembly must be replaced. For details, contact your dealer.



Caution:

Never open the case of the scanner. If you think repairs or adjustments are necessary, consult your dealer.

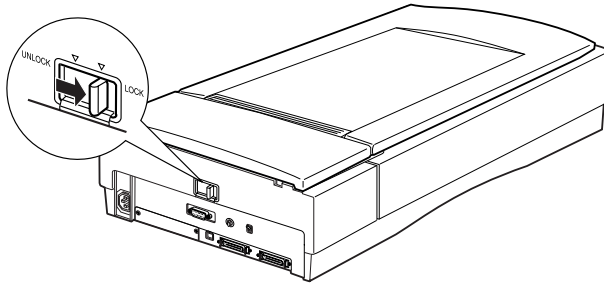
Transporting the scanner and the Transparency Unit

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

Preparing the scanner for transportation

1. Make sure the transportation lock lever is in the UNLOCK position.
2. Align the SCSI ID rotary switch with “*”.
3. Turn on the scanner.

4. After the carriage moves to the back of the scanner, slide the transportation lock lever to the LOCK position.



Preparing the optional Transparency Unit for transportation

1. With the Transparency Unit attached, turn on the scanner and wait until the unit's lamp assembly moves to its home position. Then turn off the scanner and remove the Transparency Unit.
2. Raise the front of the Transparency Unit, hold it upright, and gently shake it up and down once so that the lamp assembly slides down toward the back of the unit. Wait until the lamp assembly comes to rest.
3. Install the shipping screw in its original shipping hole.

Problems and Solutions

Most problems you encounter while operating your scanner and software have simple solutions. This section helps you identify the cause of the problem and provides you with solutions. It is divided into the following categories:

“Error indicators” on page -5

“Scanner operation problems” on page -7

“Quality problems” on page -15

“Software setup problems” on page -20

Read the appropriate section to find your problem; then follow the recommended steps.

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. For information on contacting customer support in your area, see “Contacting Customer Support” on page -28.

Error indicators

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

The scanner has received incorrect commands from your scanning software.

When this error occurs, try to 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

The interface setup is wrong or the scanner is not properly connected to the printer.

When this error occurs, check the interface connection and then push the  operate button to turn the scanner off and then back on again to reset it.

Fatal error

This type of error indicates one of the following problems:

- ☐ The fluorescent lamp needs to be replaced.
- ☐ The transportation lock lever is not released.
- ☐ 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

This indicates a problem with an installed option, such as a paper jam, an empty document feeder, or an open cover.

Check the option and correct the cause of the problem.


Scanner operation 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
(See “Setting Up the Scanner” on page 2-1 of the *Setup Guide*.)
- ❑ Incorrect setup of your computer or software
(See the *Setup Guide*.)
- ❑ Incorrect operation of your software
(See “Understanding EPSON TWAIN Pro Features” on page 2-1 and “Optimizing Scanning” on page 1-1 in this guide. Also see Chapter 4 of the *Setup Guide*, “Using Your Scanner” on page 4-1.)

Also see the documentation that came with your computer and printer for possible solutions.

The READY light does not come on.

- ❑ Press the  operate button to turn on the scanner.
- ❑ Make sure the power cord is connected to the scanner and is plugged into a power outlet.

The scanner does not scan.

- ❑ Wait until the READY light stops flashing and remains on (ready for scanning).
- ❑ 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. See your *Setup Guide* for details on making these settings.

- ❑ For SCSI interface users, 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.
- ❑ For USB interface users, try connecting your scanner to a different port on your hub, or to a different hub.
- ❑ 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; and EPSON FW ScannerLib.

The scanner software does not work properly.

- ❑ Make sure your software is installed correctly.
- ❑ For Windows Millennium Edition, 98, and 2000 users, check if your scanner is listed more than once in the Scanners and Cameras Properties dialog box. To view the dialog box, click Start, point to Settings, click Control Panel, then double-click the Scanners and Cameras icon.

If EPSON Expression1 680 appears more than once in the list of installed devices, follow the instructions in "Uninstalling the Scanner Software for Windows" on page 3-49 of the *Setup Guide* to remove it completely from the dialog box. Then follow the instructions in "Installing EPSON TWAIN Pro for Windows" on page 3-6 of the *Setup Guide* to reinstall EPSON TWAIN Pro.

- ❑ Make sure your computer meets the memory and other system requirements specified for the software you are using.

- ❑ Make sure the computer has enough memory for your software. If the computer does not have enough memory available, see your software and computer documentation for information on adding more memory.

The scanner cannot be selected or is listed as unavailable in Windows.

- ❑ Turn off the scanner and PC, and check that they are connected properly.
- ❑ Make sure that a scanner supported by EPSON Scan Server and EPSON TWAIN Pro Network is connected to the scanner server PC.
- ❑ For Windows Millennium Edition, 98, and 2000, make sure EPSON TWAIN Pro is installed on the scanner server PC (the PC which is connected to the EPSON scanner).

If you want to scan using the scanner server PC, make sure EPSON TWAIN Pro Network is installed on the PC.

- ❑ When connected using the SCSI interface, change the scanner's SCSI ID number to one that is not being used by any other SCSI device.

Note for Windows 98 users:

Depending on your Windows 98 version, you may have to uninstall the scanner from your system before changing the SCSI ID number. For instructions, see "When changing the ID number or replacing the SCSI board in Windows 98" on page 2-15 of the Setup Guide.

- ❑ Check the SCSI connection sequence and make sure the scanner's terminator switch is set correctly. The terminator switch should be set to ON when the scanner is connected directly to the computer, or when it is the last device in a daisy chain. For more information on setting the terminator switch, see your *Setup Guide*.

Scanning does not start by pressing the Start button.

- ☐ For Windows 95, NT 4.0, and Macintosh users, make sure the Scanner Monitor software is running.
- ☐ For Windows Millennium Edition, 98, and 2000 users, click the Events tab in your scanner's Properties dialog box and make sure the Disable device events check box is clear. Also make sure that the Start Button is selected as the Scanner events option, and that at least one application in the Send to this application box is selected. See "Setting Up the Start Button" on page 3-1 for details.

EPSON TWAIN Pro does not start.

- ☐ Turn off the scanner and computer and check that they are connected properly.
- ☐ Make sure the interface cable meets the requirements of your interface board. See the documentation that came with the interface board.
- ☐ Make sure the interface board is installed correctly.
- ☐ When connected using the SCSI interface, make sure to turn on the scanner before turning on the computer.
- ☐ Make sure that EPSON TWAIN Pro is selected in your application.

EPSON Scan Server does not start.

- ☐ Turn off the scanner and computer, and check that they are connected properly.
- ☐ Make sure the interface cable meets the requirements of your interface board. See the documentation that came with the interface board.
- ☐ Make sure the interface board is installed correctly.

- ❑ When connected using the SCSI interface, make sure to turn on the scanner and then your computer.
- ❑ Make sure that a scanner supported by EPSON Scan Server and EPSON TWAIN Pro is connected to the scanner server PC.
- ❑ Make sure EPSON TWAIN Pro Network is installed on the scanner server PC (the PC which is connected to the EPSON scanner).

EPSON TWAIN Pro Network does not start.

- ❑ When connected using the SCSI interface, turn on the scanner first, then turn on the scanner server PC.
- ❑ Make sure that TCP/IP is selected as the networking protocol. If you are not sure how to select the networking protocol, consult your network administrator.
- ❑ Make sure that the cables which connect the EPSON scanner, the scanner server PC and the client PC meet system requirements and are properly connected.
- ❑ Make sure the interface card is installed correctly.
- ❑ Enter the correct IP address in the EPSON TWAIN Pro Network setup dialog box.

To use EPSON scanners in a network environment, you need to assign IP addresses to the scanner server PC and client PCs.

If EPSON scanners are installed in an internal LAN (Local Area Network), that is, isolated from the Internet, the following IP addresses can be assigned to the scanner server PC.

Note:

If you use IP addresses from these ranges, you will not be able to connect this LAN to the Internet in the future, otherwise there will be IP address conflicts.

10.0.0.0 - 10.255.255.255

172.16.0.0 - 172.31.255.255

192.168.0.0 - 192.168.255.255

If you plan to use a scanner server PC in a network connected to the Internet, you should acquire a formal IP address for the scanner server PC from the Internet organization of your country.

- ☐ Make sure one of the naming services such as DNS, WINS, or LMHOSTS is used in your network. Otherwise use an IP address to specify the EPSON TWAIN Pro setup dialog box.

The Auto Document Feeder or Transparency Unit cannot be selected.

Make sure the optional equipment is installed correctly. For installation instructions, see “Using the Automatic Document Feeder” on page 4-19 or “Using the Transparency Unit” on page 4-2.

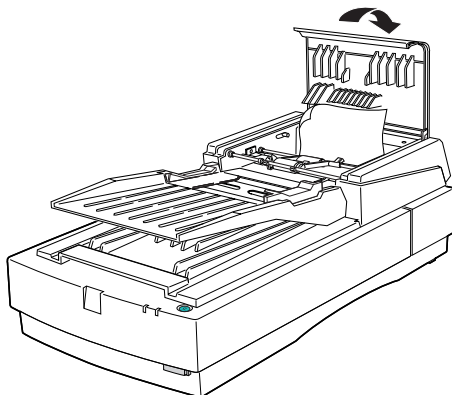
You cannot scan from the Automatic Document Feeder.

- ☐ Make sure Auto Document Feeder is selected as the Document Source in EPSON TWAIN Pro.
- ☐ If the Automatic Document Feeder is open, close it and try again. If the Automatic Document Feeder is opened while scanning, remove any jammed paper, and reload any document which has not yet been scanned, then restart EPSON TWAIN Pro.
- ☐ Take the jammed paper out and reload the document, then restart EPSON TWAIN Pro.

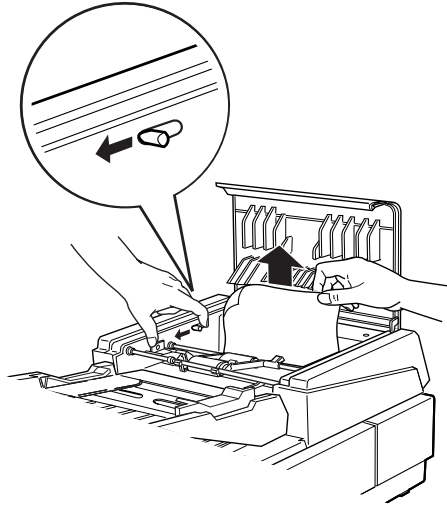
Paper jams in the Automatic Document Feeder.

Follow these steps to remove the jammed paper.

1. Open the Automatic Document Feeder's cover.



2. Pull forward on the jam-release lever and slowly pull the jammed paper out of the feeder mechanism. (Be careful not to pull too hard; the paper may tear, making it more difficult to remove.)



3. Close the document feeder cover and make sure the READY light is on and not flashing, and the ERROR light is off.

The scanner does not scan in Windows 98 after changing the SCSI ID number or the SCSI board.

Depending on your Windows 98 version, you may have to uninstall the scanner from your system before changing the SCSI ID number or replacing the SCSI board. For instructions, see “When changing the ID number or replacing the SCSI board in Windows 98” on page 2-15 of the *Setup Guide*.

Quality problems

The 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.
- ☐ Make sure the document is uniformly flat against the document table.



Caution:

Do not place heavy objects on the document table.

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

The image is faint.

- ☐ Adjust the Exposure setting in EPSON TWAIN Pro.
- ☐ Adjust the Gamma setting in EPSON TWAIN Pro.

Edges 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. Note that an area 1.6 mm from the horizontal guide and 1 mm from the vertical guide will not be scanned.

The image is too dark.

- ☐ Check the EPSON TWAIN Pro settings related to brightness and contrast. See “Adjusting Brightness and Contrast” on page 1-3 for details.

- ❑ Check the brightness and contrast settings of your computer display.

Image is dark, with little or no detail.

Select Screen/Web as the Destination setting in EPSON TWAIN Pro. For details, see “Selecting a Destination” on page 2-10.

Note:

Though selecting a printer may cause on-screen colors to differ from the colors of the original, the colors will be reproduced correctly when 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.
- ❑ When OCR is selected as the Image Type, adjust the Threshold setting in one of the following ways:

Click the Image Type button and change the B/W Option from Text Enhancement Technology to None. Then, in the Image Controls dialog box, adjust the Threshold setting.

Change OCR to Line Art, then change the Threshold setting in the Image Control dialog box. For details on the Threshold setting, see “Image Controls” on page -39.

Character recognition is poor.

- ❑ Make sure OCR is selected as the Image Type setting.
- ❑ Try adjusting the Threshold setting in the Image Controls dialog box.
- ❑ Select Text Enhancement Technology from the B/W Option in the Image Type dialog box. This helps to eliminate background noise.

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.

- ☐ Make sure the image settings of your software are appropriate for the type of image you want to scan.
- ☐ Try different image setting combinations in 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 scanned image file, make sure the file format is one your software can read.

A line of dots is always missing from the scanned image.

- ☐ If a line is missing on printouts only, the print head may be damaged or defective. See your printer documentation.
- ☐ If a line is missing on both screen images and printouts, the scanner sensor may be damaged or defective. Contact your dealer.

A line of dots always appears in the scanned image.

Wipe the scanner table glass with a soft cloth to remove any dirt.

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

- ☐ Select the 24-bit Color De-screening setting in the Image Type list or select On as the De-screening option in the Image Type dialog box.

- ❑ Place a transparent sheet between the document and document table to defocus the image.
- ❑ Move or angle the document slightly on the document table.
- ❑ Select Off from the Unsharp Mask list in the Destination dialog box.
- ❑ Make the image size slightly smaller.
- ❑ Change the focus setting.

Colors differ from the original.

- ❑ Make sure the Image Type and Destination settings are correct. To change these settings, see “Selecting an Image Type” on page 2-5 and “Selecting a Destination” on page 2-10.
- ❑ When using the Transparency Unit, make sure the opening near the hinges on the document table is uncovered, and that the Transparency Unit is closed when scanning.

Monitor colors

- ❑ 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. See your software and hardware manuals for details.
- ❑ 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

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). Check your software and printer documentation, or contact your printer company, for information on color matching and calibration.

Scanned image is too large.

Select Screen/Web as the Destination setting. See “Selecting a Destination” on page 2-10 for instructions. In some applications, if you select a printer as the Destination setting, the print will appear in the correct size even if the image is enlarged on the screen.

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. For installation instructions, see “Installing the Software” on page 3-1 of your *Setup Guide*.

The colors of negative film images look strange when previewed.

- ☐ Make sure the 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. To view the correct color, click and drag the mouse over an area, and then click the  Zoom button in the Preview window.

Software setup problems

You cannot install EPSON TWAIN Pro.

- ❑ Check if your computer and operating system meet the system requirements listed in “Installing the Software” on page 3-1 of the *Setup Guide*.
- ❑ Make sure your computer has enough memory to run the application.

You cannot install EPSON TWAIN Pro Network and/or EPSON Scan Server.

Check that both your computer and operating system match the system requirements listed in “Installing the Software” on page 3-1 of the *Setup Guide*.

The Scanner Status does not indicate “Device Ready” after you click Test in the EPSON TWAIN Pro dialog box or the Scanner’s Properties dialog box (Windows Millennium Edition, 98, and 2000) in the Control Panel.

- ❑ Turn off the scanner and computer and check that they are connected properly.
- ❑ Make sure the interface cable meets the requirements of your interface board. See the documentation that came with the interface board.
- ❑ Make sure the interface board is installed correctly.

- ❑ When connected using the SCSI interface, make sure to turn on the scanner and then your computer.
- ❑ 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.

Note for Windows 98 users:

Depending on your Windows 98 version, you may have to uninstall the scanner from your system before changing the SCSI ID number. For instructions, see "When changing the ID number or replacing the SCSI board in Windows 98" on page 2-15 of the Setup Guide.

- ❑ Check the SCSI connection sequence and make sure the scanner's terminator switch is set correctly. The terminator switch should be set to ON when the scanner is connected directly to the computer, or when it is the last device in a daisy chain. For more information on setting the terminator switch, see your *Setup Guide*.

Recovering from Scanner Software Installation Problems in Windows 98, 2000, and Millennium Edition

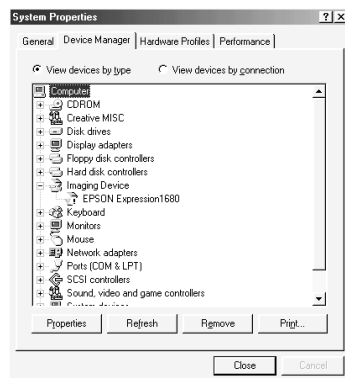
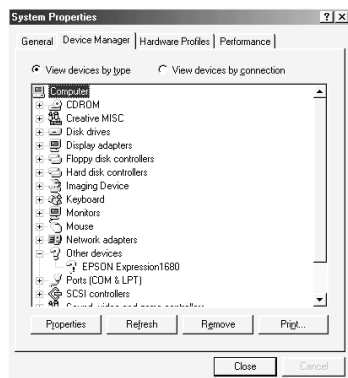
If you canceled the Plug and Play driver installation before the procedure was completed, EPSON TWAIN Pro may be incorrectly installed.

Follow the steps below to check the installation.

1. Turn on your scanner and then your computer. Plug the interface cable into your scanner and the computer.
2. Right-click the My computer icon on your desktop, then click Properties.
3. In Windows Millennium Edition and 98, click the Device Manager tab. In Windows 2000, click the Hardware tab, then click the Device Manager button.

If EPSON TWAIN Pro is correctly installed, EPSON Expression 1680 should appear under Imaging Device when you click the plus (+) sign next to Imaging Device.

If EPSON TWAIN Pro is not correctly installed, an exclamation mark (!) will appear in front of EPSON Expression1680 under Imaging Device, or EPSON Expression1680 will appear under Other devices with a question mark (?), as shown in the illustrations below. Follow the instructions below to reinstall the driver.

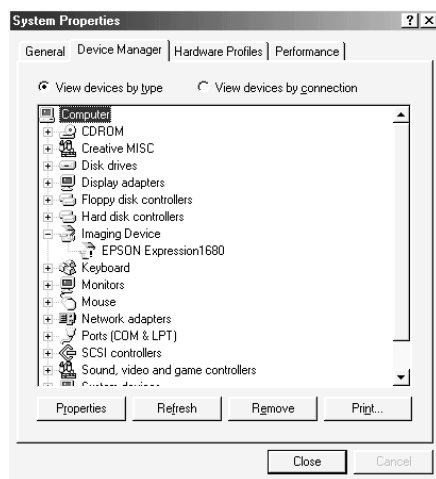


If an exclamation mark (!) appears beside EPSON Expression1680 under Imaging Device

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.

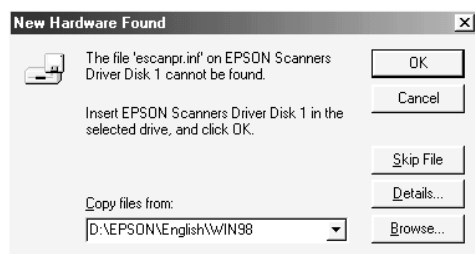
1. If an exclamation mark (!) appears beside EPSON Expression1680 under Imaging Device, click EPSON Expression1680. Then click Remove.



2. The Confirm Device Removal dialog box appears. Click OK.
3. Click Close to close the System Properties window.
4. Make sure your scanner is on, then restart your computer.
5. When the following dialog box appears, insert the scanner software CD in the CD-ROM drive, then click OK.



If the following dialog appears, browse the CD-ROM for EPSON\ (your preferred language)\ (your Windows version), as shown below, then click OK.



If EPSON Expression1680 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. If EPSON Expression1680 appears under Other devices, click EPSON Expression1680. Then click Remove.



2. The Confirm Device Removal dialog box appears. Click OK.
3. Click Close to close the System Properties window.

4. Make sure your scanner is on, then restart your computer.
5. The Add New Hardware Wizard dialog box appears. To install the driver again, follow the instructions in “Installing the Software” on page 3-1 of the *Setup Guide*.

Sizing Up Your System

If you are not satisfied with the quality of the images on your monitor or with the speed of image processing, you may want to consider upgrading your system as described in this section. While this section 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.

Contacting Customer Support

If your EPSON product is not operating properly and you cannot solve the problem using the troubleshooting information in your product documentation, contact customer support services for assistance. If customer support for your area is not listed below, contact the dealer where you purchased your product.

Customer support will be able to help you much more quickly if you give them the following information.

- ☐ Product serial number
(The serial number label is usually on the back of the product.)
- ☐ Product model
- ☐ Product software version
(Click About, Version Info, or similar button in the product software.)
- ☐ Brand and model of your computer
- ☐ Your computer operating system name and version
- ☐ Names and versions of the software applications you normally use with your product

Appendix A

Technical Specifications

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Scanning

Scanner type:	Flatbed, color
Photoelectric device:	Color CCD line sensor
Effective pixels:	13600 × 18720 pixels at 1600 dpi, 100%
Document size:	216 mm × 297 mm (8.5 inches × 11.7 inches) A4 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 12800 dpi (50 to 6400 dpi in 1 dpi increments, 12800 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:	16 bits per pixel per color internal 1 to 16 bits per pixel per color external
Brightness:	7 levels

Line Art settings:	Fixed threshold Text Enhancement Technology (enable/disable selectable)
Halftoning process:	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: 332 mm (13 inches) Depth: 562 mm (22.1 inches) Height: 133 mm (5.3 inches)
Weight:	Approx. 8.5 kg (18.7 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	0.8 A	0.4 A
Power consumption	Approx. 30 W (operating) Approx. 10 W (standby)	

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)
 10° C to 32° C (50° F to 89° F)
 when using the ADF

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.

Standards and Approvals

U.S. model:

Safety	UL 1950 CSA C22.2 No. 950
EMC	FCC Part 15 Subpart B Class B CSA C108.8 Class B

European model:

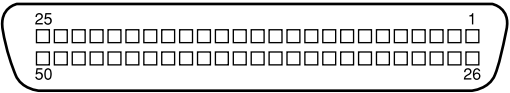
Low Voltage Directive 73/23/EEC	EN 60950
EMC Directive 89/336/EEC	EN 55022 Class B EN 55024 EN 61000-3-2 EN 61000-3-3

Australian model:

EMC	AS/NZS 3548 Class B
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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: 0x010E
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 1680"

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 (B81316*) and Transparency Unit (B81318*) only.

Electrical specifications:

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

Output current 0.6A (24 V)
0.3A (5 V)

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

Electrical Specifications:

Supplied voltage:	DC 21.6 to 26.4 V	DC 4.75 to 5.25 V
Rated current:	0.6 A	0.1 A

Environmental Conditions:

Temperature:	
Operation	5° C to 35° C (41° F to 95° F)
Storage	-20° C to 60° C (-14° F to 140° F)
Humidity:	
Operation	10% to 80%, without condensation
Storage	10% to 85%, without condensation
Reliability:	100,000 cycles for the MCBF
Document:	
Transparencies	up to 8.5 × 11.7 inches 35-mm film strips 35-mm slides 120/220 (6 × 9 cm) film strips 4 × 5 inch film

Reflective	up to 8.5 × 11.7 inches
Readable area:	216 × 297 mm
Dimensions:	Width: 324 mm (12.8 inches) Depth: 540 mm (21.3 inches) Height: 92 mm (3.6 inches)
Weight:	Approx. 5 kg (11 lb)

Automatic Document Feeder

General specifications:

Loading orientation	Face up
Ejection orientation	Face down
Loading capacity	30 sheets (55 g paper, maximum total thickness under 6 mm)

Electrical specifications:

Input voltage	DC 22.8 to 25.2 V DC 4.75 to 5.25 V
Input current	24 V: 0.6 A 5 V: 0.3 A

Environmental conditions:

Temperature:	
Operation	10° C to 32° C (50° F to 89° F)
Storage	-20° C to 60° C (-4° F to 140° F)
Humidity:	
Operation	20% to 80%, without condensation
Storage	95% or less, without condensation

Reliability:	100,000 sheets (Load/Eject MCBF)
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Dimensions: Width: 310 mm (12.2 inches)
 Depth: 528 mm (20.9 inches)
 Height: 92 mm (3.6 inches)

Weight: Approx. 4.5 kg (9.9 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

Environmental Conditions:

- Temperature:
 - Operation 5° to 35°C (41° to 95°F)
 - Storage -25° to 60°C (-13° to 140°F)
- Humidity:
 - Operation 10% to 80%, without condensation
 - Storage 10% to 85%, without condensation

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.

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.

pixel depth

The pixel depth refers to the number of bits in each pixel. Increasing the pixel depth increases the amount of detail that will be reproduced in the scanned image.

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.

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.

pixel

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

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.