



# Leafscan 35/45 Application Notes

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*Beyond the Manual*

Part Number: 99374

# Table of Contents

Leafscan 35/45 Application Notes .....	1
Resolution .....	2
Cropping and image size .....	3
Image size for pre-press .....	3
Image size for film recorders and multimedia .....	4
Lens apertures .....	5
Exposure times .....	6
Focus and sharpness .....	6
Resolution .....	7
Contrast .....	8
Unsharp masking .....	8
Unsharp masking tips .....	8
Calibration and simulation .....	9
Color correcting within the Leafscan software. ....	10
Autorange tool . ....	11
Set White and Set Black tools .....	12
Tone window .....	12
Color correcting for RGB final output .....	14
Color correcting for CMYK final output .....	14
Using Leafscan software with Kodak's PCS-100 software .....	15
Final scanning .....	16
GPIB versus SCSI .....	17
Possible SCSI configurations .....	18
Leafscan 45 lamp controller adjustment .....	19
Troubleshooting .....	21
GPIB problems .....	21
SCSI problems .....	22
Problems with image quality, focus, and calibration .....	22
Informational messages .....	23
Error messages .....	24

Leafscan 35/45 Application Notes

Part Number: 99374

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# Leafscan 35/45 Application Notes

Before you call Leaf Systems, please read this document.

This document answers the most commonly asked questions addressed to the technical support department. This information is not included in the other Leaf manuals.

The information in this document does not describe how to "push the buttons", but how to optimize the performance and quality of the images input using a Leaf scanner.

Before using this document, you should read the user's manuals for the Leafscan 35 or Leafscan 45, and the Leafscan Plug-in software manual or the WinLeafScan software manual.

## Resolution

The Leafscan 35 scans a fixed 1.5" x 1.5" area. The optics do not change position. Figure I lists the maximum resolution for each format that the Leafscan 35 supports.

<b>Leafscan 35 Formats</b>	<b>Leafscan 35 Maximum dpi</b>	<b>Width (Pixels)</b>	<b>Height (Pixels)</b>	<b>Approximate Pile Size (Megabytes)</b>
35mm Portrait*	4000	3600	5600	58Mb
35mm Landscape*	4000	5600	3600	58Mb
Superslide	4000	6000	6000	103Mb

*Figure 1: Maximum resolutions for the Leafscan 35*

The Leafscan 45 has three different magnification settings. The lens and the camera board, which contains the CCD, both move to different positions in order to capture the most resolution possible for the various size originals. Figure 2 lists the maximum resolution for each format that the Leafscan 45 supports.

<b>Leafscan 45 Formats</b>	<b>Leafscan 45 Maximum dpi</b>	<b>Width (Pixels)</b>	<b>Height (Pixels)</b>	<b>Approximate Pile Size (Megabytes)</b>
35mm Portrait*	5080	5080	7400	113Mb
35mm Landscape	2540	4000	2790	32Mb
6x4.5 cm	2540	6000	4500	81 Mb
6x6 cm	2540	6000	6000	103Mb
6x7 cm	2540	6000	7000	126Mb
6x9 cm	2540	6000	9000	162Mb
6x12 cm	2540	6000	12000	216Mb
4"x5" Portrait**	1200	4740	4740	67Mb
4"x5" Landscape	1200	6000	4740	82Mb

*Figure 2: Maximum resolutions for the Leafscan 45*

\* After cropping to the image area.

\*\* The top and bottom of the image are slightly cropped.

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## Cropping and image size

The cropping rectangle, which appears on the prescan image when using the crop tool, lets you tell the scanner what area of the image is needed for the final scan.

The cropping rectangle reduces the scanning area and in some cases limits the total amount of pixels, or resolution, you can achieve at a given magnification. When you crop an image, the software turns off the pixels that fall outside the cropping rectangle and therefore reduces the total number of pixels scanned.

In the Image Size box, use the Width, Height, and Resolution fields to enter the final output size for an image before it is scanned. Therefore, the final scan will be the proper resolution needed for the specific application of this scanned image.

The numbers in the top-right corner of the Image Size box represent the actual number of pixels to be scanned and the file size of the image after the final scan. For example:

$$600 \times 1002 = 587 \text{ Kb}$$

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## Image size for pre-press

When setting the image size for a scan that will be separated into CMYK and output using an imagesetter, you can use several formulas, or quality factors, to determine how much resolution is enough.

To set an image size for pre-press:

1. Use the crop tool in the Leafscan software to select the desired area.
2. Enter the image size in the Width and Height fields.
3. Enter the resolution in the Resolution field. Use the following formula as a guide:

$$\text{quality-factor} \times \text{line-screen} = \text{Resolution in dpi}$$

Figure 3 provides examples of calculating the resolution for 150 line-screen output using various quality factors.

Quality Factor	Line Screen	Resolution
2	150	$2 \times 1501s = 300$
1.7	150	$1.7 \times 1501s = 255$
1.5	150	$1.5 \times 1501s = 225$

Figure 3: Examples of calculating resolution

When using a lower quality factor, the required resolution is less and the file sizes are smaller. However, depending on the image resampling, artifacts may begin to appear.

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## Image size for film recorders and multimedia

When setting image size for an image that requires a specific size in pixels for such applications as output to a film recorder or monitor only viewing, there is a very easy way to get exactly what you are looking for.

To set an image size in pixels:

1. In the Image Size box of the scanner software window, enter 1" in the dimension that is most important to you and lock that dimension.
2. In the Resolution field, enter the number of pixels you need in dpi.
3. Press <Tab> to update the values.

Note that the numbers in the top-right corner of the Image Size box show what the number of pixels will be when you perform a final scan. You can now adjust the cropping rectangle on the prescan image to get the exact number of pixels in the other dimension.

For example, suppose you need a scan of an image, any size original, to be output on a 4k film recorder. For optimum quality, the scan must have 4000 pixels across the width. To do this, enter 1" in the Width field and lock it. Then, enter 4000 in the Resolution field and press <Tab>. The numbers in the top-right corner of the Image Size box will be something like  $4000 \times 3005 = 34.4$  Mb.

If you are not able to achieve the resolution you need, you may be trying to exceed the limit for the given magnification or you may be cropping the image. See Figure 1 and Figure 2 for the maximum resolution for each film format. For information on how cropping affects the resolution, see "Cropping and image size" earlier in this document.

For output to a film recorder, see the film recorder's manual for recommended resolutions.

## Lens apertures

The lens aperture controls how much light goes through the lens to the CCD. The more open the lens aperture (lower numbers on the lens), the brighter the light, which yields faster scans. Scanning with a small aperture (higher numbers on the lens) greatly increases the scanning times.

In most cases, a scan done at an aperture of f74.7 looks the same as one done at f78. Figure 4 lists the recommended apertures for the various magnifications.

Note: Whenever the aperture is changed, you must calibrate the scanner to achieve optimum dynamic range.

<b>Film Format</b>	<b>Recommended Lens Aperture</b>
35mm Portrait, 2:1	f/4 (or f/4.7, Leafscan 35 only)
35mm Landscape	f/4.7
6x4.5 cm, 6x6 cm, 6x7 cm, 6x9 cm, 1:1	f/4.7
4"x5", 1:2	f/4.7 or f/5.6

*Figure 4: Recommended lens apertures*

In some cases, you may want to use a smaller aperture. Before using an aperture smaller than 8 (remember that a smaller aperture is a higher number), do the following experiment to see if the dynamic range is suitable for the type of work you are scanning:

1. Let the scanner warm up for at least 30 minutes.



2. Put the lens aperture to f78 or to the smallest aperture the scanner will calibrate at, and then calibrate.
3. Change the lens aperture to the desired aperture. However, do not set the aperture smaller than f16.
4. Prescan the image and proceed as usual.

This procedure, which calibrates at a wide aperture and then reduces the aperture, lets you use a smaller aperture without increasing the scanning time. However, this procedure also slightly reduces the dynamic range of the scanner. If this procedure does not give acceptable results, you have to calibrate the scanner at the recommended aperture and then prescan.

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## Exposure times

The More Settings pull-down menu in the Leafscan software window has an Exposure Time command. This command lets you choose between an optimum and a minimum exposure time.

At an optimum exposure time, you will achieve the full dynamic range of the scanner with a Dmax of 3.7. Switching to a minimum exposure time will cut the scanning time, in most cases, in half.

At a minimum exposure time, the dynamic range is reduced slightly to a Dmax of 3.3. However, most color negative film only has a Dmax of 2.4 - 2.8.

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## Focus and sharpness

The Leafscan 35 is a fixed focus scanner. The focus is preset at the factory for optimum focus where the film plane is in the center of the depth of field. The depth of field for this lens at the recommended apertures is great enough to ensure the curve of the film will be in focus.

The Leafscan 45 prompts you to focus after calibrating. The focus automatically looks at the center of the image for contrast at the film plane. When the greatest amount of contrast is found, the scanner stops focusing. The result is the best possible focus based on the area.

In addition to the Leafscan 45 automatic focus, you can move the focus line to the area of the image you are most interested in or to the area with the greatest amount of contrast. In most cases, moving the focus line is not necessary and yields the same result as the automatic focus.

The prescan, which is done at 72 dpi, will look soft-focused even though it is actually in focus. If the image is so blurry it looks like it is under water, the automatic focus did not work properly. In this case, move the focus line to a different area of the image and prescan again.

The Leaf scanners do not artificially sharpen, or unsharp mask, any images during scanning. After a final scan, an image will be in focus, but still might appear to be soft. The following variables can cause an image to appear soft:

- Resolution
- Contrast
- Unsharp masking

The following sections provide more information on these variables.

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## Resolution

The film you are scanning is considered to be continuous tone and has a very fine grain. The act of scanning will cause the image to appear soft. If you consider that the film has thousands of grains per inch, but the scanner may capture only 300 dots for that same inch depending on the specified resolution, the image will appear soft.

## Contrast

Scanners that have a lesser dynamic range than a Leaf scanner produce scans that have more contrast, especially in the three-quarter tone areas, due to their inability to resolve the same detail in the shadows.

For example, the three-quarter tones from other scanners may turn darker when compared to the lighter midtones. The resultant contrast will have the appearance of being sharper.

The Leaf scans may appear to not have as much contrast because the tones are spread over a longer scale to capture more shadow and highlight detail. The greater the contrast, the sharper the image will appear. If more contrast is desired, you can use the Tone window in the Leafscan software to easily apply more contrast.

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## Unsharp masking

All high-end drum scanners have an adjustment, called unsharp *masking*, for sharpening an image while it is being scanned.

The Leaf scanners show you the actual untouched image. Using a third-party image application, you can determine visually how much sharpening the image needs based on the type of original, the resolution, and the contrast. Unsharp masking applies contrast at the pixel level to make edges of lighter to darker areas appear sharper.

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## Unsharp masking tips

When determining how much Unsharp Masking (USM) to apply to an image, always view the image at 1:1. Any other view does not display an accurate representation of the actual pixel information. The third-party application samples either up or down to display other views.

When working on large images, use the marquee tool to select a sample area to preview the USM values. You can quickly apply different values and undo them to see before and after. Don't be afraid of applying too much USM. You can always undo your changes.

To quickly determine how much is enough, first apply too much and then decrease to the desired value. It is easier to recognize too much before is that enough? Once you determine the correct amount, undo the USM, deselect the area, and apply the value to the entire image.

For example, suppose you are using Photoshop to apply USM. As an easy rule, set the Radius and Threshold fields to 1, and start to apply USM in increments of 100. To learn more about how the software applies USM, see the Photoshop documentation.

Always use the USM instead of the Sharpen filter. The USM will yield much smoother results, especially on skin tones and blue skies. The USM takes longer, but the results are worth it.

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## Calibration and simulation

You must calibrate the scanner

- Any time it is turned off
- Any time the magnification is changed (Leafscan 45 only)

The calibration for the scanner reads and corrects for any variances in the bulb, the colored filters, and the CCD for optimum scanning quality. Calibration ensures a consistent starting point for scanning.

However, scanner calibration does not directly control the color fidelity. If the calibration is bad, the scan has artifacts, such as streaking. (For more information, see "Troubleshooting" later in this document.) For the most part, the software will compensate for color shifts.

It is important to let the scanner warm up before calibrating. The bulb and state of the filters will change with temperature, time, and dust.

Some of the major manufacturers of computer monitors offer tools to perform a monitor calibration on their products. The calibration for a monitor corrects for any shift in the red, green, and blue phosphors in the monitor and ensures a consistent starting point.

The biggest single calibration everyone wants to achieve is not a calibration by definition, but a simulation. If you make the monitor simulate what the output is going to look like, then you can trust with some level of confidence that what you see is what you'll get (WYSIWYG). Many software manufacturers offer software for monitor-to-output simulation by adjusting controls like monitor gamma, brightness and contrast for all colors together, and brightness and contrast for red, green, and blue individually. In order for WYSIWYG to happen, you must calibrate and verify all products regularly.

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## Color correcting within the Leafscan software

There are several benefits for doing your color corrections while viewing the prescan image. The largest advantage is the color prescan displays and lets you manipulate the 48-bit color image before it is compressed into the standard 24-bit format required for Macintosh and PC-compatible software programs. With the 48-bit image, you have a greater dynamic range to work with and more control over adjusting the highlight and shadow areas of an image.

At 48 bits (16 bits per color), there are 65535 different pixel values, or steps. At 24 bits (8 bits per color), there are only 256 different pixel values.

Working on the prescan lets you perform color corrections at the beginning of the scanning process eliminating the need for post-processing of color corrections on the high-resolution image. The color corrections on the prescan are immediate and do not require the processing time required when working on the high-resolution file.

The tools provided in the Leafscan software take full advantage of the 48-bit image and are easy to manipulate using familiar icons and procedures. You should use the tools in the following order:

- Autorange tool
- Set White and Set Black tools
- Tone window

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## Autorange tool

The Autorange tool is one of the most powerful tools in the Leafscan software. The black and white points set using this tool become the starting point for the color correction process.

If you select the wrong area, you may be hurting the image and you may have to do more manual color work to get the image to an acceptable level. If you select the proper area and the correct method for the Autorange tool, the scanned image will be much closer to the original immediately.

Each time you perform a prescan, the software uses the Autorange tool to automatically determine the lightest and darkest points. The sample area defaults to the center of the image. Chances are, not every picture you scan will have its lightest and darkest point in this area. You will have to adjust the size and location of the blue autorange rectangle so the lightest and darkest points in the image fall within it. You will also want to try each of the four methods of autoranging to see which one best suits the original.

Do not include the following items in the autorange rectangle:

- Dust or dirt on the transparency
- Scratches or chips in the film emulsion
- Any defect in the film

These items are not part of the film emulsion and if included will shift the color in the entire image, especially when scanning negative film.

## Set White and Set Black tools

The Set White and Set Black tools are optional during normal color correcting. You should use these tools only after properly autoranging the image.

These tools are also very powerful in that wherever you select the black/white point that tonal area becomes the darkest (0) and lightest (255) point in the image. Any tones darker become black; any tones lighter become white.

For example, if you used the Set White tool on a quarter tone area, that tonal area and any tones lighter would become a specular highlight.

These tools also balance the colors. If the area you select has a cast not only will it neutralize the cast but will also pull that color out of the neighboring tonal areas.

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## Tone window

If additional color work is needed after properly using the Autorange tool and/or the manual Set White/Black tools, use the Tone window to make final color adjustments to the image before you perform the final scan.

If you want to use the densitometer to verify your adjustments made with the Tone window, you must click **Apply** for the densitometer to give you the updated reading.

There are many advantages to saving tone curves. For example, suppose you have to scan 20 transparencies that came from the same photographer, same set, same lighting, similar subjects, same film and camera, and so on. You can do your color corrections on the first image, save the tone curve, and then apply that tone curve to the following prescans. By saving the tone curve, you eliminate the need to perform repetitive color adjustments for each image.

You can also use the tone curve to create custom color corrections for different film types specific to your environment. To do this:

1. Create and scan a test target using your own photographic equipment.

2. Use the tone curve to manipulate the image to your specifications and save it.

On any job done using this same film, processing, and so on, you can then apply the proper tone curve. Be sure to also load the black and white points as part of the tone curve. (For more information, see the Leafscan Plug-in and WinLeafScan software manuals).

You can also move the points on the curve to discretely manipulate a specific tonal area. For example, suppose you want to manipulate the three-quarter tone area only. You can slide several of the points to that area of the curve, and then work on the point that adjusts only the particular tone you want to modify. See Figure 5.

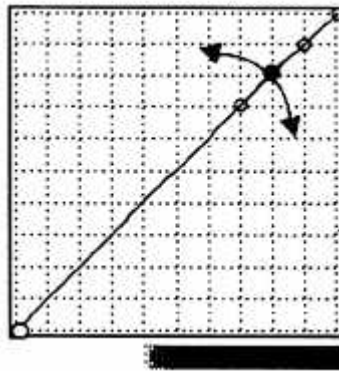


Figure 5: Discrete tone adjustment

To make the curve act as a gamma curve:

1. Move the quarter tone point to an In/Out value of 5.
2. Move the three-quarter tone point to 95.
3. Adjust the midtone point. See Figure 6.

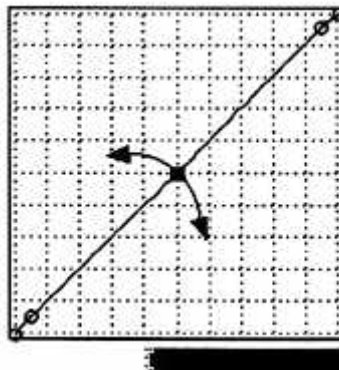


Figure 6: Gamma-like adjustment



## Color correcting for RGB final output

If your final output will be an RGB file for a color printer, a film recorder, a monitor for display, or any other device using the RGB color space, you may want to do all color corrections within the Leafscan software. After performing a final scan, you can open the file in a third-party image application for any additional work that the scan may need. In any case, the final scan will look exactly like the prescan.

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## Color correcting for CMYK final output

The Leafscan software only scans in RGB. If you need a CMYK file, you must open the image in another application, such as Photoshop, and convert RGB to CMYK.

The conversion from RGB to CMYK is not a one-to-one process. During this conversion process variables such as Under Color Removal (UCR) and Gray Component Replacement (GCR) generates a black channel for the image. The conversion process changes the values seen in the Leafscan software as R/C, G/M, B/Y because our software does not generate the black channel.

The RGB color space has a much wider gamut of colors than CMYK. In RGB, you can reproduce millions of colors. In CMYK, you can only reproduce 5000 to 6000 visually different results.

When scanning images that will be output in CMYK, do not spend too much time trying to get the densitometer readings to exact values. As soon as the RGB file is converted to CMYK the values will change and so will the image visually. Within the Leafscan software you can make brightness and contrast adjustments and use the densitometer to check the gray balance of the 3 colors to each other, that will not change. After converting the image to CMYK, you can then make your final color corrections. You should make final color judgements in the same color space as your output device.

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## Using Leafscan software with Kodak's PCS-100 software

When using Kodak's PCS-100 software, you also use their Input Color Calibration (ICC) software to calibrate your input scans. The ICC software requires that every image is scanned using the same exact color information.

To achieve consistency for every scan:

1. Prescan the measured Kodak Q-60 target using the Leafscan software.
2. Use the Autorange tool to select the entire image area. Do not include the film holder.
3. Turn on the Maximum Range option, and then click Apply.
4. Open the Tone window and save the curve. (Name the curve the emulsion that was scanned.)
5. Perform the final scan at the correct dpi.
6. Follow Kodak's instructions for using this image to create an ICC table.

To use the Kodak ICC table you just created:

1. Prescan the image.
2. Open the Tone window and load the tone curve including the black and white points created for the emulsion scanned, and then click OK.
3. Crop the image, enter an image size, and click Final Scan.
4. Follow Kodak's instructions on how to apply the ICC table to the image.

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## Final scanning

The Leafscan Plug-in software for the Macintosh will always state approximately how long each pass of a final scan will take to complete.

To calculate approximately how long a final scan will take to complete, use the following equation:

$$(\text{exposure-time} \times \text{scan-lines}) + 5 \text{ seconds} = \begin{array}{l} \text{Approximate} \\ \text{scan time} \\ \text{to RAM} \end{array}$$

For example, the time to scan an image with an exposure time of 34.4 milliseconds and a height of 4750 pixels is:

$$(.0344 \times 4750) + 5 = 2 \text{ minutes } 48 \text{ seconds for one pass}$$

The exposure time for each color will be different, but not by a significant amount.

To get the exposure time, use the Exposure Time command on the More Settings pull-down menu. To get the height in pixels, use the number in the top-right corner of the Image Size box or use the resolution chart (see Figure 1 and Figure 2) as a quick reference for maximum resolution.

## GPIB versus SCSI

Figure 7 lists the pros and cons to using SCSI or GPIB to connect a Leaf scanner to your computer. In either case, the scanner inputs and transfers data slower than either interface making them equal in scan times.

<b>SCSI Connection</b>	<b>GPIB Connection</b>
Built into every Macintosh, some PC compatibles	Requires a separate board
Sensitive - part of mother board, cannot connect/disconnect with Macintosh power on	Flexible - just another optional board, can connect/disconnect with computer power on
Limited to 6 devices	Up to 30 devices on 1 card, can have multiple cards
18" cable length from 25-pin connector on back of the Macintosh	Up to 30' away from the board
Needs termination	No terminators
Maximum 6' away from any 50-pin connector on a peripheral, maximum total SCSI length is 20'	Maximum length is 30'
Cannot share scanner easily with other computers using SCSI	Can connect several computers with GPIB connections using a switch box at the scanner
Standard interface	Standard interface
Can be INIT conflicts between the scanner and third-party software	Can be INIT conflicts, questions in configuration and versions of card/software

Figure 7: Comparison of SCSI and GPIB connections

## Possible SCSI configurations

Figure 8 shows the possible SCSI configurations and lists the associated Leaf part numbers.

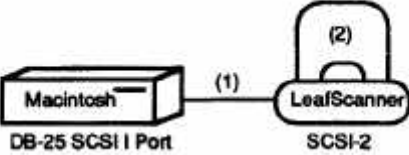
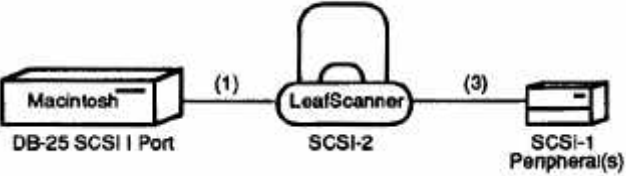
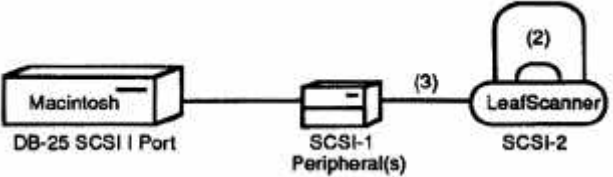
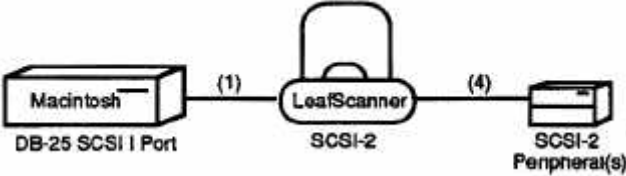
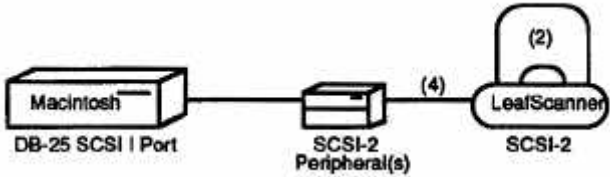
Description	SCSI Configuration
<p>Option 1</p> <p>(1 ) SCSI-2 to DB-25 18" cable* (LP# 50184)</p> <p>(2) SCSI-2 terminator (LP# 20698)</p>	
<p>Option 2</p> <p>(1) SCSI-2 to DB-25 18" cable* (LP# 50184)</p> <p>(3) SCSI-1 to SCSI-2 6' cable (LP# 20695)</p>	
<p>Option 3</p> <p>(2) SCSI-2 terminator (LP# 20698)</p> <p>(3) SCSI-1 to SCSI-2 6' cable (LP# 20695)</p>	
<p>Option 4</p> <p>(1) SCSI-2 to DB-25 18" cable* (LP# 50184)</p> <p>(4) SCSI-2 to SCSI-2 9' cable (LP# 20697)</p>	
<p>Option 5</p> <p>(2) SCSI-2 terminator (LP# 20698)</p> <p>(4) SCSI-2 to SCSI-2 9' cable (LP# 20697)</p>	

Figure 8: Possible SCSI configurations

\* LP# 50184 is limited to 18" due to the Apple SCSI specification. Option 3 and Option 5 offer alternative solutions for increased configuration flexibility.

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## Leafscan 45 lamp controller adjustment

There will be times when you need to adjust the lamp controller. You only need to adjust the lamp controller on the Leafscan 45. The Leafscan 35 does not have a lamp adjustment.

To adjust the lamp controller on the Leafscan 45:

1. Make note of the current switch settings.
2. Turn off the scanner and set the switches as follows:



3. Change the lens aperture to f78, close the lens cover, and turn on the scanner.



4. Let the scanner warm up for at least 15 minutes.
5. Make sure the blue filter in the scanner is lit. If not, reset the scanner.
6. Change the aperture to f74 and close the lens cover before continuing.



7. Find the lamp adjustment tool that was delivered with the scanner. The tool is like a very small screwdriver.

*Leafscan 45 lamp controller adjustment*

8. Insert the tool into the Lamp Adj hole until it touched the adjustment screw.

Lamp Adj



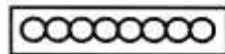
9. Turn the adjustment screw clockwise until you hear it click. This may take several turns.

Lamp Adj



At this point, all 8 Status lights should be lit.

Status



10. Turn the adjustment screw counterclockwise until only 2 lights are lit.

Lamp Adj



Status



11. Reset the scanner mode and address switches, and then reset the scanner.

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## Troubleshooting

When troubleshooting, try one correction at a time in the order listed. For any problems you cannot resolve, copy the Leafscan Troubleshooting Check List and send the completed form to Leaf Systems.

Any time you have a problem with a Leaf scanner or associated software, always record the following items:

- The scanner serial number, PROM cartridge version, and application software version
- Your system model and any special devices, such as accelerator cards, that are installed
- Whether the problem is constant or intermittent

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## GPIB problems

For problems accessing the scanner via GPIB, check the following items:

- Check the DIP switch settings for mode and device address. (See the Leaf scanner owner's manual.)
- Turn off all INITs, except the NB Handler, and try again.
- Record the version of the National Instruments NB Handler INIT. Verify with National Instruments that you have the correct version for your configuration.
- Check the NB Handler INIT or other GPIB software for correct settings for both gpibO and dev8.
- For a Macintosh, look at the information for Bus/Device gpibO. Check that either the Repeat **Addressing** or **Unaddressing** option is turned on.

The message "Unable to initialize scanner interface" indicates there is a problem with the GPIB card or the gpib0 configuration.

The message "Unable to locate Leafscanner" indicates the GPIB cable is bad or disconnected, the address switch settings are incorrect, or the dev8 configuration.



## SCSI problems

For problems accessing the scanner via SCSI, check the following items:

- Check the DIP switch settings for mode and device address. (See the Leaf scanner owner's manual.)
- Turn off all INITs and try again.
- Check for proper SCSI termination and for possible conflict of address with other SCSI devices.

If other SCSI devices are connected, try to change the order of the devices on the chain or remove the other devices from the chain if appropriate cables are available.

- Make sure that the cable connecting the Macintosh to the first SCSI device does not exceed 18 inches.
- Make sure that the total length of all cables on the chain does not exceed 6 meters (20 feet).

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## Problems with image quality, focus, and calibration

For all problems with quality of scanned images that you cannot resolve, send a sample file or print to Leaf Systems. Be sure to include a completed copy of the Leafscan Troubleshooting Check List.

For streaking in images and calibration problems:

- You may need to clean dust or dirt from the colored filters.
- You may need to adjust the lamp controller (Leafscan 45 only).
- You may need to replace the lamp, particularly if it is more than 6 months old (approximately 3000 hours).

For Leafscan 45 users:

- For image quality, focus, or calibration problems, see if the problem occurs in all film formats (35mm, 4x5, and so on).

- For focus problems, try moving the green focus line to a different position or try a different piece of film, and then Prescan again.
- For registration problems, turn over the film holder, and try scanning again.
- If the prescan looks posterized on a Macintosh, open the control panel and make sure the monitor is set to millions. If the monitor is set to millions, try using the autorange tool. For more information, see "Autorange tool" earlier in this document.
- When acquiring the scanner on a Macintosh, if the monitor turns dark and does not recover, open the control panel and make sure the monitor is set to millions. If the monitor is set to millions and the problem still exists, change to 256 colors.
- If the scanner works at 256 colors, the video board in the Macintosh may need to have its FROM upgraded. Call the manufacturer for an upgrade.
- If the scanner still does not work at 256 colors, the video card may be bad or incompatible. Try another video card or another Macintosh.

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## Informational messages

The following messages are informational only. The Leafscan software displays these messages to report progress and status information to you.

- Loading lookup tables
- Saving calibration .
- Saving prescan image .
- Setting up for final scan .
- The image you are reloading came from a different sized window. Cropping changes will be inaccurate until you Prescan
- The current Prescan image came from a different sized window. Please Prescan to restore accurate cropping.
- Unable to load stored preferences. Using defaults instead.

## Error messages

Whenever you get a Leafscan error message, always reset the scanner (off/on), and/or the Macintosh, and try again.

If the error still exists, see Figure 9 for additional information.

Error Message	What To Do
Can't save prescan image this time.	The disk is full or the Leafscan image file is locked or corrupted.
Can't load the prescan image from "Leafscan Image File",	The disk is full or the Leafscan image file is locked or corrupted.
There is not enough memory available to open Leafscan now. Please close some windows and try again	<ul style="list-style-type: none"> <li>• Save and close some of the pictures on the monitor.</li> <li>• Highlight the Photoshop icon, and then select Get Info from the Finder. There should be a minimum of 4096k allocated to the application.</li> </ul>
Scanner problems detected. Please see "Scanner Info." for more details.	Select Scanner Info from the More Settings menu to view additional error messages. Check this table for information on what to do.
Camera: Not enough light at CCD for calibration. Or, below legal limit,	<ul style="list-style-type: none"> <li>• Remove lens cap and film holder from scanner.</li> <li>• Open the lens by setting a lower number (f/4 is wide open).</li> <li>• Clean colored filters (air).</li> <li>• Perform lamp controller adjustment. (Leafscan 45 only.)</li> <li>• Replace the bulb, and then perform lamp controller adjustment.</li> </ul>
Camera: Subrange gain out of range.	<ul style="list-style-type: none"> <li>• Clean colored filters (air).</li> <li>• Perform lamp controller adjustment. (Leafscan 45 only.)</li> </ul>
Camera: Too much light at CCD for calibration.	<ul style="list-style-type: none"> <li>• Close the lens by setting a higher number (not more than f/8).</li> <li>• Perform lamp controller adjustment. (Leafscan 45 only.)</li> </ul>

Figure 9: Error messages

Error Message	What To Do
DSP: Pixel value overflow during scan.	Ignore this message unless artifacts appear in the scan.
Lamp: Controller fault or bad lamp. LS 45 only	<ul style="list-style-type: none"> <li>• Remove lens cap and film holder from scanner.</li> <li>• Clean colored filters (air).</li> <li>• Perform lamp controller adjustment. (Leafscan 45 only.)</li> <li>• Replace the bulb, and then perform lamp controller adjustment.</li> </ul>
Please move the green focus line to a different area. Leafscan 45 only.	Move the focus line only if image is blurry (that is, fuzzy or "under water"). If the image appears soft, see "Focus and sharpness" earlier in this document for more information.

Figure 9: Error messages