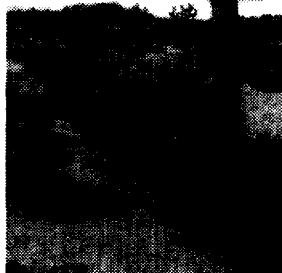


EPSON®



ES-1200C Scanner



User's Guide

注 意: スキャナを電源につなぐ前に、下図のように輸送用固定ネジをゆるめて下さい。

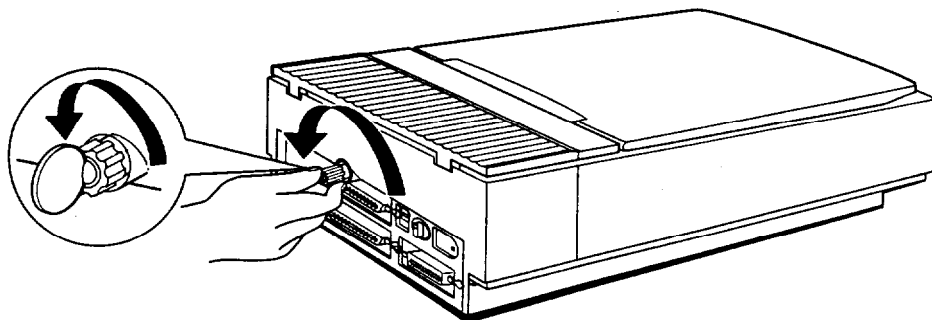
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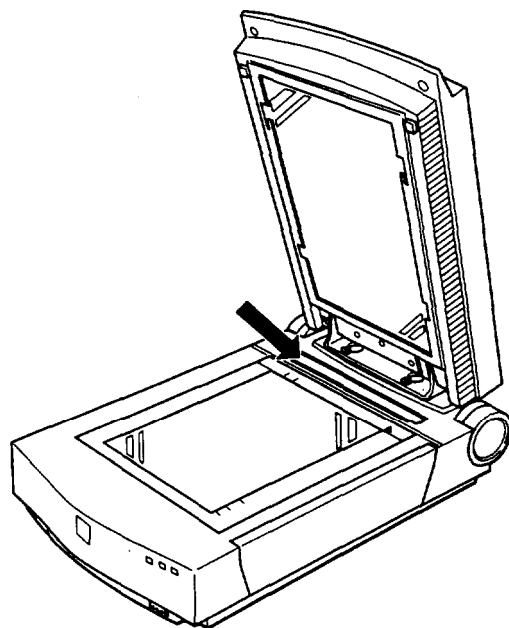
ACHTUNG: Bevor Sie den Scanner ans **Netz anschließen**, lösen Sie bitte die Transport-Sicherungsschraube wie in den folgenden Abbildungen dargestellt.

ATTENTION: Avant de connecter le scanner au secteur, retirez la vis de **blocage** pour le transport comme **indiqué** ci-dessous.

ATENCIÓN: Antes de conectar el scanner a la **toma** de corriente, afloje el tornillo de **protección para el transporte** tal como puede ver en la **ilustración** siguiente.

ATTENZIONE: Prima di collegare lo scanner all' alimentazione elettrica rimuovere la vite di bloccaggio come **indicato nella** figura sottostante.





Note: Before scanning, make sure the strip of glass shown in the illustration is completely free of dust or dirt. If it is not, a black vertical line may appear in the scanned image. If this happens, wipe the glass with a soft, clean cloth.

Hinweis: Stellen Sie vor jedem **Scanvorgang** sicher, daß das in der Abbildung markierte Glasfeld absolut sauber und staubfrei ist, da auf dem gescannten Bild ansonsten eine **schwarze** vertikale **Linie** auftreten kann. Reinigen Sie das Glasfeld in einem solchen Fall mit einem weichen sauberen **Tuch**.

Note: Avant de **numériser**, assurez-vous que la glace **représentée** sur l'illustration est propre. Si ce n'est pas le cas, des lignes **verticales** noires peuvent apparaître sur l'**image**. Si des lignes noires apparaissent, nettoyer la glace **avec un** chiffon doux et propre.

NOTA IMPORTANTE: Antes de empezar a explorar, compruebe que la franja de cristal indicada en la **ilustración** **esté completa-**mente limpia. Si no lo **está**, es posible que aparezca una **línea** vertical negra en la imagen explorada. **Para** limpiar esa franja de cristal **utilice** un paño suave y limpio.

Nota: Prima di effettuare la scansione, assicuratevi **che** la **finestra indicata** nell'illustrazione sia perfettamente pulita. In **caso con-**trario potrebbe apparire una **linea verticale** nera nell'immagine acquisita. In **questo caso** è necessario pulire la finestra con **un** **panno soffice** e pulito.

ご注意：図の矢印で示したガラス面に汚れがある場合、読み取ったデータに黒すじが表われますので、柔かい布で拭き取ってください。

A Note Concerning Responsible Use of Copyrighted Materials

Like photocopiers, scanners can be misused by improper copying of copyrighted material. Although Section 107 of the U.S. Copyright Act of 1976 (Title 17, United States Code), the “fair use” doctrine, permits limited copying in certain circumstances, those circumstances may not be as broad as some people assume. Unless you have the advice of a knowledgeable attorney, be responsible and respectful by not scanning published material without the permission of the copyright holder.

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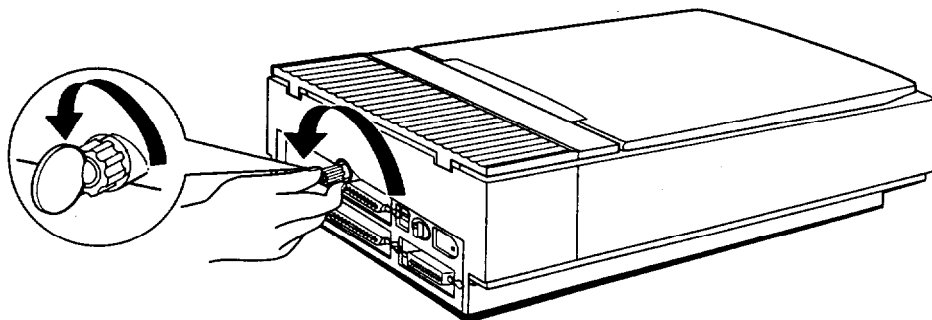
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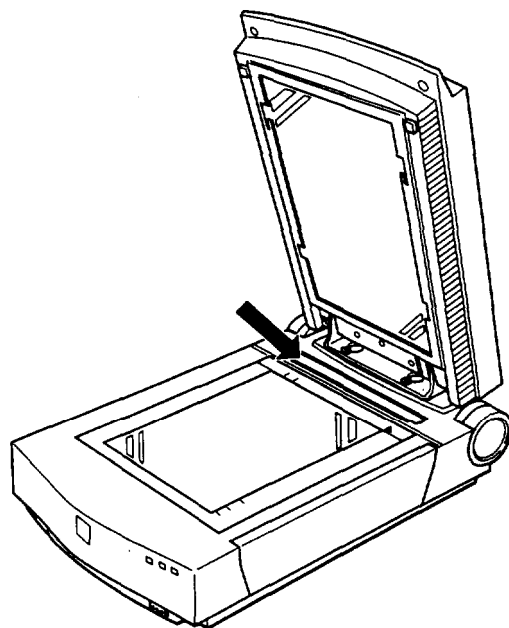
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introduction

The EPSON® ES-1200C is a true 600 dpi full-color flatbed image scanner with an A4 size scanning area. It has the ability to scan in color or gray-scale monochrome, making it ideal for virtually all uses, from simple drawings to complex full-color illustrations. It achieves extremely high quality in color by reading 30 bits per pixel and saving 24 bits per pixel.

Options

The following optional items are available to expand the versatility of your scanner. For detailed information on the use of these options, see the guides that come with the options.

Automatic Document Feeder 03813011)

This option is designed primarily for optical character recognition (OCR) scanning. With software that supports the ES-1200C and OCR, you can stack up to 30 pages in the automatic document feeder and scan them automatically. You can then use them in a word processing program just as if you had typed them yourself.

Transparency Unit (B813021)

This option allows you to scan transparent materials, primarily 35mm slides and negatives.

How to Use This Manual

Chapter 1 describes setting up your scanner and connecting it to your computer. Be sure to read this first. Chapter 2 gives basic information on using your software and scanner, including maintenance and transportation. Chapter 3 contains troubleshooting information, and Chapter 4 and the Appendix provide technical information. See the end of this guide for a glossary of scanner terms and an index.

Warnings, Cautions, and Notes



Warnings must be followed carefully to avoid bodily injury.



Cautions must be observed to avoid damage to your equipment.

Notes contain important information and useful tips on the operation of your scanner.

Where United States Users Can Get Help

Epson America provides local customer support and service through a nationwide network of authorized EPSON dealers and Service Centers.

EPSON also provides the following support services through the EPSON Connection® at (800) 922-8911:

- ☐ **Assistance in locating your nearest Authorized EPSON Reseller or Service Center**
- ☐ **Technical assistance with the installation, configuration, and operation of EPSON products**

- ❑ EPSON technical information library fax service
- ❑ Product literature with technical specifications on our current and new products
- ❑ Sales of supplies, parts, documentation, and accessories for your EPSON product
- ❑ Customer Relations

CompuServe® On-line Support

The fastest way to access helpful tips, specifications, drivers, application notes, and bulletins is through the Epson America Forum on CompuServe.

If you are not currently a member of CompuServe, you are eligible for a free introductory membership as an owner of an EPSON product. This membership entitles you to:

- ❑ An introductory \$15 credit on CompuServe
- ❑ Your own user ID and password
- ❑ A complimentary subscription to *CompuServe Magazine*, CompuServe's monthly publication

To take advantage of this offer, call (800) 848-8199 in the United States and Canada and ask for representative #529. In other countries, call (614) 529-1611 or your local CompuServe access number.

If you are already a CompuServe member, simply type GO EPSON at the menu prompt to reach the Epson America Forum.

Important Safety Instructions

Read all of these instructions and save them for later reference. Follow all warnings and instructions marked on the scanner.

- **Unplug the scanner before cleaning. Clean with a damp cloth only and do not use liquid or aerosol cleaners. Do not spill liquid on the scanner.**
- **Do not place the scanner on an unstable surface or near a radiator or heat register.**
- **Do not block or cover the openings in the scanner's cabinet. Do not insert objects through the slots.**
- **Use only the type of power source indicated on the scanner's label.**
- **Connect all equipment to properly grounded power outlets. Avoid using outlets on the same circuit as photocopiers or air control systems that regularly switch on and off.**
- **Do not let the scanner's power cord become damaged or frayed.**
- **If you use an extension cord with the scanner, make sure the total ampere rating of the devices plugged into the extension cord does not exceed the cord's ampere rating. Also, make sure the total of all devices plugged into the wall outlet does not exceed 15 amperes.**
- **Except as specifically explained in this User's Guide, do not attempt to service the scanner yourself.**
- **Unplug the scanner and refer servicing to qualified service personnel under the following conditions:**

If the power cord or plug is damaged; if liquid has entered the scanner; if the scanner has been dropped or the cabinet damaged; if the scanner does not operate normally or exhibits a distinct change in performance. Adjust only those controls that are covered by the operating instructions.

- **If you plan to use the scanner in Germany, observe the following:**

To provide adequate short-circuit protection and over-current protection for this scanner, the building installation must be protected by a 16 Amp circuit breaker.

Beim Anschluß des Scanners an die Netzversorgung muß sichergestellt werden, daß die Gebäudeinstallation mit einem 16 A Überstromschutzschalter abgesichert ist.

Chapter 1

Setting Up the Scanner

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Choosing a Place for the Scanner

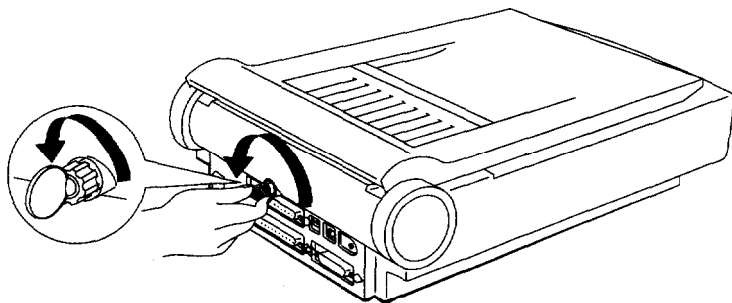
You should consider the following when selecting a location for your scanner:

- ❑ Place the scanner on a flat, horizontal, stable surface. If the scanner is tilted or at an angle, it cannot operate properly.**
- ❑ Place the scanner close enough to the computer for the cable to reach.**
- ❑ Allow some space behind the scanner for the cables, and make sure to place the scanner where you can easily unplug the power cord. Also allow sufficient space above the scanner so that you can fully raise the document cover if necessary.**
- ❑ Keep the scanner away from high temperatures and humidity and places subject to rapid changes of temperature and humidity.**
- ❑ Keep the scanner away from direct sunlight and strong light sources.**
- ❑ Avoid places subject to shocks and vibrations.**

Releasing the Transportation Screw

Before connecting the scanner to a power source, you must release the transportation screw.

- 1. Place the scanner on a flat, stable surface so that its rear panel is facing you.**
- 2. Locate the round screw knob in the middle of the rear panel.**
- 3. Turn the screw counterclockwise as shown by the arrow. If necessary, turn the screw with a coin. The screw has a built-in spring, so it pops out a little when it is released. You cannot remove the screw.**

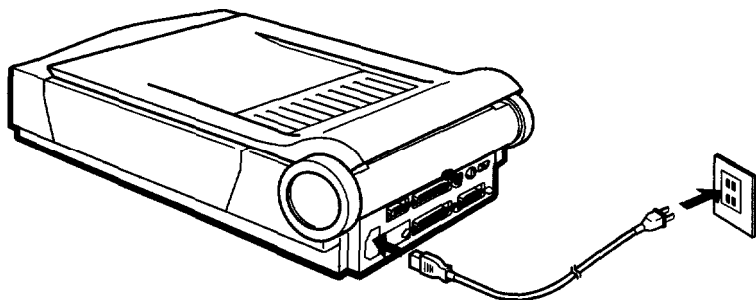


Note:

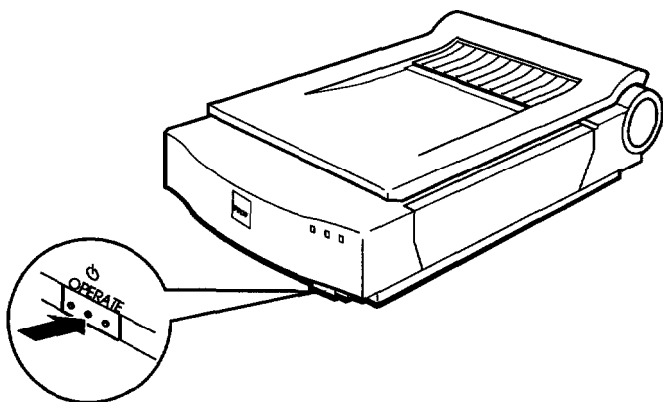
You will need to screw in the transportation screw when you store or transport the scanner.

Plugging in the Scanner

1. **Firmly connect the power cable to the power inlet on the rear of the scanner and the other end into an appropriately grounded outlet as shown below.**



2. **If any of the scanner's lamps come on, press the OPERATE button to turn the scanner off.**



Warning:

Whenever you turn off the scanner, wait at least 10 seconds before turning it back on. Rapidly turning it on and off can damage the scanner.

Initialization

In this step you observe the scanner's self initialization. This lets you see that the scanner is operating properly before you connect it to your computer.

1. Open the document cover so you can see the operation of the scanner during the initialization.
2. Turn on the scanner by pressing the OPERATE button.

When the scanner is initializing, the fluorescent lamps on the carriage flash and the carriage's position is reset. If the carriage is not at the home position (the rear of the scanner), it moves to the home position.

When the scanner has completed its initialization, the READY light comes on. If the scanner does not work as described, turn it off. Then make sure that you have released the transportation screw and that the power cord is firmly plugged in and turn it on again.

If it still does not work as described, see your dealer or call the EPSON Connection at (800) 922-8911.

Connecting the Scanner to the Computer

Your scanner has both a bidirectional parallel interface and a SCSI (Small Computer System Interface). You can connect both of the interface cables to the scanner at the same time. The scanner switches automatically to the appropriate interface.

Note:

When the scanner is capturing an image, the computer connected to the other interface cannot use the scanner. When the computer connected to the parallel interface is turned off, the RESET button may not work.

Computer types

- ❑ **For a PC-compatible computer, do one of the following:**

Install a bi-directional parallel interface board in your computer. Then connect the computer to the scanner's bidirectional interface.

Note:

*IBM® PS/2® computers and some other computers have built-in bi-directional parallel interfaces. You do not need to install one in those **computers** unless you need the built-in parallel interface for your printer.*

Install a SCSI board in your computer. Then connect the computer to the scanner's SCSI interface.

- ❑ **For a Macintosh® computer you do not need to install a board in your computer; you just connect your Macintosh to the scanner's SCSI interface.**

To use an interface correctly, you may need to change settings on the scanner, computer, or both. The following sections explain how to set up and connect each type of interface.

Connecting the parallel interface

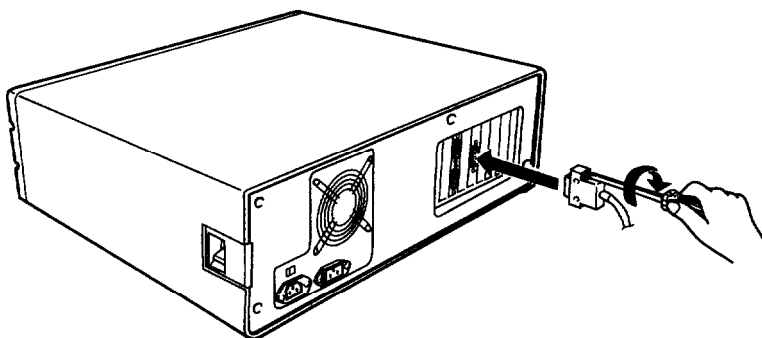


Caution:

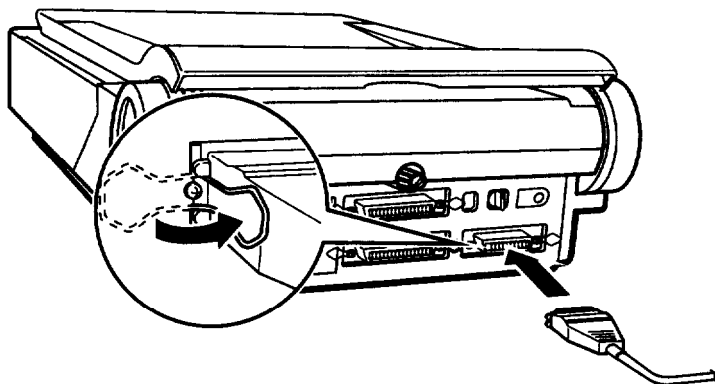
The scanner's bi-directional parallel interface requires a compatible type of interface on your computer. You may not be able to use the ordinary parallel printer interface on your computer; check your computer's specification to see if the parallel interface is bi-directional.

Use a standard shielded parallel interface cable.

- 1. Make sure that both the scanner and computer are turned *Off*.**
- 2. Connect the 25-pin end of the cable to the computer; then tighten the screws on the sides of the connector.**



- 3. Connect the 36-pin end of the cable to the scanner; then fasten the connector with the clamps on the sides of the connector.**



SCSI

For some computers, you first install a SCSI board in your computer. Then follow the directions below to connect your scanner and computer. All Macintoshes have SCSI ports; you do not need to install a SCSI board in the computer. Follow the directions below to connect the scanner to your Macintosh

SCSI connections

The SCSI interface allows you to connect up to eight devices, including the computer, in what is called a daisy-chain arrangement. A daisy chain is made up of a computer and one or more SCSI devices. Only the first SCSI device is connected to the computer; each of the other devices is connected to the previous device.

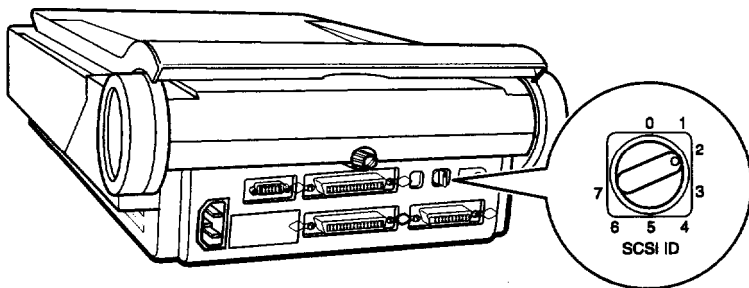
Each device has a SCSI ID number: the computer is usually number 7, and each of the other devices must have a different number between 0 and 6. Also, the first device and the last device in the chain (not including the computer) must have a terminator, and no other device can have a terminator. The SCSI on the scanner has two 50-pin connectors.

If you connect the scanner directly to the computer, you need a SCSI cable with a 25-pin connector on one end (for the computer) and a 50-pin connector on the other end (for the scanner). If you connect the scanner to another SCSI device, use a SCSI cable with 50-pin connectors on both ends.

SCSI ID number setting

The factory set SCSI ID of the scanner is 2. The computer is usually ID number 7. If you are going to add the scanner to a system in which one of your SCSI devices already has a SCSI ID of 2, change the ID number of the scanner to an unused number as described next.

1. Locate the SCSI ID rotary switch on the rear panel of the scanner.



2. To change the SCSI ID, turn the small dial to the desired number.

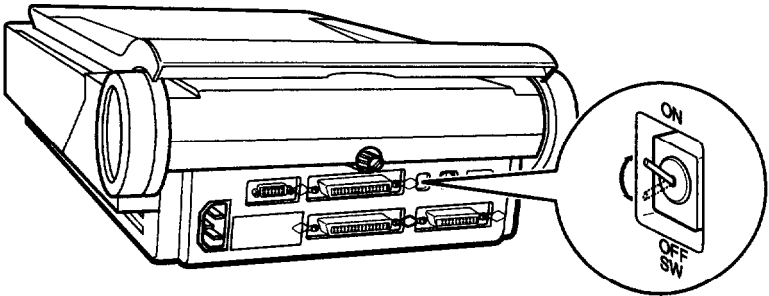


Caution:

Do not set the SCSI ID to an ID number that is already assigned to another device. The computer, scanner, and other devices will not function properly.

Terminators

The scanner has a built-in terminator. If the scanner is the only SCSI device you connect to your computer or if it is the last device in the daisy chain, leave the internal SCSI terminator turned on. It is on if the switch is up.



If the scanner is in the middle of a daisy chain, turn the terminator switch off.

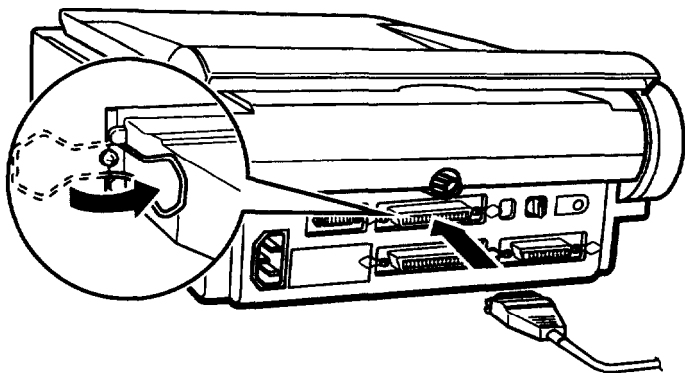
Do not use an external terminator.

Connecting the SCSI

Connect the scanner with the SCSI as follows:

1. See that the scanner, the computer, and all other SCSI devices are turned off and unplugged from the power source.

2. **Connect the 50-pin end of the cable to either the top or bottom SCSI connector of the scanner; then fasten the connector with the clamps on the sides of the connector, as shown.**



3. **Connect the other end of the cable to the SCSI port of your computer or the other SCSI device.**

Notes:

- ❑ *The SCSI port of the Macintosh is the larger port with the SCSI icon (🔌) over it.*
 - ❑ *If you are connecting the scanner to a SCSI device other than the computer, use a cable with 50-pin connectors on both ends.*
4. **The connection is now complete. Connect the power cables.**
 5. **Always turn on the scanner and other external SCSI devices before you turn on your computer.**

Power-on sequence

Follow these instructions for the power-on sequence each time you turn your computer and SCSI devices on.

If you have an internal hard disk, turn on the scanner and any other SCSI devices you plan to use. Wait a few seconds; then turn on the computer.

If you have an external hard disk, turn on the scanner, external hard disk (first on the daisy chain), and any other SCSI devices you plan to use. Wait a few seconds; then turn on the computer.

SCSI devices in the middle of the daisy chain may be left off if you don't plan to use them.

Installing *Scanner Software*

Now that you have connected the scanner to your computer, the next thing to do is install your scanner software. Follow the instructions in the user's manual for the software. Then read Chapter 2, "Scanner Basics," before your first scan

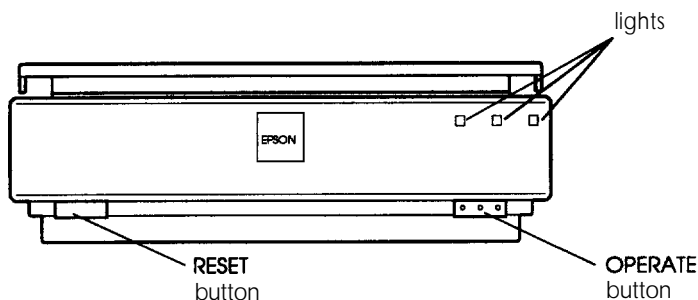
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Lights and Buttons

The scanner has three indicator lights and two buttons.



OPERATE light (green)

Comes on when the scanner is turned on.

READY light (green)

Comes on when the scanner is ready to scan images. This light flickers during scanning. When an error occurs, it and the ERROR light indicate the type of error.

ERROR light (red)

Indicates when an error occurs. Along with the READY light, it indicates the type of error.

OPERATE button

Turns the scanner on and off.

RESET button

Resets the scanner after an error occurs. Pressing this button during scanning stops the scanner and may cause an error in the scanning software. This button may not work if two computers are connected to the scanner, and the computer with the bi-directional parallel interface is not turned on.

Scanner errors

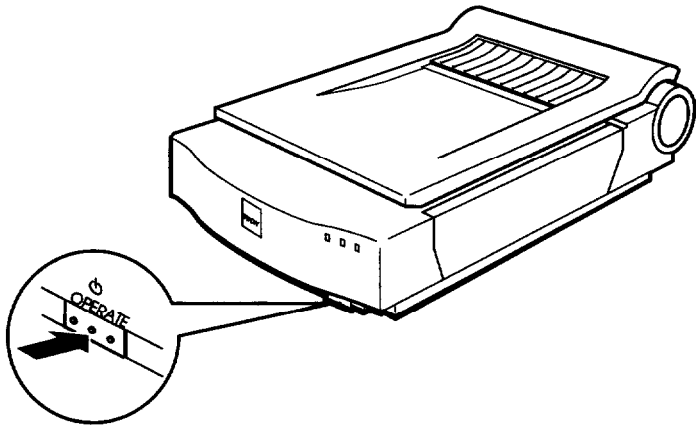
If an error occurs, the scanner stops operating and the READY and ERROR lights show the type of error. See Chapter 3 for details.

Responsible use of copyrighted materials

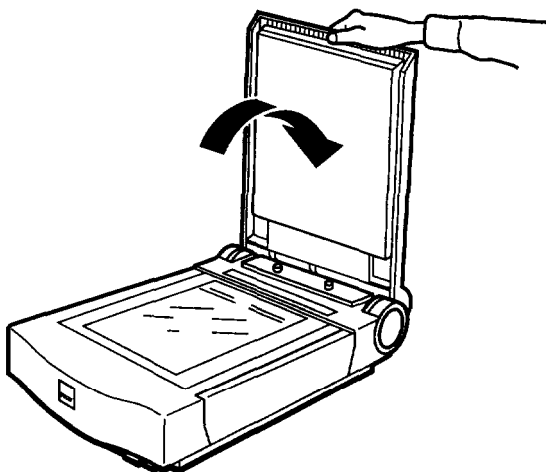
Remember to respect the rights of copyright owners. Don't scan published text or images without first checking the copyright status.

Placing a Document on the Scanner

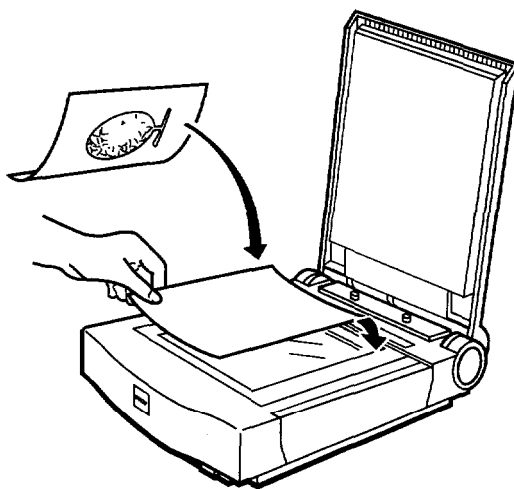
1. Turn on the scanner by pressing the OPERATE button. The OPERATE light comes on.



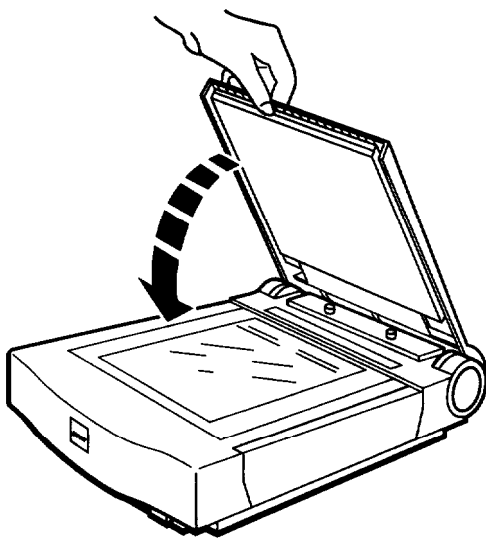
2. Turn on the computer and see that the scanner's READY light has come on. Open the document cover.



3. Place the document on the document table, with the side to be scanned down. Make sure that the document is carefully aligned.



4. **Close the document cover gently so that the aligned document is not moved.**



Note:

Make sure that the document is flat against the glass surface so that the image is properly focused. Also make sure to close the document cover. This prevents interference from external light.

Always keep the document table clean. See “Maintenance” later in this chapter for information on cleaning the scanner.

Avoid twisting the document cover when you open or close it.

Do not leave photographs on the document table for an extended period of time; they may stick to the glass.

Do not place heavy objects on top of the scanner.

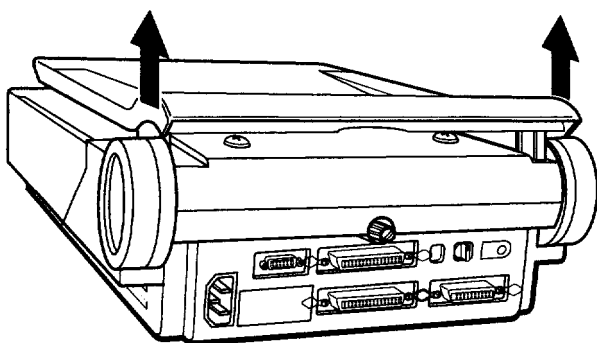
5. **Start the scanner software on the computer, and follow its procedures to scan the image.**

Scanning Large or Thick Documents

Your scanner has three ways you can adjust it so that you can scan large or thick documents or other materials.

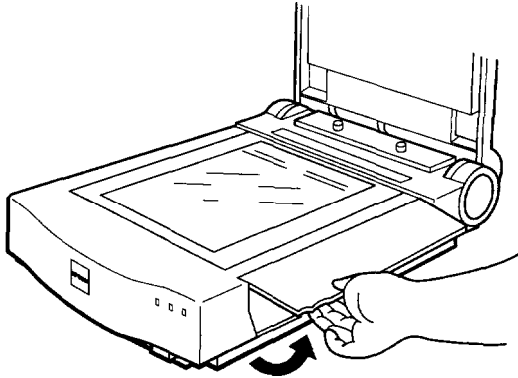
Raising the back of the document cover

For thick documents or other materials, you can raise the back of the document cover, as shown below. Then close the cover and scan.

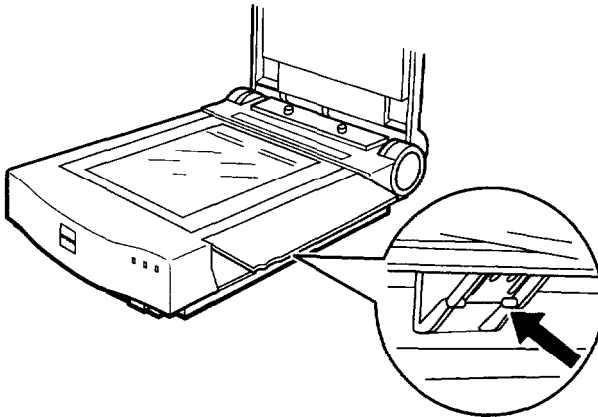


Using the document shelf

For wide documents or other materials, you can lift the document shelf into place as shown below.

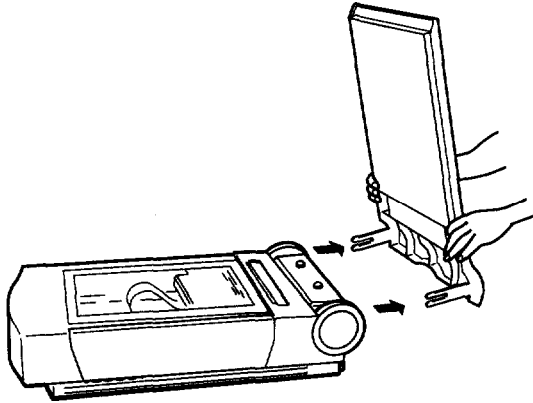


After you have finished using the document shelf, push in on the support of the shelf, as shown below. Then return the shelf to its former position.

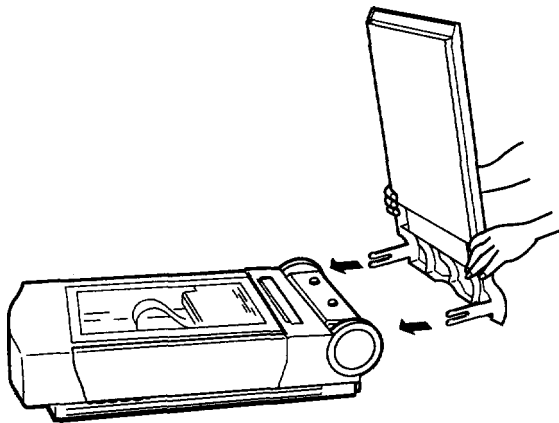


Removing the *document cover*

For especially difficult documents or other materials, you can completely remove the document cover. Just raise it completely; then pull it off in the direction of the arrows in the illustration below.



Reattach the document cover reversing the procedure above. Be sure to hold the cover in a vertical position as you slip its attachments into place.



Scanner Setting Guidelines

This overview of scanner settings will give you a little background for using your scanning software. The messages on the screen and your software manual should be your main guide to scanning, but this section can supplement your understanding of your software's on-screen menus.

Each 4 icon indicates a setting that you make or check. The first two are the most important.

Note:

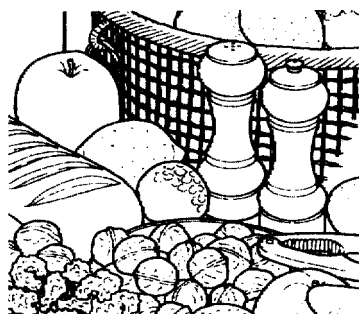
Your software may use a somewhat different order or slightly different terminology.

√ *Image type or mode*

For the best and most efficient scans, you need to know which type of images you are scanning: drawings, black and white photographs, or color photographs. The corresponding terms used by scanning software are *line art*, *gray scale*, and *color*.

Line art

This is the setting for drawings, including all drawings or pictures made up of black and white only, with no gray tones, such as the ones below.



Gray **scale** (also called *monochrome* or *continuous tone*

This is the setting for black and white photographs and drawings with various shades of gray in addition to black and white. You can also use this setting for color photographs that will be printed in black and white.

color

This is the setting for color photographs or other originals in color.

Note:

Scans from photographs are better than scans from published images, such as newspaper or magazine pictures, because of half toning conflicts. Use photographs instead of published images for experimenting with your scanner.

√ Resolution

The best resolution setting depends on the image type or mode (line art, gray scale, or color) and the printing method. Read “Printing methods” and “File size” below; then use the table on page 2-13 to find the resolution you should use.

Printing of display methods

The best resolution to use depends on what type of output or printing method you will be using. The usual printing methods for scanned images fall into the following categories.

- ☐ **Black and white printers (laser, inkjet, or dot matrix) are good to excellent for text and line art but are not as good for gray-scale images. These printers can be used for reproducing photographs in documents like newsletters that do not require the highest quality.**

The examples below show the typical quality of photographs printed on laser printers. Laser printers with a resolution of 600 dpi produce much better results for photographs than 300 dpi laser printers, as you can see below.



300 dpi



600dpi

- ❑ **Electronic color printers use laser, ink jet, or other technologies to produce color or gray scale images that range from coarsely patterned to nearly photographic (often called continuous tone) quality. It is best to see samples from a color printer before you decide to use it. These printers are usually used for small quantities of color images or for preliminary proofs of images that will be printed on a printing press.**
- ❑ **Printing presses are for high quality and high volume work. You scan and edit your images and then send the files to a service bureau or printing company, which uses high resolution phototypesetters (also called imagesetters) for high quality text and gray-scale images. For full-color images, you scan in color and then use your image editing software to manipulate the image and produce color separation files. If you plan to do this, see the guidelines below on resolution and then follow the instructions in your software manual for making separations. Your service bureau or printing company should also provide helpful information.**
- ❑ **Computer screens require lower resolutions than most printers. If your scanned image will be viewed only on a computer monitor or screen and will never be printed, you can use lower scanning resolutions for top-quality work. Remember that the scanner can read and save up to 16 million colors. If your computer can display only 16 or 256 colors, you will not be able to see all of the quality of the scanned image.**

File size

In gray scale and color, use the lowest resolution that gives acceptable quality for your printing or display method because high resolutions mean large files. An A4 or letter-size full-color scan at 300 dpi uses as much as 25 megabytes (MB) of disk space.

Large files use up your computer and hard disk memory; they take longer to process, to print, or to transmit by modem; and they are more difficult to save to a disk for sending to a service bureau or printing company.

Many printing methods cannot use all of the information stored in a high-resolution scan, so in these cases part of the information is wasted.

Resolution guidelines

This table shows the recommended resolutions in dots per inch or pixels per inch for the image types and printing or display methods just described. Also, you may want to experiment with your scanner settings, possibly using a cropped version of your image to save time, until you achieve the desired results.

The resolution that you use to scan an image (input resolution) does not have to match the dots per inch of your printer (output resolution). Input and output resolution are two quite different measurements. Just follow the guidelines below.

Resolution guidelines

	Line art	Gray scale	Color
Black and white printer	300-600	80-120	
300 dpi black and white laser	300-600	80-110	
600 dpi black and white laser	300-600	125-170	
Electronic color printer	300-600	150-200	150-200
Printing press/Imagesetter	600-1200	150-350	150-350
Computer screen	72	72	72

Here's how to calculate more precisely the required resolution for gray scale or color on an electronic color printer or a printing press:

- 1. Find out the *lines per inch* of the printing method. This is the measurement of resolution for high quality image printing. Do not confuse it with dots per inch, which is not an equivalent measurement.**
- 2. Multiply the lines per inch by two to find the best scanning resolution For example, for 175 lines per inch (a common resolution for magazines and books), scan your image at 350 dpi ($2 \times 175 = 350$).**

For even smaller file sizes, try scanning at about 1.5 times the lines per inch This may cause little or no perceptible loss of output quality.

Note:

For color or gray scale images, ignore the dpi (dots per inch) of your printing device. Even though your service bureau may use an imagesetter with a 2400 dpi resolution, a scan resolution of only 150 to 350 dpi will produce the highest quality gray-scale or color images the imagesetter can print. Similarly, even though your laser printer may have a 300 dpi resolution, a scan resolution of only 80 to 120 dpi give the best quality gray scale images it can print.

√ **Size or scale**

This is usually expressed as a percentage. If you want your printed image to be larger than the original, increase its size with this setting. If you are not sure how large you want the printed image, choose the *largest size you might use*. You can reduce the image size later with your software. (You can also increase the size with your software, but you may lose some quality.)

Note:

The size of the image on your monitor will probably be different from the size of the image when you print it.

√ *Halftoning and dropout*

For nearly all uses, *none* is the best setting for these. In case you have special needs that require halftoning at the time of scanning, see the Appendix for technical information on halftoning, dithering, and dropout.

√ *Brightness*

The minus numbers lighten the image, the plus numbers darken the image. To lighten a dark original use -1 to -3, or to darken a light original use +1 to +3. Usually you should leave this setting at zero.

√ *Color correction*

Use the default or CRT display.

√ *Gamma correction*

Use the default or CRT Display B.

Note:

Your software may have different settings for Brightness, Color correction, and Gamma correction.

√ *Cropping*

If you know you are going to use only part of an original, use your software's cropping tools before you scan (if possible) to select only the part of the image that you will use. This will make your image file smaller.

Judging Image Quality

When you look at your monitor to evaluate a scanned image, remember that the image will look different when it is printed. A monitor is a comparatively low-resolution device; some images that look good on a monitor do not look as good when printed and vice versa. Keep in mind the final output device as you choose settings and manipulate the image.

In addition, each output device may produce different results. A proof printed on an electronic color printer will look different from the same image printed on a printing press.

Equipment

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

RAM and hard disk size

Scanned images can use much more memory than text files, so you may need more Random Access Memory (RAM) 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, for the best display of images.

Monitors

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

File compression software

Many different programs are available to make image files smaller for storage or transmission. For example, they can enable you to store a 3MB image file on a floppy disk. Some compression software can 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, not always noticeable.

Maintenance

To keep your scanner operating at its best, you should clean it periodically. Before cleaning, unplug the power cable.

Clean the outer case with mild detergent dissolved in water.

If the glass of the document table gets dirty, clean it with a soft dry cloth. If the glass is stained with grease or other hard-to-remove material, use a small amount of glass cleaner on a soft cloth to remove it. Wipe off any remaining liquid with a dry cloth.

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



Warning:

Be careful not to get water on the scanner mechanism or electrical components.



Caution:

Do not 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 lamps

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



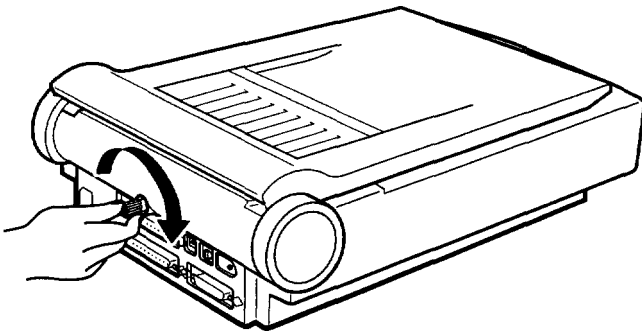
Warning:

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

Transporting the Scanner

When you transport the scanner a long distance or store it for an extended period, follow the steps below to secure the carriage.

- 1. Turn on the scanner and wait until the carriage moves to the home position (the back of the scanner). Then turn off the scanner.**
- 2. Push in the transportation screw and turn it clockwise to secure the carriage.**



Note:

If the scanner is broken, the carriage may not automatically return to the home position. If it does not, raise the front of the scanner and hold it up until the carriage comes to rest at the back of the scanner. Then perform Step 2 above.

Chapter 3

Troubleshooting

Problems and Solutions	3-2
Indicator lights	3-2

Problems and Solutions

The problems you may have while using the scanner often involve the operation of your software and computer. Problems fall in the following major categories:

- ☐ Incorrect setup of the interface
- ☐ Inappropriate selection of the scanner functions
- ☐ Incorrect setup of your computer or software
- ☐ Incorrect operation of your software.

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

Indicator lights

If an error occurs, the scanner stops operating and the READY and ERROR lights show the type of error.

Error type	READY	ERROR
Command error	On	On
Interface error	Off	Flashing
Fatal error	Flashing	Flashing
Option error	off	Off

Command error

The scanner has received incorrect commands from your scanning software.

When this error occurs, try the scanning operation with your software over again. The scanner returns to normal when it receives correct commands. Normally you do not need to reset the scanner.

Interface error

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

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

Fatal error

This indicates one of the following problems:

One or more fluorescent lamps need to be replaced.

The transportation screw is not released.

The scanner is broken.

There is a problem, such as an open cover, with the optional transparency unit or the optional automatic document feeder.

Check that the transportation screw is released and check any options installed; then push the RESET button. If the scanner still does not operate properly, try turning the scanner off and then back on. If the scanner still does not operate properly, or if this error occurs repeatedly, consult your dealer.

Option error

This indicates a problem such as a paper jam with an installed option unit.

Check the option unit and correct the cause of the trouble.

The OPERATE light does not come on.

Make sure the power cable is correctly plugged into the scanner and the power outlet.

The READY light does not come on.

Make sure the scanner is correctly connected to the computer and that the computer is turned on.

The scanner does not start scanning.

See that the scanner's READY light is on.

Make sure that you have selected the correct interface port and settings with your software. Also make sure the interface board on your computer is properly installed.

If you are connecting the scanner with the SCSI interface, see that the terminator and SCSI ID are correctly set up.

If you have other expansion boards in your computer, see that they are not interfering with the interrupt setting of the interface board for your scanner. (See your computer manual.)

The scanner software does not work properly.

Be sure you have correctly installed your software.

Check that the system requirements, such as the operating system version, are correct for using your software.

See if the computer has enough memory for your software. If you are running other software at the same time, using RAM resident programs, or have many device drivers, the computer may not have enough memory remaining. (see your software and computer manuals.)

Make sure that your software supports this model of scanner and that you correctly installed or set up the software. (see your software manuals.)

The entire image is distorted or blurred.

Make sure that the document is placed flat against the document table (the glass area).

You may have accidentally moved the document during scanning. Check the position of the document and do not move it while the scanner is operating.

See that the scanner is not tilted or placed on an unstable surface.

Part of the image is distorted or blurred.

Part of the document may be wrinkled, warped, or not in contact with the document table (the glass area). Be sure the document is uniformly flat.



Caution:

Do not place heavy objects on the document table.

The edges of the document are not scanned.

The document table has non-readable areas around the edges. Adjust your document's position so that the image comes inside the readable area.

Color is patchy or distorted at the edges of the document.

If the document is very thick or warped at the edges, the edges of the image may be colored. Cover the edges of the document with opaque paper to avoid having outside light interfere.

If part of the document is outside the document table, the edge may not be in contact with the document table and may be discolored. Change the position of the document.

The image is faint or out of focus.

Check that the document is placed flush against the document table.

Check your gamma correction setting. If it is set for printer, the image looks lighter when displayed on a monitor.

Make the brightness setting darker.

The image is too dark.

Adjust the brightness with your software. Also check the brightness and contrast values of your display screen.

Straight lines in the image are jagged.

The document may be placed at an angle on the document table. Align it so that the horizontal and vertical lines are carefully aligned with the scales on the top and side of the document table.

The image does not look the same as the original.

Try different settings and combinations of the scanner functions.

Check that your software is correctly installed. Check the capability of your software and computer. (see your software and computer manuals.)

If you are importing an image file into your application software, see if the file format is acceptable for your software. Also check that the settings of your application and your image match (See your software manual.)

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

If this happens on your printed image only, your printer or its print head is probably malfunctioning. (see your printer manual.)

If this happens on both your screen and printout, the scanner's sensor may be malfunctioning. Consult your dealer.

When halftoning is used, textured patterns composed of a series of dots appear on particular areas of an image.

This is normal. See the Appendix for examples of halftoning.

The color on the display seems different from that of the original image.

Check the settings of the scanner functions, especially data format (bits/pixel/color), gamma correction, and color correction. Try a different combination of these settings.

Check the capability of your computer, display adapter, and software. Some computers can change the color palette to adjust colors on your screen. (see your computer manual.)

Exact matching of colors is very difficult. Check the manuals for your software and your monitor for information on color matching and calibration.

The printed color seems different from that of the originals.

Exact reproduction of colors is very difficult. See your software manual or your printing company for guidance on color matching.

The printed image is larger or smaller than the original size.

Check the image size settings in your software. Do not use the size of the image on your monitor to judge the printed size.

The image cannot be printed on the printer, the printout is garbled, or the printout is not an image.

Check that the printer is properly connected with the computer and is correctly set up. (See your printer manual.)

Check that your software is properly installed and set up for your printer. (See your software manual.)

Chapter 4

Technical Specifications

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Scanner Specifications

Scanner type:	Flatbed, color /monochrome
Photoelectric device:	CCD line sensor
Effective pixels:	5096 dots by 7016 dots at 600 dpi, 100%
Maximum document size:	216 mm by 297 mm (8.5 inches by 11.7 inches) US letter size or A4
Scanning resolution:	600 dpi
<i>Output resolution:</i>	50,60,72,75,80,90,100,120,133,144, 150,160,175,180,200,216,240,300,320, 360,400,480,600,800,900,1200,1600, 1800, and 2400 dpi. Values above 600 through software interpolation.
<i>Color separation:</i>	By switching light sources (G, R, B)
<i>Reading sequence:</i>	Monochrome mode: One-pass scanning (Dropout color selectable from Green, Red or Blue.) Color page sequence mode: Three-pass scanning (G, R, B) Color line sequence mode: One-pass scanning (G, R, B)
size:	50%to 200% in 1% steps.
Image data:	10 bits per pixel per color saved as 8 bits per pixel per color maximum
Brightness:	7 levels

<i>Maximum reading in pixels:</i>	16128 (main scan)
<i>Halftoning process:</i>	Enable/disable selectable. 3 halftoning modes (A, B, and C) and 4 dither patterns (A, B, C, and D) for bi-level data (Halftoning mode A only in color line sequence mode) (2 downloadable dither patterns)
<i>Gamma correction:</i>	2 for CRT display 3 for printer 1 for user defined
<i>Color correction:</i>	1 type for CRT display 3 types for printer output, available in color line sequence mode only 1 type for user defined
<i>Interface:</i>	Bi-directional parallel and SCSI
<i>Light source:</i>	Noble gas fluorescent lamps
<i>Reliability:</i>	Main unit MCBF: 100,000 cycles of carriage movements
<i>Dimensions and weight:</i>	Width: 383 mm (15 inches) Depth: 595 mm (24 inches) Height: 170 mm (7 inches) Weight: about 12 kg (26 lb)

Electrical Specifications

Rated voltage: **120 VAC or 220 to 240 VAC**

Rated frequency: **50 to 60 Hz**

Power consumption: **Approx. 45 W**

Insulation resistance: **10 MΩ between AC power line and chassis at 500 VDC**

Environmental Conditions

Temperature: **Operation: 40° F to 95° F (5° C to 35° C)
Storage: -13° F to 140° F (-25° C to 60° C)**

Humidity: **Operation: 10% to 80%, without condensation
Storage: 10% to 85%, without condensation**

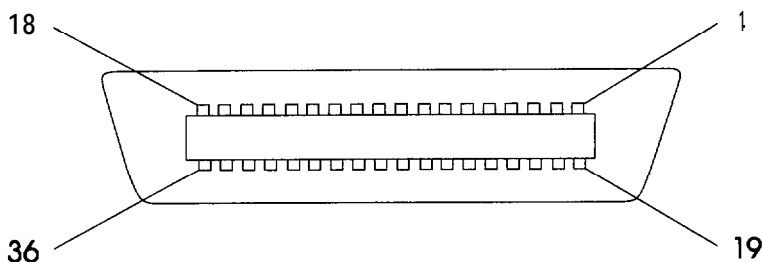
Operating conditions: **Ordinary office or home conditions.
Extreme dust should be avoided.
Operation under direct sunlight
or near a strong light source should be avoided.**

Note:

Specifications are subject to change without notice.

Parallel Interface Specifications

<i>Interface type:</i>	Bi-directional parallel interface
<i>Data format:</i>	8-bit parallel
<i>Synchronization:</i>	By external strobe pulse
<i>Handshaking:</i>	By $\overline{\text{ACKNLG}}$ and BUSY signals
Logic level:	Input/output data and interface control signals are TTL level compatible
<i>Connector type:</i>	36-pin Centronics[®] type connector
<i>Connector pin arrangement:</i>	



Signal pin assignments

Pin No.	Return pin	Signal	Direction	Function
1	19	STROBE	IN/(OUT)	STROBE pulse to read In or send out data. Pulse width must be more than 0.5 microseconds at the receiving terminal.
2 3 4 5 6 7 8 9	m 21 22 23 24 25 26 27	DATA0 DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7	IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT IN/OUT	These signals represent information of bits 1 to 8 respectively. Each signal is at a high level when data is logical 1 and low when it is logical 0 .
10	28	ACKNLG	OUT/(IN)	About a 12-microsecond pulse. Low indicates that data has been received and that the scanner is ready to accept more data.
11	29	BUSY	OUT/(IN)	When this signal is high, the scanner cannot receive data. The signal is high: 1) during data entry 2) during scanning 3) when the scanner is not ready 4) when the scanner has an error
12-15	—	NC	—	Not used
16	—	GND	—	Logical ground level
17	—	C-GND	—	Scanner chassis ground
18	—	NC	—	Not used

Signal pin assignments (continued)

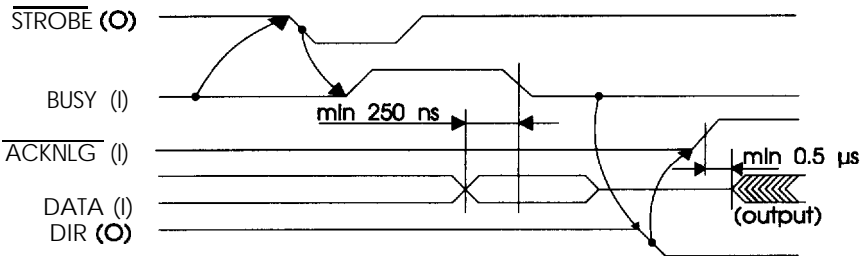
Pin No.	Return pin	Signal	Direction	Function
19 30	—	—	—	Twisted pair return signal ground level
31	—	INIT	IN	When this signal level becomes low, the scanner is reset to the state when power is turned on. This level is usually High. The pulse width must be more than 50 microseconds at the receiving terminal .
32	—	NC	—	Not used
33	—	GND	—	Twisted pair return signal ground level
34-35	—	NC	—	Not used
36	—	DIR	IN	Low indicates the direction is input.

- ❑ **“Return” denotes the twisted-pair return, to be connected at signal ground level. For interface wiring, be sure to use a twisted-pair cable for each signal, and to complete the connection on the return side. These cables should be shielded and the ground connected to the chassis of the host computer and the scanner.**
- ❑ **All interface conditions are based on TTL level.**

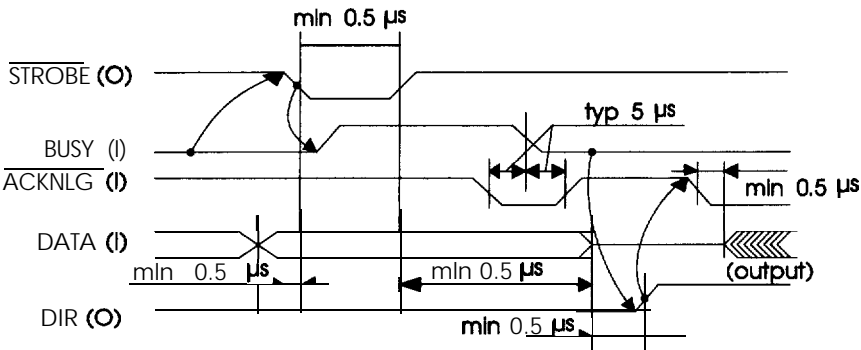
Timing charts

The figures below show the timing for the b&directional parallel interface as viewed from the scanner.

OUT (from scanner to computer)



IN (from computer to scanner)



SCSI Specifications

Interface type: ANSI X3.131-1986 standard

Function: The following functions are included.

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

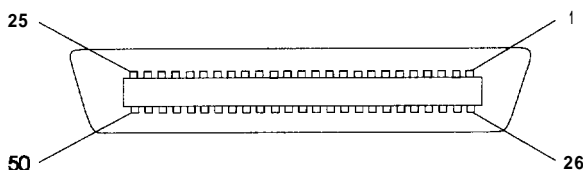
Logic level: TTL level compatible

Electrical standard: As per ANSI X3.131-1986

ID Setting: Selectable from 0 to 7 and 9 with the rotary
switch (8 should not be selected, and 9 is
for the ES-300C™ emulation mode.)

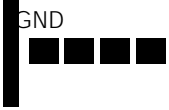
Connector type: Two 50-pin connectors

Connector pin arrangement:



Signal pin assignments

In this table, the direction of the signals is given relative to the scanner.

Signal	I/O	Pin No.	Description
	—	1-12 14-25 35-37 39-40 42	Ground
NC	—	13	Not connected
DB0	I/O	26	Data bus 0
DB1	I/O	27	Data bus 1
DB2	I/O	28	Data bus 2
DB3	I/O	29	Data bus 3
DB4	I/O	30	Data bus 4
DB5	I/O	31	Data bus 5
DB6	I/O	32	Data bus 6
DB7	I/O	33	Data bus 7
DBP	I/O	34	Data bus parity
TERMPWR	—	38	Termination power (+5V)
ATN	I	41	Attention
BSY	I/O	43	Busy
ACK	I	44	Acknowledge
RST	I	45	Reset
MSG	O	46	Message
SEL	I/O	47	Select
C/D	O	48	Control/Data
REQ	O	49	Request
I/O	O	50	Input/Output

Initialization

The scanner can be initialized (returned to a fixed set of conditions) in three ways.

Hardware initialization:

- ☐ **When the power is turned on.**
- ☐ **When the scanner receives an INIT signal at the parallel interface (pin 31 goes low).**
- ☐ **When the scanner receives a SCSI Reset signal at the SCSI interface.**

Software initialization:

- ☐ **When the software command ESC @ (initialize the scanner) is received.**
- ☐ **When the SCSI Bus Device Message is received.**

Chapter 5

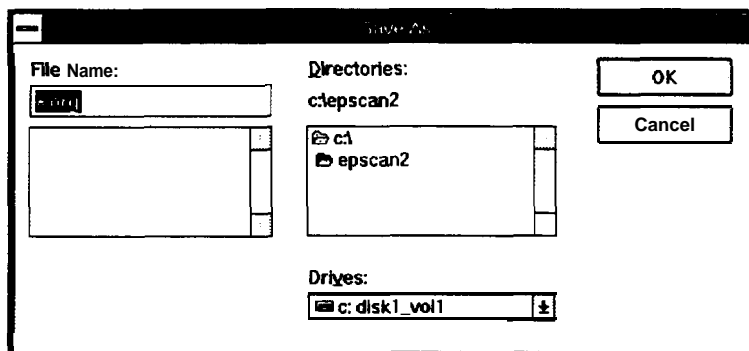
Saving and Exporting Images

You can always scan an image using your TWAIN-compliant image editing application. However, if your application is not TWAIN-compliant, you can use EPSON Scan! II to scan the image and export it in a format your application can open, as described in this chapter.

Saving a Scanned Image

before you export an image, you need to save it in its original EPSON Scan! II format. Otherwise, you will not be able to retrieve it again in EPSON Scan! II. Follow these steps:

1. Start EPSON Scan! II, if necessary.
2. Select Acquire from the File menu.
3. Select Scan to scan your image.
4. Choose Save As from the File menu. You see the following dialog box:



5. Choose the drive and directory where you want to save the image.
6. Type a filename for your image in the File Name field. Make sure to use the file extension .ORG.
7. Choose OK.

The image is saved in the EPSON Scan! II file format. You can now open this file and export it with a different format, as described below.

Exporting an Image

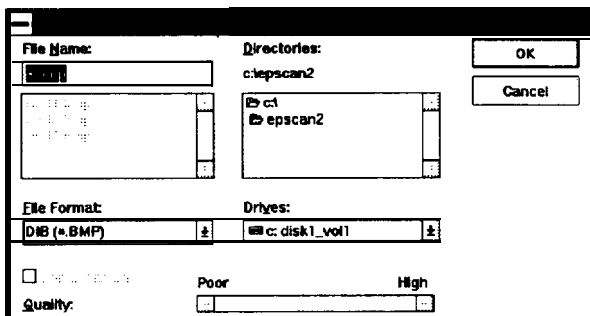
EPSON Scan! II allows you to export an image in a file format your application software can use. For information on file formats your software can open, see your software manual.

Note

Your application software cannot open images saved in the EPSON Scan! II file format and EPSON Scan! II cannot open an exported image file. Always save an image in EPSON Scan! II before exporting.

Follow these steps to export an image:

1. Choose Export from the File menu. You see the following dialog box:



2. **Choose the drive and directory where you want to save the image.**
3. **Type a filename for your image in the File Name field.**
4. **You can choose one of these formats from the File Format menu: DIB, TIFF5.0, TIFF6.0(JPEG), JPEG, and EPSF. (For a description of these file formats, see the Term Glossary.)**

Note:

*You can select TIFF6.0(JPEG) and JPEG formats only if you selected 16 Million Colors for the Pixel Depth **setting** in the Image Type dialog box when you scanned the image.*

5. **If you selected the TIFF6.0(JPEG) or JPEG format, EPSON Scan! II allows you to choose the image quality. Since JPEG uses a Lossy compression scheme, selecting higher quality gives you less compression. To choose the image quality, move the Quality slide bar to the desired setting.**
6. **Choose OK.**

The image is saved in the selected file format. You can now import this file into your application software; see your software manual for instructions.

Acquiring and Exporting an Image

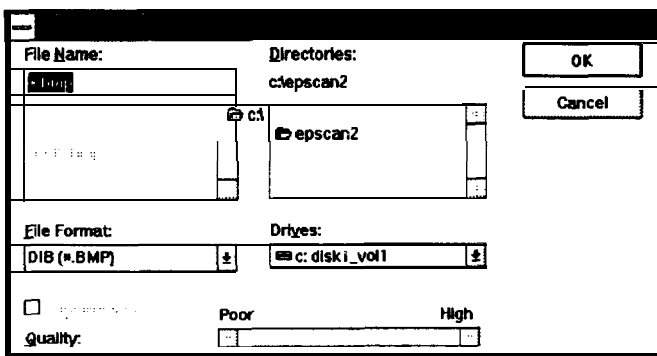
EPSON Scan! II allows you to scan and export an image directly into a selected file format, without displaying it on the screen. Since the image is not displayed, you can perform scanning operations more quickly.

Note:

EPSON Scan! II cannot open an image file once it is exported.

Follow these steps:

1. **Start EPSON Scan! II, if necessary.**
2. **Choose Acquire and Export from the File menu. You see the TWAIN screen. (If you see the easy screen, click Advanced.)**
3. **Choose Scan. You see the following dialog box:**



4. **Choose the directory and drive where you want to save the exported image.**
5. **Type a filename for your image in the File Name field.**
6. **You can choose one of these formats from the File Format menu: DIB, TIFF5.0, TIFF6.0(JPEG), JPEG, and EPSF. (For a description of these file formats, see the Term Glossary.)**

Note:

You can select TIFF6.0(JPEG) and JPEG formats only if you selected 16 Million Colors for the Pixel Depth setting in the Image Type dialog box when you scanned the image.

7. If you selected the TIFF6.0(JPEG) or JPEG format, EPSON Scan! II allows you to choose the image quality. Since JPEG is a Lossy compression scheme, selecting higher quality gives you less compression. To choose the image quality, move the Quality slide bar to the desired setting.
8. Choose OK.

The image is scanned and exported in the selected file format. You can now import this file into your application software; see your software manual for instructions.

Exiting EPSON Scan! II

To exit EPSON Scan! II, make sure you have saved or exported your image file. Then choose Exit from the File menu.

Appendix

Scanner Functions	A	A-2
How the scanner works	A-2
Scanner settings	A-3

Scanner Functions

Various image processing functions are built into your scanner. They are briefly described in Chapter 2. This Appendix contains fuller, more technical, information. All functions must be controlled from the scanner software, and most functions can be combined with others to produce a variety of effects.

Note:

*Because all functions must be **controlled from** scanner **software**, not all the scanner functions may be available, or the range of the settings may be limited. The software may **perform** unique processes on the image data and the results can be **different from** those described in this manual. When using application **software**, see its documentation for details.*

How the scanner works

The image is divided into a two-dimensional matrix of tiny elements. Each element is called a pixel, or picture element. The sensor on the carriage scans a line of pixels, and as the carriage moves, the succeeding lines of pixels are scanned.

The values of the electrical current for pixels are then processed and converted into binary data that can be used by computer devices.

Images such as photographs contain various, almost infinite, tones between black and white as well as various colors. These are detected as varied intensities of reflection. In monochrome reading, the scanner converts the intensities into the tonal data for each pixel. In color reading, the scanner separates the various colors into three primary colors—green, red, and blue—and converts the tones of these colors for each pixel. By this method, the scanner can read any colors within the image.

The data produced by the scanner needs to be reproduced to be seen as an image. This is done, for example, by displaying the image data on a computer screen or printing it on a printer. The same image data can appear different depending on how it is reproduced. The various scanner functions aid in providing optimum reproduction results by adjusting the way the image is captured and converted into image data.

Scanner settings

The table below summarizes the scanner functions and the settings available on your scanner. Each of them is explained in the following pages. All of these functions are controlled by the software commands from your scanner software.

Function	Available settings
Resolution	29 settings from 50 to 2400 dpi
size	50% to 200% at 1% step
Data format	1 to 8 bits/pixel/color Captures up to 10 bits/pixel/color. When it captures over 8 bits, it converts the information to 8 bits/pixel/color .
Color mode	Color line sequence mode, color page sequence mode and monochrome mode (dropout color selectable)
Brightness	7 levels
Halftoning mode	3 modes and disabled 4 dither patterns
Gamma correction	5 settings for output devices plus 1 user-defined
Color correction	4 settings for output devices plus 1 user-defined

You may need to do some trials by yourself to find out your preferred settings because the original images and the output methods you use can vary greatly.

Resolution

The output resolution determines how many pixels are used for scanning and reproducing an image. Resolution is measured in units of dpi (dots per inch), spi (samples per inch), or ppi (pixels per inch). (AU are equivalent units of measure.) As the resolution value increases, the image is read and reproduced in finer detail. At 600 dpi, for example, an image of one square inch is represented by 360,000 dots.

The 29 resolution settings allow you to choose the best resolution for most types of printers. The settings available are 50, 60, 72, 75, 80, 90, 100, 120, 133, 144, 150, 160, 175, 180, 200, 216, 240, 300, 320, 360, 400, 480, 600, 800, 900, 1200, 1600, 1800, and 2400 dpi. To find a matching resolution for your particular output device, follow the guidelines in Chapter 2.

Size of scale

The size or scale function allows you to reduce or enlarge the size of the output image. The value can be set in the range of 50% to 200% in increments of 1%.

When the size is set to 100%, the image is scanned at the actual size for the current resolution. The size values determine the vertical and horizontal lengths of the image. When the size is set to 200% the image is enlarged four times the original size. When the size is set to 50%, the image size is reduced to one fourth of the original size.

The size function affects the number of dots scanned. An image scanned at 180 dpi and 200% has the same number of dots as an image scanned at 360 dpi and 100%.

To enlarge or reduce the image size, use the scanner's size function through your software at the time of scanning. Avoid increasing the image size after scanning because the image quality deteriorates. The default size value is 100%.

Data format

The data format specifies the number of bits used to represent the tone of a pixel. The data format can be set in the range of 1 bit to 8 bits per pixel per color.

As the value increases, more tones and colors can be captured in the scanned image. In monochrome, 1 bit/pixel (bi-level data) can represent only two levels of tones, black (0) or white (1). With 2 bits/pixel (quad-level data), four levels of tones can be represented by the binary values of 00, 01, 10 and 11. Using 8 bits/pixel corresponds to 256 shades of gray, producing near photographic quality results.

In color, the data format defines tones for each of the three primary colors of green, red, and blue. One bit/pixel/color can represent eight colors ($2 \times 2 \times 2$), and 2 bits/pixel/color can represent 64 colors ($4 \times 4 \times 4$). Eight bits/pixel/color (total 24 bits for a pixel) can represent over 16 million colors.

The scanner can read up to 10 bits/pixel/color. Above 8 bits/pixel/color the scanner converts the image data to 8 bits/pixel/color and sends it to the computer. This gives much higher quality.

Data format	Monochrome	color
1 bit/pixel/color	2 grays	8 colors
2 bits/pixel/color	4 grays	64 colors
3 bits/pixel/color	8 grays	512 colors
4 bits/pixel/color	16 grays	4,096 colors
5 bits/pixel/color	32 grays	32,768 colors
6 bits/pixel/color	64 grays	262,144 colors
7 bits/pixel/color	128 grays	2,097,152 colors
8 bits/pixel/color	256 grays	16,777,216 colors



8 bits



2 bits



1 bit

To reproduce an image of more than 2 bits/pixel/color the output device should be capable of producing the same tones. Many displays and printers cannot do this and are limited to monochrome without gradations, or to 8 or 16 or 256 colors.

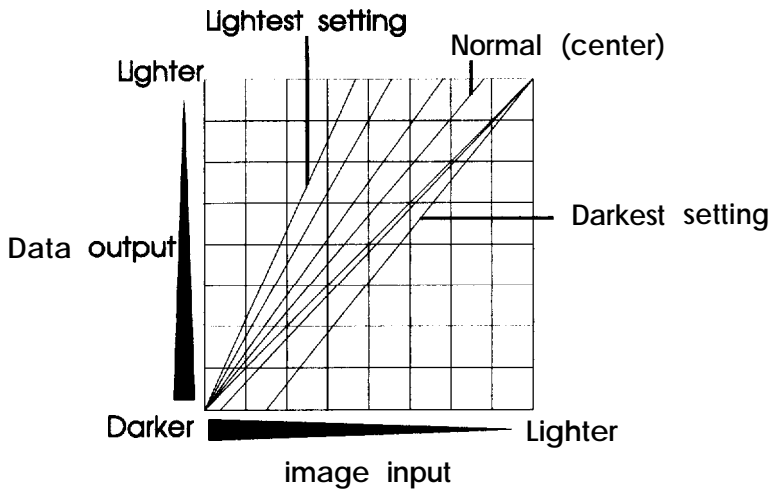
The data format chosen also affects the amount of data necessary for scanning and storing an image. The larger the bits per pixel value chosen, the larger the amount of image data becomes.

Brightness

One of seven brightness levels can be chosen for scanning. Medium is the normal setting.

It is better to use darker settings for line art, or faint original images, and to use lighter settings for darker original images. The brightness can be combined with any other function.

The graph below shows the differences between the brightness settings when the gamma correction is set for the CRT Display A setting.



Color mode

The color mode specifies color reading or monochrome reading. In color reading, you can choose either page sequence reading or line sequence reading. In monochrome reading a dropout color can be specified (green, red, or blue).

❑ *Color page sequence reading*

The scanner scans the document three times (one each for green, red, and blue), and produces three pages of image data that combine to give full color image data. Since the image data can be divided into three sets, a computer with limited memory or processing speed can handle it more easily.

❑ *Color line sequence reading*

The scanner scans the document with one pass of the carriage, reading green, red, and blue for every line. This yields more accurate color separation. Because the color for each pixel can be determined as soon as it is read, the color correction function can be used.

❑ *Monochrome reading (standard)*

The scanner scans the document with one pass and reads the image in monochrome (black and white). In standard monochrome, the scanner illuminates the document with the green, red, and blue lights all at once so that minimum dropout color results.

❑ *Dropout colors (monochrome reading only)*

The dropout color is the color you tell the scanner not to read. You can choose a dropout color from green, red or blue. Use a dropout color when you do not want to read one of these colors—for example, when scanning an image on a colored background.

The default color mode is standard monochrome.

Halftoning mode

Halftoning is a process of changing an image to a pattern of dots. This is required because a printing press produces images in a different way than photography does.

Photographs have an almost infinite number of tones, with an almost infinite number of colors for color photographs, but printing uses only individual single-color dots. Black and white images use black dots, and color images use only four colors of dots: cyan (blue-green), magenta, yellow, and black. The size and spacing of these dots is varied to simulate photographic continuous tones. In some halftoning the dots are quite noticeable, as you can see in one of the illustrations on page 2-11 of this manual. If the dots are fine enough, however, the printed image appears to have continuous tones, as you can see on the cover of this manual.

You can choose various types of halftoning at the time you scan, but it is nearly always best to choose the halftoning setting “off” or “none” and have the halftoning done by the image editing software or by the output device (such as a laser printer). The illustrations on page 2-11 were scanned in gray scale with no halftoning and printed on a black and white laser printer. The printer performed the halftoning so that it could print the image.

You will always get better results scanning from a photograph than from a printed image, such as a picture in a newspaper or magazine, because printed images have already been halftoned and you may see a conflict in the halftone methods.

You can select from three types of halftoning, as well as enable or disable the halftoning process itself. When halftoning is disabled, the tones that the data can represent are determined by the data format. Halftoning is not available when 3 bits/pixel/color or more are selected as the data format, since halftoning is not necessary for such data. Halftoning modes B and C are not available with color line sequence reading.

Your scanner also provides four typical dither patterns for 1- or 2-bits/pixel/color data format. With suitable software, you can define two more dither patterns.

Note:

*Usually your scanner software or printing method can **perform** the halftoning. Therefore, you should usually not use **halftoning** or dither patterns when you scan.*

☐ **Halftoning mode A**

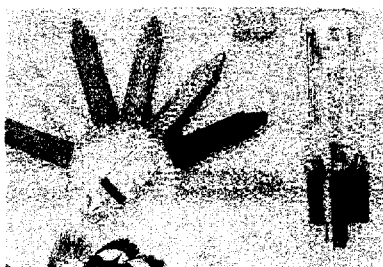
This is the standard halftoning mode. The image is converted into a hard tone to produce a distinct image, and is suitable for most purposes. (1 and 2 bits/pixel/color)

☐ **Halftoning mode B**

With this mode, the image is converted into a softer tone. This mode is suited for images which contain large areas of similar tones. (1 bit/pixel/color)

☐ **Halftoning mode C**

With this mode, the image is represented in a way similar to the screen commonly used for newspaper photographs. The gradations of the tones are represented by clusters of different numbers of dots. (1 bit/pixel/color)



Halftoning mode A



Halftoning mode B



Halftoning mode C



NOW

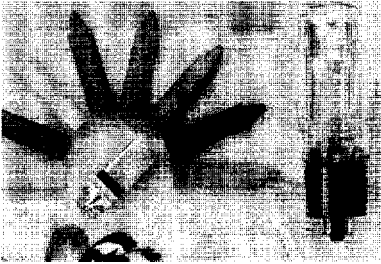
- ❑ *Dither pattern A*
Halftone is expressed in 4 by 4 bayer dither pattern.
- ❑ *Dither pattern B*
Halftone is expressed in 4 by 4 spiral pattern.
- ❑ *Dither pattern C*
Halftone is expressed in 4 by 4 net screen dither pattern.
- ❑ *Dither pattern D*
Halftone is expressed in 8 by 4 net screen dither pattern.



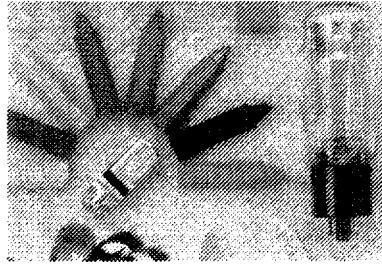
Dither pattern A



Dither pattern B



Dither pattern C



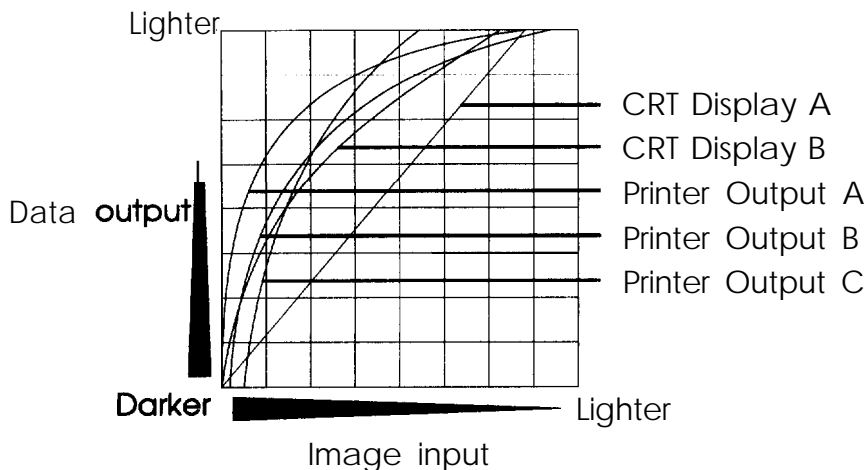
Dither pattern D

Note:

Changing the size of a halftone-processed image with your application software may degrade the image. Instead use the scanner's size or scalefunction at the time ofscanning to select your desired image size.

Gamma correction

This function adjusts the light intensity ratio between the original image and the output data. It brings out more detail in areas of both highlight and shadow. When the image is reproduced on certain types of output devices, the tones of the image will be closer to those of the original. The term “gamma” (γ) means the shape and slant of the line on the graph that shows the ratio, as shown below



Gamma correction provides five settings, and can be combined with all other scanner functions. Choose an appropriate setting from the five modes below.

☐ *CRT Display A*

The output data is in proportion to the original image, as shown in the above graph. This setting is suited for most types of computer displays which can display an image in 1-bit/pixel/color format. This mode is also suited for images without continuous tones, such as line art ($\gamma = 1$).

- ❑ *CRT Display B*
This setting is suited for analog-input CRT displays which can display an image with multiple levels of tones of more than 1 bit/pixel/color ($\gamma = 1.8$). This is usually the best setting.
- ❑ *Printer Output A*
This setting is suitable for high-density printers, such as 24-dot printers and some page printers. The image is converted into a lighter image to compensate for the higher (darker) density of such printers. The image looks faint when viewed on a CRT display.
- ❑ *Printer Output B*
This setting is suitable for low-density printers, such as 8-dot (9-pin) printers, and page printers. The image is converted into a slightly darker image to compensate for the lower (lighter) density of such printers. The image looks faint when viewed on a CRT display.
- ❑ *Printer Output C*
This setting is suitable for high contrast printing of images which contain both picture and text. This setting gives higher contrast and more definition than either Printer Output A or B. The dark and light parts of images are accentuated by this method.

C o l o r o f c o r r e c t i o n

Color correction is functional only with color line sequence mode, because the color of a pixel is immediately determined when the pixel is scanned. Color correction provides four settings. To disable this function, simply choose color page sequence reading or monochrome reading.

This function processes the image data so that the data will be most suited for the characteristics of the color output device used.

- ❑ *CRT displays*
This setting compensates colors for the characteristics of color CRT displays.
- ❑ *Impact dot-matrix printers*
This setting compensates colors for the characteristics of impact dot-matrix color printers.
- ❑ *Thermal transfer printers*
This setting compensates colors for the characteristics of thermal transfer color printers.
- ❑ *Ink jet printers*
This setting compensates colors for the characteristics of ink jet color printers.

Glossary

additive primary colors

Primary colors which produce white when mixed in a certain proportion. These are red, green and blue--the colors of the scanner lamps and color monitor displays.

bi-level data

Image data which is composed of 1 bit/pixel. A pixel is represented by a single bit of digital data that can express only 1 (light) or 0 (dark).

bit

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

bit/pixel

The unit to indicate the number of bits allocated for a pixel. The larger the value, the more detail of a pixel is represented.

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 which 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 become close to the original colors.

color separation

A process to convert full-color images into a limited number of primary colors. The 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 separations.

default

A set of values used when no other selections have been made.

dithering

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

document

The physical item, such as a sheet of paper or a book, that you place 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 you set the scanner not to recognize.

ESC/I

Abbreviation for EPSON Standard Code for Image scanners. A system of commands to control image scanners with software.

ESC/P

Abbreviation for EPSON Standard Code for Printers. A system of commands to control printers with software.

gamma correction

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

gamma curve

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

halftoning

A data processing method of converting continuous tones into patterns of dots so that the output data simulates the tones.

home position

The position at the back of the scanner where its 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 printer

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

Ink jet printer

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

Interface

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

line sequence

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

monochrome

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

page sequence

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

pixel

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

plain bi-level

Bi-level image data without the halftoning process.

port

An interface channel through which data is transmitted between devices.

primary colors

Basic colors. See additive primaries and subtractive primaries.

resolution

Indication of how finely an image is resolved into pixels. Measured in dots per inch (dpi), or 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.

subtractive primary colors

Primary colors that produce black when mixed in certain proportion. These are cyan magenta, and yellow. In printing, black is often added to give more definition because mixing of actual inks cannot produce pure black.

threshold

A value that is referenced to determine whether a certain value is larger or smaller. The scanner uses a number of thresholds to convert an image into digital data.

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