Lasergraphics Film Recorder Series

User Guide

LASERGRAPHICS ™

Limited Warranty

Lasergraphics, Inc. warrants the Lasergraphics Film Recorder (LFR™) to be free from defects in design, workmanship, and material under normal use for a period of one year from the date of initial shipment.

Lasergraphics agrees to repair or to replace, at its option, without charge, all defective parts in systems which are returned to its factory for inspection within the warranty period, provided that such inspection discloses that the defects are as specified above and provided, further, that the equipment has not been altered or repaired other than with authorization from Lasergraphics in compliance with its approved procedures, has not been subjected to misuse, improper maintenance, negligence, or accident, has not been damaged by excessive current , and has not had its serial number or any part thereof altered, defaced, or removed.

All defective items replaced hereunder become the property of Lasergraphics. The parties agree that the sole and exclusive remedy against Lasergraphics shall be the repair or replacement of defective parts as provided herein. The Buyer agrees that no other remedy, including incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other loss, shall be available to him.

This warranty is in lieu of, and Buyer waives, all other warranties, expressed or implied, including those of merchantability or fitness for a particular purpose.

Warranty Registration

Please complete the enclosed Warranty Registration Card and send it to Lasergraphics. Warranty registration enables us to keep you informed of new developments for the LFR.

An Extended Limited Warranty is available. For details, contact Lasergraphics' Sales Department at (949) 753-8282.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications, in which case the user will be required to correct the interference at his own expense.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

☐ Reorient the receiving antenna.

☐ Move the computer away from the receiver.

☐ Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

☐ Ensure that all cable connectors are fastened securely to the computer's chassis.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission (FCC) helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

Canadian Department of Communications Compliance Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception, requiring the owner or operator to take whatever steps are necessary to correct the interference.

Âvis de conformité aux normes du ministère des Comminications du Canada

Cet équipment ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques telles que préscrites par le Règlement sur le brouillage radioélectrique
établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des receptions radio et télévision, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

VDE Compliance Statement - German

Hiermit wird bescheinigt, daß die Lasergraphics Filmrekorder LFR Mark II DPM, LFR Mark III DPM, LFR Mark V DPM, LFR Mark VI DPM, Personal LFR Plus, LFR-X 95, LFR Mark II, & LFR Mark III in Übereinstimmung mit den Bestimmungen der VFG 1046/1984 funkentstört und nach CE RFI/EMC geprüft worden sind.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Lasergraphics, Inc.
20 Ada
Irvine, CA 92618
USA

VDE Compliance Statement - English

We hereby certify that the Lasergraphics Film Recorders Personal LFR Plus, LFR-X 95, LFR Mark II, LFR Mark III, LFR Mark II DPM, LFR Mark III DPM, LFR Mark V DPM & LFR Mark VI DPM are in compliance with Postal Regulation 1046/1984 and have passed CE RFI/EMC testing.

The marketing and sale of the equipment was reported to the German Postal Service. The right to retest this equipment to verify compliance with the regulation was given to the German Postal Service.

Lasergraphics, Inc.
20 Ada
Irvine, CA 92618
USA

Important Safety Instructions

Read all these instructions.

Save these instructions for later use.

Follow all warnings and instructions marked on the product.

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

Do not use this product near water.

Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

Slots and openings in the cabinet and the back or bottom are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.

If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the

extension cord do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.

Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage points or other risks. Refer all servicing to service personnel.

Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

A. When the power cord or plug is damaged or frayed.

B. If liquid has been spilled into the product.

C. If the product has been exposed to rain or water.

D. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

E. If the product has been dropped or the cabinet has been damaged.

F. If the product exhibits a distinct change in performance, indicating a need for service.

About this Guide

This guide describes the installation and use of the LFR series film recorders.

"Introduction" describes the LFR, how it works, and what you need to get started.

"Installation" describes how to set up the LFR.

"Using the LFR" describes how to use the LFR and supported camera backs.

"Appendices" describe compatible hardware and troubleshooting procedures.

"Glossary" defines terms used in this guide.

"Index" points to the location of specific information in this manual.

Contents

Introduction

This chapter introduces you to the Lasergraphics Film Recorder (LFR) family: the Personal LFR Plus, the LFR-X, the LFR Mark II, the LFR Mark III, the LFR Mark II Digital Photography Model (DPM), the LFR Mark III DPM, LFR Mark V DPM and the LFR Mark VI DPM. While these film recorders vary in their performance (e.g. image quality, speed), they are all installed and used essentially in the same way.

The first section, **"Getting to Know the LFR,"** describes the exterior features of the LFR.

"How the LFR Works" describes the basics of film recorder technology.

"What You Need" lists the equipment and material you need to use the LFR.

The LFR produces professional-quality slides and color prints at a fraction of the cost of outside services. With the LFR, you save time, maintain control, and can keep important information confidential.
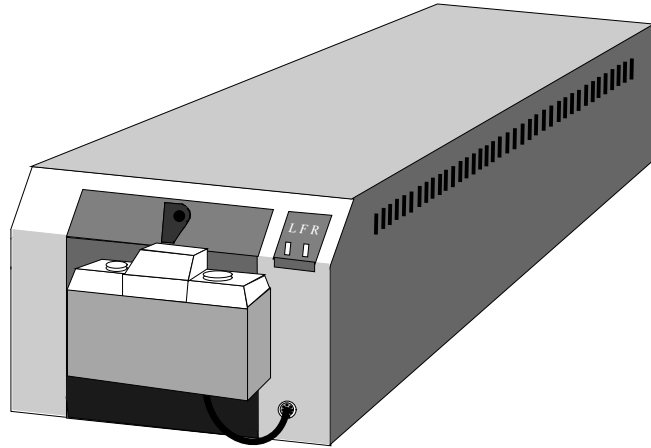
Top Performance

The LFR makes professional quality slides and color prints with 2000-or 4000-line resolution. The Mark III, V and VI models also support 8000- line resolution and image with 36-bit per pixel color accuracy. The Mark VI images 16000-line resolution also. The LFR is fast, too. For example, the LFR Mark II takes less than one minute to create most slides.

Easy Operation

Installation takes just a few minutes. Once installed, all you have to do is reload film. The LFR sets exposures automatically so you get consistent color images every time. The LFR also advances film automatically and knows when the camera runs out of film, making unattended operation possible.

Multiple Operating Environments

The LFR runs with PC/Compatibles and Macintosh computers via one of the following Lasergraphics RIPs (Raster Image Processors).

Operating Environment	Lasergraphics RIP
IBM® PC/Compatibles	WinRascol RIP software-only RIP or RISC Rascol, a powerful external co-processor RIP.
Macintosh®	MacRascol™ software-only RIP or RISC Rascol, a powerful external co-processor RIP.
Macintosh/PC Combination	MacRascol software-only RIP and WinRascol RIP software-only RIP or RISC Rascol, a powerful external co-processor RIP.
Sun	APUNIX

Compatibility

The LFR accepts input from any graphics application that outputs images in one of the following ways:

- BLL (Binary Lasergraphics Language) from PC or Mac
- Macintosh Chooser-Level Driver
- Microsoft® Windows™ Device Driver
- Adobe Photoshop (PSD)
- TARGA®
- TIFF
- PICT 1 and PICT 2 (MacRascol Only)
- LL (Lasergraphics Language)
- HP-GL® (Hewlett-Packard Graphics Language)

Getting to Know the LFR

The LFR's front panel contains the camera mount and indicator lamps. The LFR is shown here without a camera and without the dust cover that protects the lens hole during shipping or when the camera is removed.

Since the Personal LFR Plus camera backs are permanently connected, the camera lock, mount, socket, and lens hole are absent. The Personal LFR Plus also lacks the indicator lights since all information is available on the display of the SMARTBACK.
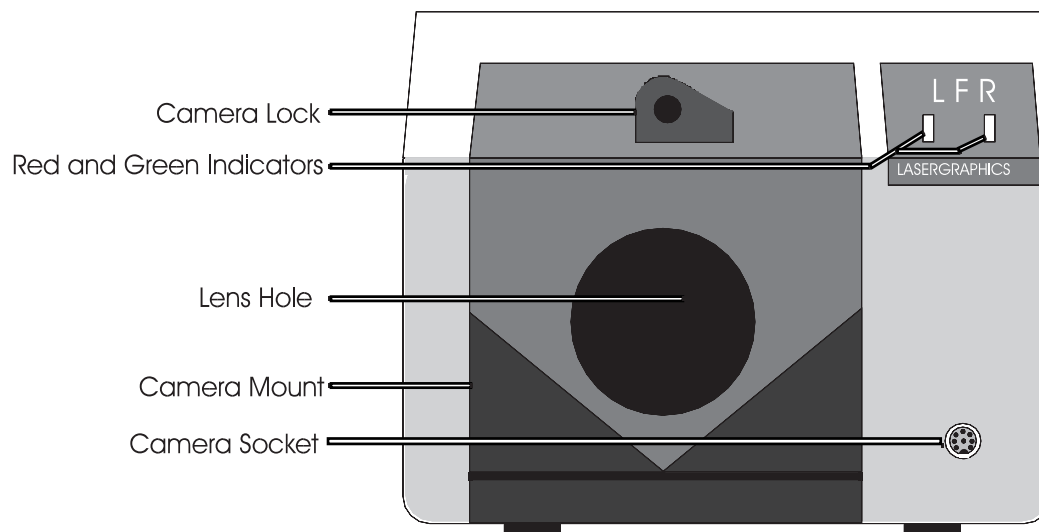
The **camera lock** secures the camera to the front panel.

The **green indicator** flashes rapidly when you turn on the LFR, turns solid when the LFR is ready to use, and flashes slowly while an image is being exposed.

The **red indicator** turns solid if an error has occurred or the camera runs out of film.

The camera lens fits into the **lens hole** and the camera's mounting plate slides into the **camera mount**. The camera cable attaches to the **camera socket**.

The LFR's rear panel contains the power switch, fuse holder, power connector, DIP switch, 25-pin connector, and SCSI connectors as shown in this illustration.

Vents

DIP Switch

SCSI Ports

25-pin Port

Power Switch

Fuse Holder

Power Connector

Serial Number

LASERGRAPHICS

LFR

12345
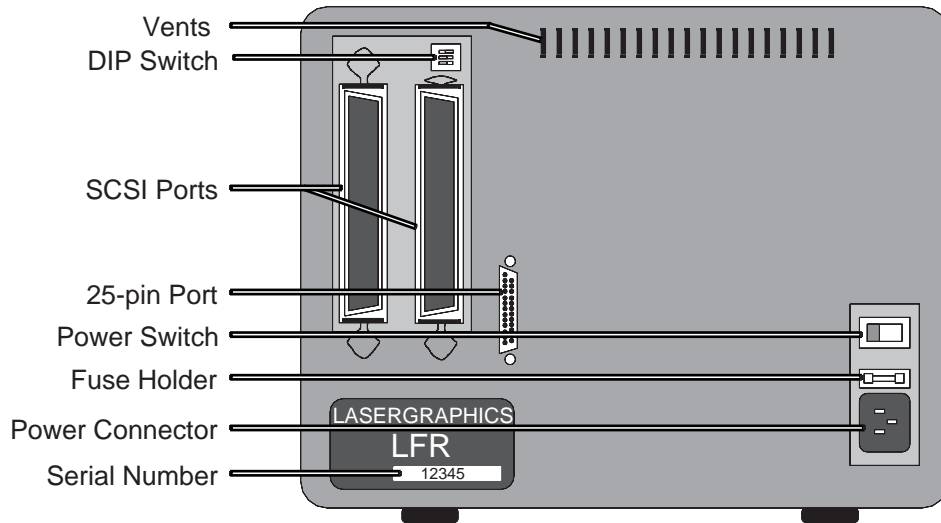
The **vents** help cool the LFR. Don't block any of the vents on the rear, side, or bottom panels.

The **DIP switch** sets the SCSI ID number. The DIP switch is used only when connecting the LFR to a SCSI bus (Macintosh or Sun). The **SCSI ports** are for connection to a SCSI bus. Both SCSI ports are equivalent.

The **25-pin port** enables you to connect the LFR to a PC's LPT port, the high speed RascolPort PC interface card, or a RISC Rascol.

☞ **CAUTION: This 25-pin port is not an RS-232 port.**

The **power switch** turns the LFR on and off. The Mark V and Mark VI **power switch** is located on the front of the film recorder.

The **fuse holder** contains a fuse. There is a spare fuse stored inside the fuse holder.

The **power connector** is where you connect the LFR's power cord.

How the LFR Works

The LFR's basic components are a high-resolution black-and-white cathode-ray tube (CRT); a color wheel that contains red, green, and blue color filters; and a camera back.

Rasterization is the process of transforming a computer image into an image made up of dots ready for output on a high resolution device.

To create a slide, your host CPU or RISC Rascol controller **rasterizes** the image at high-resolution and separates it into red, green, and blue components. A red filter is positioned in front of the camera lens and the camera shutter opens. The red portion of the image is displayed in shades of gray on the CRT inside the LFR. The light passes through the red filter and is recorded on film as the red portion of the image.

Once the red portion of the image has been exposed, the CRT shuts off. The camera shutter stays open while a green filter is positioned in front of the lens. Then the green portion of the image is recorded.

The process is repeated once more for the blue portion of the image. Then the camera shutter closes and the film advances to the next frame.

What You Need

You need film to create slides or prints. The standard SMARTBACK accepts 35mm film, most commonly Kodak Ektachrome 100 ASA. To develop Polachrome™ slide film, you also need a Polaroid 35mm Autoprocess System. The Autoprocess System is available at most camera stores.

In addition to the 35mm SMARTBACK , a medium format SmartPro 120/220 camera back, a SmartLoader 35mm autoloading back, and a SmartPro 4x5 camera back are available.

The hardware you need to connect the LFR depends on the type of computer and interface to which you are connecting the LFR.

Macintosh or Workstation via SCSI

■ One of the following SCSI cables:

  □ To connect the LFR directly to your Macintosh, a SCSI system cable (normally 50-pin to 25-pin) is required.

  □ To connect the LFR directly to your Workstation, a SCSI system cable (50-pin to workstation connector) is required.

  □ To connect the LFR to a SCSI device other than your Macintosh, a SCSI peripheral cable (normally 50-pin to 50-pin) is required.

■ Power cord.

PC via RascolPort

■ Lasergraphics 25-pin male to 25-pin male parallel cable.

■ Power cord.

PC via Parallel Port

■ Lasergraphics 25-pin male to 25-pin male parallel cable.

■ Power cord.

RISC Rascol

■ Lasergraphics 25-pin male to 25-pin male parallel cable.

■ Power cord.

You also need cables to connect the RISC Rascol to your computer. Please refer to the RISC Rascol user guide for details.

Installation

This chapter explains how to set up your LFR for use with any of the Rascol family of Raster Image Processors (RIPs).

The first section, **"Quick Start,"** outlines the installation process.

"Installing the Rascol Hardware and Software" points you to the guide that came with your Rascol for instructions on installing the rasterizing hardware and software.

"Placing the LFR" provides guidelines on where to put the LFR.

"Connecting the LFR" explains how to connect a RascolPort, IBM PC, Macintosh or RISC Rascol to your LFR.

"Mounting the Camera Back" explains how to install the camera.

"Connecting the Power Cord" explains how to connect the power cord.

"Installing Two Rascols" describes how to set up the LFR for use with two Rascols at the same time.

Quick Start

The following steps are intended for people with experience in connecting peripheral devices to their computer systems. If you've never connected a peripheral device to your computer or you are not sure about all the steps, read the detailed instructions following this section.

1. Install the Rascol hardware.

If you are using a Rascol Port interface card, install it in the PC at this time. (See your Rascol user guide for instructions.)

2. Place the LFR on a smooth, flat surface in a well-ventilated area.

Keep the LFR well away from electrical devices such as computer monitors, power supplies, and motors.

3. Connect the LFR to the Rascol, PC, or Macintosh.

If you have a RISC Rascol, connect the 25-pin male D connector of the LFR to the film recorder connector of the RISC Rascol. Use only the 25-pin male to 25-pin male cable specified for use with your Rascol and LFR. Connect the RISC Rascol to your PC or Mac with the appropriate cable. See the RISC Rascol manual for detailed instructions.

If you have a PC/Compatible, connect the PC LPT port to the LFR with a 25-pin male to 25-pin male cable.

If you have a PC/Compatible and the high speed RascolPort, connect the RascolPort DB25 connector to the LFR with a 25-pin male to 25-pin male cable.

If you have a Macintosh or Workstation, connect the LFR directly to the SCSI chain, via the 50 pin SCSI connector.

☞ **MACINTOSH CAUTION:** If you are connecting to the Macintosh via the SCSI bus, make sure that your SCSI bus is correctly terminated and that there are no duplicate SCSI ID numbers. Incorrect termination can damage the LFR, your Macintosh, or both.

4. Connect the power cord.

Use the same electrical outlet as your computer in order to avoid ground loops.

5. Mount the camera back and plug in the camera cable

This step does not apply to the Personal LFR Plus.

6. Turn on the power to your computer equipment and LFR.

6. Install the WinRascol and/or MacRascol Software

Refer to the WinRascol or MacRascol User Guide for full instructions for installation.

7. Check that the Rascol and LFR communicate properly with each other.

Installing the Rascol Hardware and Software

Install the Rascol hardware and software before you proceed. Each Rascol constitutes a different collection of hardware or software:

Rascol	Components
RascolPort	Hardware and WinRascol RIP software
RISC Rascol	Hardware and software
MacRascol	Software only
WinRascol RIP	Software only

See your Rascol, MacRascol, or WinRascol RIP user guide for instructions.

Placing the LFR

Always turn off the LFR before moving it and always carry it by the base.

☞ **CAUTION:** Never use the lens hole as a handle for moving the LFR.

Place the LFR:

■ **In a low dust environment.**

   Dust can attach to the optical components and degrade image quality.

■ **Away from electrical devices and magnets.**

   Electrical or magnetic interference from computer monitors, power supplies, motors, telephones, etc. causes distortion on your images.

■ **On a flat surface with room for air to circulate on all sides and underneath.**

   Do not set the LFR on carpet, next to a wall, or anywhere that may block the cooling vents.

■ **So all four feet contact the surface.**

   Do not let the LFR hang over the edge of a table or desk.

■ **Where you can change film without removing the camera back.**

■ **Within reach of the connecting cables.**

Connecting the LFR

The sections that follow explain how to connect the LFR to a RascolPort, RISC Rascol, IBM PC/Compatible, or Macintosh. Read the section that describes your system.

☞ **CAUTION: Never connect anything to the 25-pin connector except a 25-pin male to 25-pin male straight through shielded cable connected to a RascolPort, RISC Rascol or PC/Compatible parallel port. The connector looks like an RS-232C connector but is not.**

The LFR requires one of the following cables:

System	Required Cable	Lasergraphics Part Number
IBM PC	25-pin male to 25-pin male	230-003
RascolPort (PC)	25-pin male to 25-pin male	230-003
RISC Rascol	25-pin male to 25-pin male	230-003
Macintosh	25-pin male to 50-pin (SCSI system cable)	Not included
Macintosh	50-pin to 50-pin (SCSI peripheral cable)	Not included
Workstation	50-pin to Workstation Connector	Not included

➠ **NOTE:** Macintosh cables are available from your local Apple dealer.

To IBM PC/Compatibles

Be sure a parallel port is available or a RascolPort, high speed parallel interface, is installed in the PC.

☞ **CAUTION:** Use only the cable that came with your LFR.

1. Make sure that the LFR and your computer are turned off.

2. Plug one end of the cable into the 25-pin port on the LFR's rear panel and the other end into the 25-pin port on the RascolPort or parallel port.

Note that the connectors have a wide and a narrow side.

Rear Panel of the LFR

Parallel or Rascol Port DB25 Connector

LASERGRAPHICS

LFR

12345
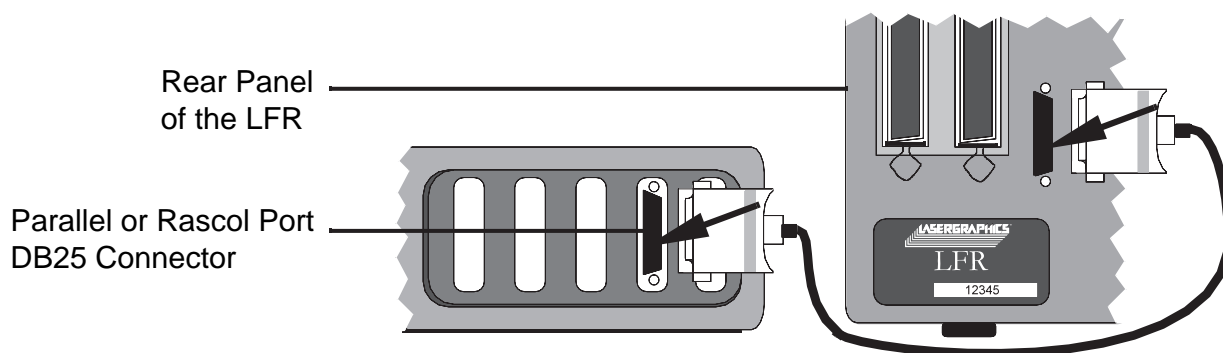
3. Tighten the screws on the cable housings.

Don't over tighten the screws.

You are now ready to mount the camera back.

To a Macintosh

The LFR connects to a Macintosh via the Small Computer System Interface (SCSI) bus. This section discusses SCSI ID numbers, SCSI termination principles, and how to connect the LFR to a Macintosh.

Please read this entire section before installing the LFR. That way you will know what type of SCSI cable you need and whether or not termination is required.

☞ **CAUTION:** Incorrect SCSI installation can damage the LFR, your Macintosh, or both.

The SCSI ID Number

You can connect up to seven SCSI devices to your Macintosh. The connection is called the **SCSI bus.**

Devices on the SCSI bus are identified by a SCSI ID number. If two devices have the same ID number, your system won't work. The LFR comes preset to ID number 4. If another device has the same ID number, change the LFR's ID number, using the DIP switches on the LFR's rear panel.

➠ **NOTE:** Do not set the LFR's SCSI ID number to seven. This number is always reserved for the Macintosh. Internal Macintosh hard disk drives usually have SCSI ID number zero.

Termination

SCSI **terminators** are small devices that clip onto a SCSI cable. They define the beginning and end of the SCSI bus.

The SCSI bus must have a **terminator** at the beginning and at the end of the SCSI chain. Use a terminator even if the LFR is your only external SCSI device. Devices in the middle of the chain do not require termination. The LFR is not internally terminated.

Check the documentation of all SCSI devices connected to your Macintosh to determine if they are internally terminated. An internally terminated device must be at either the beginning or the end of the SCSI chain.

☞ **CAUTION:** No more than two SCSI terminators are allowed on the SCSI bus.   Incorrect termination can cause data loss or damage to all the devices on the bus.
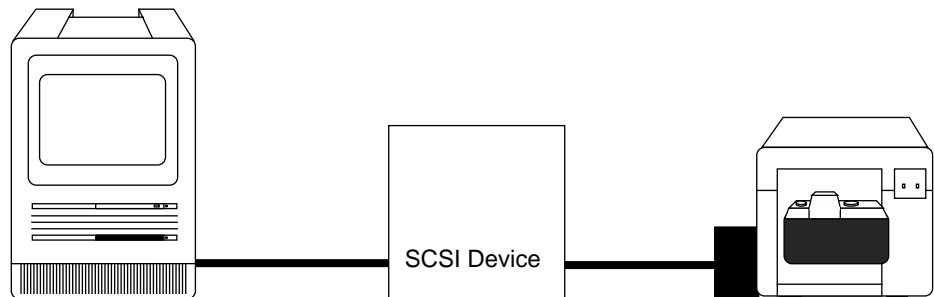
Internal hard disk drives are always terminated. They represent the beginning of the SCSI chain. If you have an internal hard disk drive, you only terminate the last device in the SCSI chain.

☞ **CAUTION:** The Macintosh IIfx uses a different terminator than earlier Macintosh II's. Use the black terminator supplied with the Macintosh IIfx.

The following drawings illustrate how to use SCSI terminators. The black rectangles at the cable ends represent SCSI terminators:
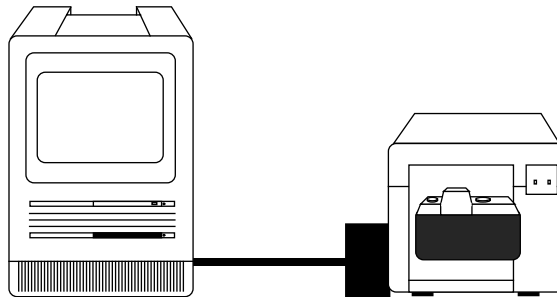
Your Macintosh has an internal hard disk drive and the LFR is your only SCSI device. The LFR must be terminated.

Your Macintosh has an internal hard disk drive and the LFR is the last device in the SCSI chain. The LFR must be terminated.
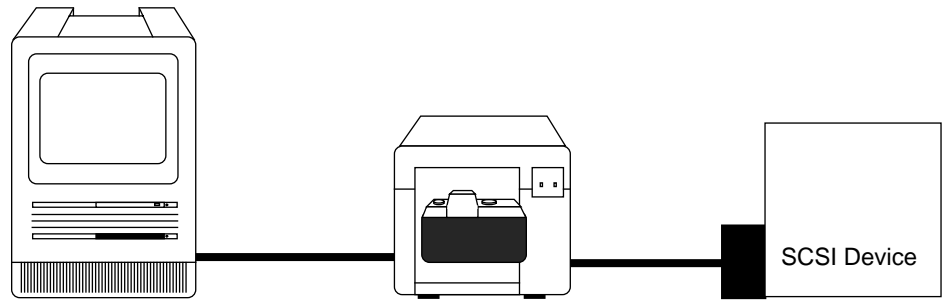
Your Macintosh has an internal hard disk drive and the LFR is not the last device on the SCSI chain. Do not terminate the LFR. The last device on the SCSI chain must be terminated.

If you are still unsure about termination, refer to your Macintosh owner's guide. It describes SCSI termination in detail.

Making the Connection

The LFR requires one of two cables: a SCSI system cable (50-pin to 25-pin) for connecting directly to a Macintosh, or a SCSI peripheral cable (50-pin to 50-pin) for connecting to another SCSI device.

1. Make sure that your Macintosh and all its SCSI devices are turned off.

2. The LFR comes preset to SCSI ID number 4. If that number is used by another SCSI device, change the LFR's SCSI ID number, using the DIP switches on the rear panel.

To change a DIP switch setting, push it in the direction you want it to move. It clicks into place. These are the switch settings for SCSI ID numbers 1 through 6:
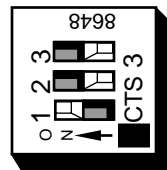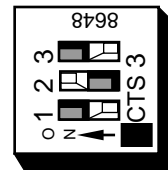
SCSI ID 1   SCSI ID 2   SCSI ID 3
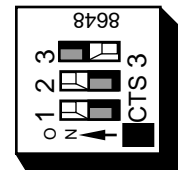
SCSI ID 4   SCSI ID 5   SCSI ID 6
(Factory Preset)
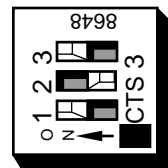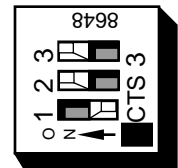
3. If necessary, add a terminator to the SCSI cable.

You need a terminator on the first and last devices in the SCSI chain. Keep in mind that some devices may have internal termination.

4. **Connect a SCSI cable to the LFR.**

   Both SCSI ports are identical. You can connect a cable to either one. Be sure to connect the spring clips to the sides of the connector.

   ☞ **CAUTION:** Do not connect the 25-pin end of a SCSI system cable to the 25-pin connector on the LFR. Doing so can damage the LFR, your Macintosh, or both.

5. **Connect the SCSI cable to your Macintosh or to another device in the SCSI chain.**

   ☐ **Directly to a Macintosh:** Connect the cable to the SCSI port on the Macintosh rear panel and tighten the screws on the cable. This requires a SCSI system cable (50-pin to 25-pin).

   The Macintosh SCSI port is identified by the symbol on the left.
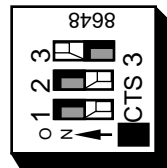
   ☐ **As the last device in the SCSI chain:** Connect the cable to an open SCSI port on the device that precedes the LFR and clip the cable in place.

   ☐ **Between two other devices in the SCSI chain:** disconnect the cable between the two devices where you want to place the LFR. Connect the LFR to one of the devices. Connect the second device to the LFR.

Now you are ready to mount the camera back.

Macintosh SCSI Symbol

To RISC Rascol

☞ **CAUTION:** Use only the 25-pin cable that came with your LFR.

1. **Make sure that the LFR and RISC Rascol are turned off.**

2. **Plug one end of the cable into the 25-pin film recorder port on the rear panel of the RISC Rascol. Tighten the screws on the cable.**

3. **Plug the other end of the cable into the 25-pin port on the rear panel of the LFR. Fasten the cable to the LFR.**

   Note that the connectors have a wide and a narrow side.

You are now ready to mount the camera back.

Mounting the Camera Back

Use the following procedure to attach the standard 35mm SMARTBACK, SmartPro 120/220, or SmartPro 4x5 to the LFR. This procedure does not apply to the Personal LFR Plus since the SMARTBACK is already permanently attached. To attach other camera backs, refer to the instructions included with them.

1. **Loosen the camera lock knob on the front of the LFR and swing the camera lock up out of the way.**

2. **Pull out the plastic dust cover.**

   Save the dust cover and use it if you ever take the camera off for an extended period of time or if you ship the LFR.

   ☞ **CAUTION:** Never put your hand inside the lens hole. There are color filters inside that are easily damaged.

3. **Remove the camera lens cap. Save it for later use.**

4. **Grasp the camera by the back with the point of the triangular mounting plate facing down.**

   Be careful not to touch the camera lens.

5. **Put the camera lens into the lens hole and slide the mounting plate into the camera mount.**

   The camera is held in place by the camera mount.

   ➠ **NOTE:** Always keep a camera mounted on the LFR. It keeps dust out of the LFR and also protects the camera lens.

6. **Swing the camera lock down and tighten the camera lock knob.**

   Always use the camera lock. It keeps the camera from being accidentally knocked from the LFR.

7. Align the camera cable with the camera socket and plug it in.

The plug only fits one way—with the alignment mark facing the floor.

Alignment Mark

Camera Socket

Camera Cable
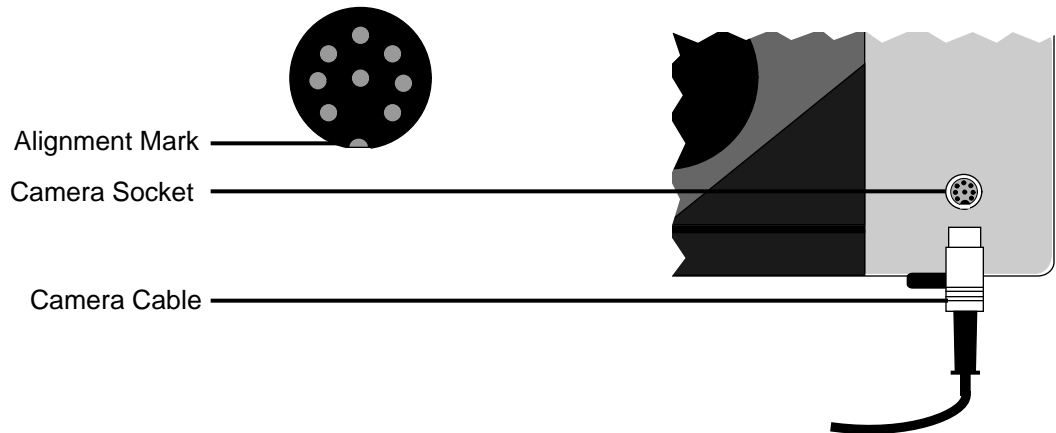
☞ **NOTE:** When unplugging the cable, pull on the body of the plug, not the cable. You may need to wiggle it a little while pulling.

Now you are ready to connect the power cord.

Connecting the Power Cord

The LFR uses a universal power supply that is designed to work with 90 to 250 VAC, 50/60 Hz.

■ **Connect the power cord to the LFR and to a grounded electrical outlet.**

➠ **NOTE:** Use the same outlet that your computer is plugged into. This prevents ground loops from occurring.

The LFR is now installed and ready to go. If you will be using the LFR as a dual-hosted unit with both a IBM PC/Compatible and a Macintosh, read the next section. Otherwise, move on to the "Using the LFR" chapter.

Installing Two Rascols

Although there are many two-Rascol configurations, the most common and the one illustrated in this manual is both a Macintosh and a PC connected to an LFR.

The LFR has a SCSI and parallel interface. This will allow you to simultaneously connect the LFR to the PC via a parallel port or RascolPort and to the Macintosh via the SCSI port.
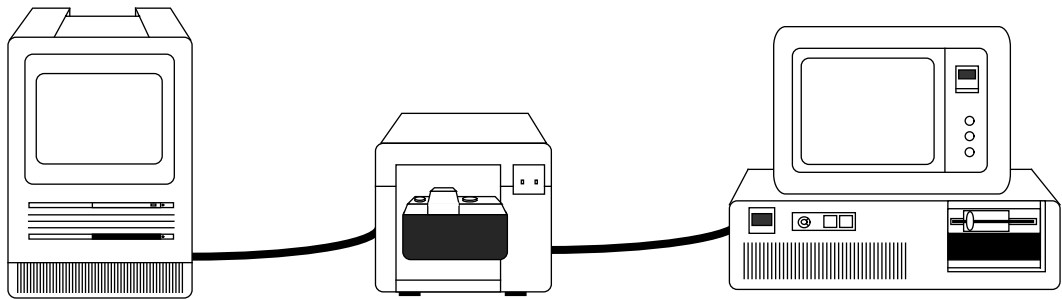
Connect to IBM PC/Compatible

Connect to the IBM PC by connecting the LFR through its 25-pin port to a parallel port or RascolPort. Refer to the previous section titled "To IBM PC/Compatibles".

Connect to Macintosh

Connect to the Macintosh by connecting the LFR through its SCSI port. Refer to appropriate sub-section in the "To a Macintosh" section for details.

The LFR can now produce slides from either of the two sources. If both try to expose an image at the same time, the LFR is allocated on a first come, first served basis.

Using the LFR

This chapter describes how to use the LFR and the cameras.

The first section, **"Starting Up the LFR,"** describes start-up procedures.

"Reading the Indicator Lights" explains how to interpret the indicator lights.

"Exposing Images" describes how the LFR functions during image exposure.

"Selecting the Right Film" provides general film selection guidelines.

"Using the Cameras" gives step-by-step instructions on loading and unloading film.

"Keeping the LFR Clean" provides tips on keeping the LFR and the cameras clean.

"Changing the Fuse" gives step-by-step instructions on replacing the LFR's fuse.

Starting Up the LFR

The LFR takes less than 15 minutes to warm up. You can leave the LFR on all the time, or start it in the morning and leave it on all day.

1. **Press the power switch on the LFR.**

   The display on the SmartBack, SmartLoader, or SmartPro will begin to display a series of status messages.

2. **Turn on the equipment connected to the LFR.**

   The LFR will begin to warm up. The SmartBack, SmartLoader, or SmartPro camera back will display the message WARMING UP. All LFR's except the Personal LFR Plus will also begin to flash the green indicator on the front panel.

3. **The LFR won't expose any images until the warming up period is finished.**

   This should not take longer than 15 minutes. You can send images to the LFR any time after it starts up. The Rascol software will wait for the LFR to complete the WARMING UP period before exposing the images. This allows you to start up your computer and the LFR, send the images, and begin to do something else.

LFR Status Displays

The status display on the SmartBack, SmartLoader, or SmartPro camera backs will show you the current condition of the camera and LFR. All LFR's except the Personal LFR Plus, also have a red and green indicator on the right front panel. These indicators will give you a quick status. Following are definitions of various combinations of indicator conditions.

Green Indicator	Red Indicator	Condition
Flashing Quickly	—	Warming up
Solid	—	Ready
Flashing Slowly	—	Exposing film
Solid	**Solid**	Error or Film out

The previous section "Starting Up the LFR" describes the warming up and ready conditions. The section "Exposing Images" describes the exposing film condition. The section "Using the Cameras" describes error conditions and what to do when the camera runs out of film.

Exposing Images

When the LFR begins exposing an image, the green indicator flashes slowly and the camera's shutter opens. Depending on the Rascol being used, it may also display a status message:

Rascol	Message
RISC Rascol	PRINT indicator lights.
MacRascol	"Exposing: *Filmtype*" appears on the MacRascol RIP status line.
WinRascol RIP	"Processing Red Pass" appears on the WinRascol RIP status line.

When the LFR finishes exposing the image, the camera shutter closes and the film advances. The green indicator stops flashing and turns solid. The LFR is ready for another image.

Selecting the Right Film

The LFR supports various film types. You can view the available film types for your LFR in the MacRascol or WinRascol software. The film types shown are actually LFC (Lasergraphics Film Correction) files installed with the Lasergraphics software. LFC files can be updated or added by installing the new files using the Rascol software. New LFC files may be supplied by Lasergraphics or generated by a Lasergraphics program called FullCircle Calibration.

Positive Film

Kodak Electronic Output Film LFC files are included with the LFR software. EOF film enhances the quality of image from the LFR. This is a good choice for positive film.

Select the film type that matches the film you will be exposing. For instance, if you were going to image slides on Kodak Electronic Output Film, then select that film in your Rascol software. If you are using an unlisted film, then use the similar film in the film list. For 100 ASA slide film from Agfa, use the Kodak Ektachrome Professional Plus 100 film type.

Negative Film

When imaging to negative film, the best LFC to use is one that is calibrated to the LFR, negative film, paper, and scanner you are using. These LFC files are generated by a program called Lasergraphics FullCircle Calibration. The program will generate custom LFC files from existing LFC files in the Rascol software. When the calibration process is complete, you will have a new film type in the Rascol software such as: *120 Vericolor,Ultra,Nikon*. This LFC calibrates your LFR, Nikon scanner, Kodak Vericolor negative film, and Ultra paper. Read the FullCircle Calibration manual for more details, or contact Lasergraphics to purchase the software.

Using the Cameras

This section explains how to load and unload film. Keep the
following points in mind when using the cameras:

■ **Never touch the lens.**

   If the lens is dirty, see the "Keeping the LFR Clean"
   section later in this chapter.

■ **Leave the camera mounted on the LFR.**

   This makes film loading easier, keeps the lens clean,
   and prevents dust from entering the LFR. If you do
   remove the camera, place the dust cover over the lens
   hole.

■ **Never unplug the camera while the LFR is exposing
   an image.**

■ **Make sure the LFR is not currently exposing an
   image and that it will not start exposing one while
   you are loading film.**

Using the 35mm SMARTBACK

The SMARTBACK is an intelligent 35mm camera designed specifically for use with the LFR series film recorders. The SMARTBACK is highly automated and includes a liquid crystal display which provides status information.

The SMARTBACK is removable for all LFR models except the Personal LFR Plus, to which it is permanently attached.

The SMARTBACK only operates while the camera is plugged into the LFR and the LFR is turned on. The SMARTBACK may be connected or disconnected at any time, except while images are being exposed or film is being loaded. The SMARTBACK will retain valid status after being disconnected or after the LFR is turned off. Film should only be loaded or unloaded while the camera is operating.

Loading Film

1. Verify that the SMARTBACK is operating and that the display indicates the NO FILM, END OF ROLL or BACK OPEN message. If film is already loaded in the camera it must be re-wound into the canister before the back is opened.

2. Push the camera release latch down to open the camera back door.

3. Place the film cartridge, top first, into the left side of the camera back.

4. Pull the film leader to the right until it lies past the film leader mark in the camera body.

5. Close the camera back door.

6. Verify that the SMARTBACK displays the LOADING FILM message and that the LED flashes green. If the status display indicates NO FILM, open the camera back door and check that the film leader was properly positioned.

7. The SMARTBACK should load the entire roll of film onto the take-up spool. After the film has been loaded, the camera should display the number of exposures on the roll. The camera is now ready to expose images.

Unloading Film

The SMARTBACK automatically rewinds the film back into the canister after the last available exposure has been completed.

After the film has been re-wound into the canister, the SMARTBACK will display the END OF ROLL message. To remove the film, push down the camera door release latch to open the camera back door, and remove the canister. A new roll of film may now be loaded.

To unload a roll of film before the end of the roll, press the rewind button and hold it down until the SMARTBACK begins to rewind the film and displays the REWINDING FILM message. **The rewind button must be held for a couple of seconds before the SMARTBACK will rewind the film.**

Loading Your Own Film

If you load your own film canisters, be sure to leave at least 9.5inches (48 sprocket holes) of film beyond the number of exposures needed.

SmartBack Display Messages

LCD MESSAGES	LED STATE	COMMENTS
LASERGRAPHICS v. 2.2 (C)1992	Off	Initial power on.
Frames Left: NN Frames Used: NN	Solid green	Ready to expose.
Rewinding Film Frames Used: NN	Quick Flashing Green	Rewinding at the end of the roll.
Loading Film	Quick Flashing Green	SmartBack is loading a new roll of film.
Exposing: NN Frames Left: NN	Slow Flashing Green	Exposing. Shutter open.
Back Open	Solid Red	Camera back is open. Close back
End of Roll Frames Used: NN Remove Film	Solid Red	Remove exposed film.
Error: Film Jam Remove Film	Quick Flashing Red	Remove film.
No Film	Quick Flashing Red	Put film in SmartBack.
Film Is Reusable	Quick Flashing Red, Slow Flashing Green	Open back. Reload film.
Please Shut Back	Slow Flashing Red, Quick Flashing Green	Shut back.
No Message		Unplug SmartBack and plug back in.

Using the 35mm SMARTLOADER

The SMARTLOADER is an intelligent 35mm, multi-film canister camera designed specifically for use with the LFR series film recorders. It allows you to shoot up to seven rolls of 35mm film without operator intervention. The SMARTLOADER is highly automated and includes a liquid crystal display which provides status information.

The operating instructions for the 35mm SMARTLOADER are contained in the separate SmartLoader Users Guide supplied with the camera back.

Using the SmartPro 120/220

The *SmartPro 120/220* is an intelligent 120/220 camera back designed specifically for use with the LFR series film recorders. The *SmartPro* is highly automated and includes a liquid crystal display which provides status information.

The *SmartPro* uses a standard Mamiya RZ67 Roll Film Holder in either the 120, 6x7 cm format or 220, 6x7 cm format. The *SmartPro* can be ordered with or without the Film Holder.

The *SmartPro* is removable. It may be used with all current LFR series film recorders except the LFR-X 95 and Personal LFR Plus.

The *SmartPro* only operates while the camera is plugged into the LFR and the LFR is turned on. It may be connected or disconnected at any time, except while images are being exposed or film is being loaded.

Loading Film

1. Verify that the *SmartPro* is operating and that the display shows the OUT OF FILM and PUSH >> TO ADV messages. If film is already loaded in the camera, it must be advanced into the take-up roll before the back is opened.

2. Open the back cover using the latches on the right side of the film holder.

3. Remove the roll assembly and load the appropriate film into the roll assembly.

4. Advance the film, using the film advance knob on the top of the roll assembly until the alignment marks on the roll of film are aligned with the arrow inside the roll assembly.

5. Place the roll assembly back into the main holder mounted to *SmartPro* and close the cover. Secure the cover using the latch on the side of the film holder.

6. The exposure counter on the film holder will display an S for start. Push the black push button near the LCD display on the *SmartPro* to advance the film to the first frame. The counter will now display a 1. If the dark slide is inserted

into the film holder, the *SmartPro* display will now show the REMOVE DARKSLIDE message.

7. To begin exposing images, remove the dark slide. The *SmartPro* will display CAMERA READY. The back will automatically advance the film after every exposure.

8. The current frame number is displayed on the film holder window on the left side.

9. To skip a frame on the roll, press the black button for a half second to a second. To wind forward to the end of the roll, press the button continuously for approximately 3 seconds. To stop the advancing to the end of the roll, hit the button again for half a second.

Unloading Film

1. When the last image is exposed on the roll, the *SmartPro* will wind the roll all the way onto the take-up spool. The film counter window will show 10 or 20 with a red flag in the same counter windows. The *SmartPro* LCD will display the messages OUT OF FILM and PRESS >> TO ADV.

2. Open the back cover using the latches on the right side of the film holder.

3. Remove the roll assembly and unload the film.

SmartPro 120/220 Display Messages

LCD MESSAGES	LED STATE	COMMENTS
LASERGRAPHICS V. 1.0 (C)1995	Solid red	Initial power on.
REMOVE DARKSLIDE	Solid red	
CAMERA READY	Solid green	Ready to expose.
EXPOSING	Slow Flashing Green	
ADVANCING FILM	Quick Flashing Green	Advancing to next frame.
ADVANCING TO END	Quick Flashing Red	Advancing to end of roll.
OUT OF FILM	Quick Flashing Red	No film or finished exposing film.
PUSH >> TO ADV	Quick Flashing Red	

Using the SmartPro 4x5

The *SmartPro 4x5* is an intelligent 4x5 camera back designed specifically for use with the LFR series film recorders. The *SmartPro* is highly automated and includes a liquid crystal display which provides camera and film recorder status information.

The *SmartPro* accepts standard 4x5 film holders.

Loading Film

1. With no film holder inserted into the *SmartPro*, verify that the *SmartPro* is operating and that the display indicates the OUT OF FILM and INSERT HOLDER messages.

2. Insert the 4x5 film holder into the *SmartPro*. A new status message will be displayed, CAMERA READY and REMOVE DARKSLIDE.

3. Remove the dark slide. The message will now be CAMERA READY.

4. You are now ready to expose your images from the Rascol software. Start the Rascol software.

5. The *SmartPro* display will now show EXPOSING.

6. The color passes will be displayed on the LCD. When the exposure is complete, the display will change to EXPOSURE DONE.

Unloading Film

1. Insert the dark slide back into the holder.

2. Remove the holder.

SmartPro 4x5 Display Messages

LCD MESSAGES	LED STATE	COMMENTS
LASERGRAPHICS V. 1.0 (C)1995	Solid Red	Initial power on.
OUT OF FILM INSERT HOLDER	Fast Flashing Red	No holder in back.
CAMERA READY	Solid Green	Ready to expose.
REMOVE DARKSLIDE PUSH >> TO CONT.	Fast Flashing Red	
EXPOSING	Slow Flashing Green	
EXPOSURE DONE REMOVE HOLDER	Fast Flashing Red	

Using the Polaroid 339 Camera

The optional Polaroid camera lets you create instant 4x3 prints on Polaroid 339 film. This camera is not available for the Personal LFR Plus.

These are the important parts of the Polaroid camera:

Film Door Tab/
Film Door
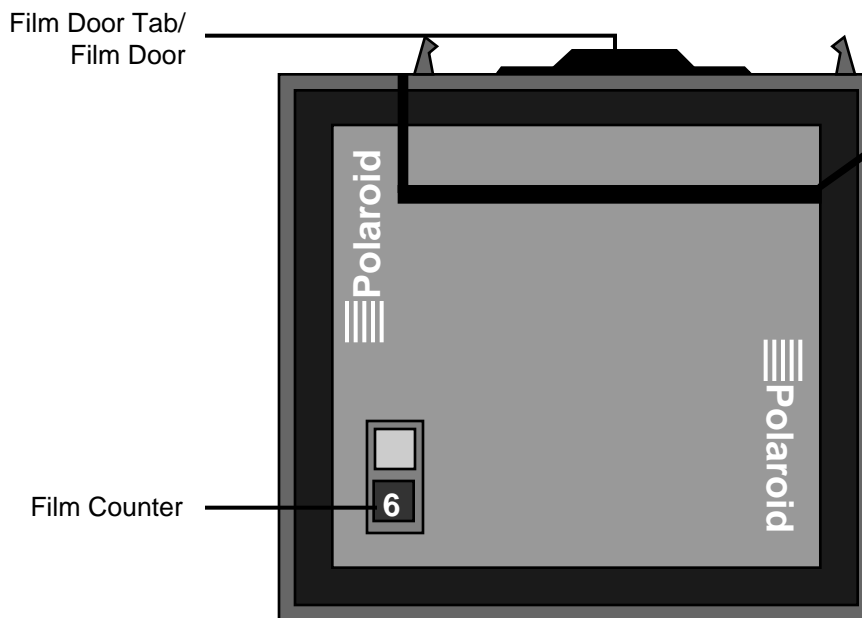
Film Counter

The **film door** is where you load film and where the camera ejects prints.

The **film door tab** is the large protrusion at the front of the film door. Use the film door tab to open the film door.

The **film counter** indicates the status of the film pack:

- ☐ Blank indicates a new film pack or that no film pack is loaded.

- ☐ A number (1−10) indicates the number of the print to be exposed next.

- ☐ A dot indicates an empty film pack.

➠ **NOTE:** Never push the green button on the camera back. Doing so causes the camera to eject a print.

Loading Film

Follow these steps to load a new film pack into the Polaroid camera back:

1. Open the film door.

To open the film door, pull back on the film door tab.

2. If the old film pack was not removed, grasp the yellow tab and pull the old film pack out.

Throw away the old film pack.

3. Insert the new film pack.

☞ **CAUTION:** Hold the film pack by the edges only and never touch the thick end. This could damage the film.

Slide the film pack into the Polaroid camera back until it clicks into place. The yellow tab on the film pack points up and the cardboard film cover faces toward the lens. The film pack fits only one way, so don't force it.

4. Close the film door.

The LFR will automatically eject the cardboard film cover before exposing the first image.

Unloading Film

You should leave the film pack in the camera until all prints have been exposed. Removing the film pack ruins at least one of the unexposed prints. If you later load a partially used film pack, the film counter and film out sensor will not work.

1. **Make sure that the LFR is not exposing an image and that it will not do so while you are unloading the film.**

   There are two possibilities:

   The Rascol indicates that the camera is out of film:

   ☐ **MacRascol/WinRascol**—The red indicator is lit and the film out message is displayed on the MacRascol RIP/WinRascol RIP status line.

   In this case, it is safe to unload the film. The Rascol controller knows that the camera is out of film and can't expose any images until more film is loaded.

   All images have not been exposed, but you want to unload the film:

   The Rascol has not detected that the camera is out of film. Stop the Rascol software by clicking the Stop button.

2. **Open the film door.**

   To open the film door, pull back on the film door tab.

3. **Grasp the yellow tab on the end of the film pack and pull the pack out.**

   Throw away the old film pack.

4. **If you are changing film packs because the camera ran out before all images were exposed, load a new pack of the same type of film.**

   See "Loading Film" earlier in this section.

5. **If the Rascol software was stopped, restart it; otherwise the Rascol software will continue imaging after the film is reloaded.**

Keeping the LFR Clean

Dust on the LFR's internal monitor, filter wheels, or camera lens can reduce output quality. To help keep your LFR producing high quality images:

■ **Keep a camera mounted on the LFR at all times.**

This prevents dust from entering the LFR through the lens hole and protects the camera lens.

■ **Keep the cabinet clean.**

Periodically wipe the cabinet with a moist cloth. Do not use spray cleaners, solvents (such as acetone or MEK), strong detergents, or abrasives.

■ **Keep the camera lens clean.**

Use a soft lens brush to remove dust and other particles. Then moisten a lens cleaning tissue with lens cleaning solution and carefully wipe the lens in a circular motion from the center out. Finally, use a fresh lens cleaning tissue to lightly buff the lens in the same manner. All of these materials can be purchased at any camera store.

■ **Keep the 35mm camera clean.**

Use a soft, dry, lint-free cloth to wipe off the exterior of the camera back. Do not clean the camera interior. If the interior becomes dirty, have it cleaned by a qualified camera technician.

■ **Keep the rollers in the Polaroid camera clean.**

There are two steel rollers inside the film door. Clean them with a soft, lint-free cloth. Be careful not to scratch the rollers.

Changing the Fuse

The fuse protects the LFR from power surges and other electrical anomalies.

1. Turn off the LFR and unplug it from the electrical outlet.

2. Pry out the fuse holder with a screwdriver.

Fuse Holder Tab
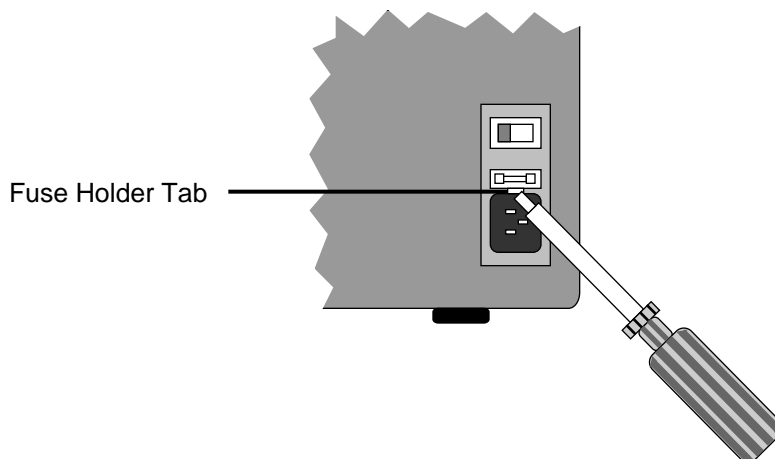
3. Check the fuse.

Generally, if the fuse is bad, the wire running down its center will be broken. Sometimes, the wire breaks at the end where you can't see it.

4. If necessary, replace the fuse.

The LFR uses a IEC 5x20 mm, 250V, 2.0 A, slow blow fuse.

5. Reinsert the fuse holder.

Appendices

"Appendix A – Compatible Computers" lists hardware that works with the LFR.

"Appendix B– Troubleshooting" describes service procedures and explains how to solve some common problems.

Appendix A –Compatible Computers

The LFR works with the following computers:

- IBM PC, PC/XT, PC/AT, PS/2 or 100% compatibles with a parallel LPT port or RascolPort, Windows, and a 386 or later CPU.
- Any SCSI capable Macintosh, including Power Mac (using MacRascol software).
- RISC Rascol - independent rasterizing co-processor.
- Sun Workstations using APUNIX software.

The LFR uses the standard SCSI interface. Documentation is available for developers who want to use the LFR in other environments via the SCSI interface. Contact the Lasergraphics Technical Support Department for more information.

Appendix B – Troubleshooting

This appendix describes some common problems and possible solutions.

If you can't find a solution in this appendix, contact the Lasergraphics Technical Support Department:

Technical Support Department (949) 753-8292

Monday through Friday
7:30 A.M. to 5:30 P.M. Pacific Standard Time.

Internet:http://www.lasergraphics.com

Service

If your LFR ever needs to be returned to the factory for service, it is important that you follow these steps:

1. **Obtain a Return Material Authorization Number (RMA#) from the Lasergraphics Technical Support Department.**

   The Technical Support Department can be reached at (949) 753-8292.

2. **Carefully pack the unit in its *original* packing materials and shipping carton.**

   ☞ **CAUTION:** Failure to pack the unit properly is likely to result in shipping damage and may void warranty coverage.

3. **Send the unit prepaid and adequately insured to:**

   Lasergraphics, Inc., Technical Support Department
   20 Ada
   Irvine, CA 92618

   Put a label on the outside of the carton stating your name, company, and the RMA#.

   ➠ **NOTE:** No returns are accepted without an RMA#.

Problems and Solutions

This section describes problems, reasons, and possible solutions.

When a problem occurs, try this simple reset procedure:

1. **Turn the LFR off.**

   Before turning the LFR back on, always wait 30 seconds or more.

2. **Wait for 30 seconds.**

3. **Turn the LFR on.**

4. **There are two indicators that show the LFR is working normally on power-up:**

   ☐ With SmartBack, SmartLoader, or SmartPro camera backs mounted, the display will show WARMING UP.

   ☐ On all LFR's except the Personal LFR Plus, the green indicator will begin to blink fast, indicating a WARMING UP condition.

You can check to see if the LFR is operating, as follows: Plug the 35mm camera into the camera socket, but don't mount the camera. Load a bad roll of film. Start exposing an image with a lot of white in it. Look through the lens hole at the filter wheel inside the LFR. You should be able to see a flickering, horizontal line behind the red filter.

If you don't see any activity, refer to the following sections, looking for the problem you have, and follow the suggested solutions.

Please note that if the LFR is turned off and then turned back on rapidly, the LFR will power up after a short delay. This is normal behavior to protect the LFR from power surges.

Film exposure problems

Your slides or prints may not have turned out as you expected. If so, locate the problem you have on the left side of the page and read the possible solutions to that problem.

Shutter does not open

- **LFR may not be turned on.**

  Make sure the LFR is plugged in and turned on. Allow the LFR to warm up for 15 minutes before exposing an image.

- **Camera cable is not connected.**

  Make sure that the camera cable is securely attached to the camera socket on the LFR's front panel.

- **Film type is set incorrectly.**

  Make sure that the film type is set correctly for the film you are using.

- **Computer cable is not connected.**

  Make sure that the cable running from the IBM/PC or Macintosh to the LFR is securely connected.

Spots appear in the same place on all your images

The CRT may be dirty. Contact Lasergraphics for service. See the "Service" section at the beginning of this appendix.

Image is too dark or too light

Make sure that the film type is set correctly for the film you are using. You can adjust the overall image exposure of your images by adjusting the brightness controls in the WinRascol or MacRascol software.

Black image (no exposure)

■ **Unsupported file type.**

If you add a file to the queue that is not a supported file format (see page three), you can get black slides.

■ **The image really is black.**

You may have sent an entirely black image to the LFR or you may have sent an image with black text on a clear background. Since the background color on the LFR defaults to black, you must change the LFR background color to white in order to see the text.

■ **Computer cable is not connected.**

Make sure that the cable running from the Rascol controller (or Macintosh) to the LFR is securely connected.

■ **Lens cap is still on the camera lens.**

Image is not centered vertically or horizontally

The image may not have been centered when generated by your graphics application. Return to your graphics application and make sure that the original image is centered. Make sure the magins are set to zero. Print a sample known to image correctly.

Distorted pictures or hundreds of horizontal bands appear in image

The LFR is located too close to some source of electromagnetic interference.
Move the LFR away from electrical devices such as computer monitors, power supplies, and motors. Even if there is no apparent interference, always keep the LFR away from electrical devices.

Smoothly shaded backgrounds show color banding

■ **Your graphics software is not generating enough color bands.**

Specify more bands of color in your graphics software and then expose the image.

■ **You are using shades in the 0 to 10% (dim) range.**

These are the most difficult to reproduce smoothly. Try omitting this range if possible. For example, image shades from 10% to 100% instead of 0% to 100%.

Random spots appear in different areas of your images

This usually results from dirt on the film or slide mount. Make sure slides and slide mounts are clean before projecting. Negatives should be cleaned before printing.

Slides are smudged or out of focus

This usually results from the film curving inside the slide mount or because of distorted slide projector lenses. Use glass slide mounts to prevent film curvature. Use a flat field projection lens in your slide projector to prevent lens distortion.

Green indicator flashes quickly

This is normal. It indicates that the LFR is warming up. The LFR will not expose any images until after it has warmed up.

The red and green indicators are flashing alternately

■ **The LFR is waiting to expose film on the older 4x5 camera back.**

This is a normal condition when using the older 4x5 format backs. You are being prompted to open the dark slide in the film holder. When you have opened the dark slide you should push the button on the back, and the LFR will begin the exposure.

Neither the red nor the green indicators is lit

The LFR may be turned off. Make sure the LFR is plugged in and turned on before exposing an image.

The red indicator glows continuously

■ **The camera is out of film.**

Reload the camera with the same type of film you were using.

■ **The camera is not connected to the LFR.**

Make sure that the camera cable is securely attached to the camera socket on the LFR's front panel.

■ **The wrong camera is mounted for the film type selected.**

Make sure that the film type is set correctly for the film and camera you are using.

The Rascol software indicates an error, but the red indicator is not lit

■ **The LFR is not connected to the PC Port.**

Make sure that the cable running between the RascolPort or parallel port in the PC is securely connected and screwed into place. See the "Connect the Cable" section in the "Installation" chapter.

■ **The SCSI ID number is incorrectly set.**

Make sure that the DIP switch on the rear panel of the LFR is set to a unique SCSI ID number. Then check that the same SCSI ID number is set in MacRascol RIP.

Polaroid camera problems

Your instant prints may not be turning out as you expected or you may be having trouble with the camera.

Repeated spots

The steel rollers inside the film door may be dirty. Clean them
with a soft, lint-free cloth. Be careful not to scratch the rollers.

Portions of the image are missing

The film pack may have been damaged. hold the film pack by the edges Only and never touch the thick end.

Two prints are ejected at once

Try exposing the image again. If the camera continues to eject two prints at a time, replace the film pack with a new one.

Wide horizontal light and dark bands appear on image

The steel rollers inside the film door may be dirty. Clean them with a soft, lint-free cloth. Be careful not to scratch the rollers.

Subtle diagonal or vertical streaks are visible on image

This is normal. It results from the action of the print being ejected from the film pack.

Error message on SmartBack

Some error conditions can be caused by data being corrupted before it gets to the film recorder. Be sure the 25 pin cable is screwed into the LFR and the PC. Try running Windows with generic display drivers. Do not use cables over six feet in length. For more suggestions, contact Lasergraphics Technical Support.

RASCOL controller problems

See the "Troubleshooting" sections in the WinRascol RIP or MacRascol User Guides.

Glossary

camera back   A camera that attaches to the LFR.

cathode-ray tube   An electronic device, similar to a television picture tube, that displays images on a phosphor-coated screen.

CRT cathode-ray tube.

HP-GL   Hewlett-Packard Graphics Language.

Lasergraphics Language   A sophisticated graphic description language used to drive various output devices.

LFR   Lasergraphics Film Recorder.

LL   Lasergraphics Language.

pixel   Short for *picture element.* A single dot on a graphics screen.

raster   A rectangular group of dots that make up an image.

rasterize   To transform a computer image into an image made up of a rectangular group of dots ready to be output on a raster imaging device.

resolution   The number of dots across an image.

RISC Rascol   A high performance independent co-processor that relieves your computer from the compute intensive task of rasterization.

SCSI   Small Computer System Interface. An industry standard interface for connecting peripheral devices to small computers.

SCSI bus   The cables that link together the devices in a SCSI chain.

SCSI ID number   An unique number that identifies a device on the SCSI bus.

SCSI peripheral cable   A cable with 50-pin connectors at each end. Used to connect two SCSI devices together.

SCSI system cable   A cable with a 25-pin connector at one end and a 50-pin connector at the other end. Used to connect a SCSI device directly to the Macintosh SCSI port.

SCSI terminator   A small device that attaches between a SCSI cable and a SCSI device. Terminators are used at the beginning and end of the SCSI bus.

SMARTBACK   Standard 35mm camera back shipped with an LFR as of January 1991.

terminator   See **SCSI terminator.**

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