



Leica DFC Cameras

Quick Start Guide

Leica DFC Cameras Quick Start Guide

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Leica
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Contents

Contents	1
Symbols	2
Safety concept	3
Introduction	6
Computer and Camera Requirements and Conditions	7
Overview of Leica DFC Cameras and components	8
Overview of Hardware and Software Installation	10
Installing Leica DFC Twain Software	11
Installation of Leica Camera Hardware	13
Setting up DFCTwain to view and acquire images	32
Hints and tips	37
Troubleshooting	38
Service	40

Symbols



Warning

This symbol denotes information that must be read and observed. Failure to do so may lead to malfunction of, or damage to the equipment.



User information

This symbol denotes additional information or explanation.

▶ **Action**

This symbol within the text indicates that certain actions must be carried out.

Safety concept

Intended use

Leica DFC Cameras can be attached to stereomicroscopes, surgical microscopes, macroscopes and classical microscopes in order to view the images obtained on computer monitors. The images can subsequently be processed, recorded and archived.

Use with surgical microscopes

The Leica DFC Cameras have not been tested for compliance with IEC 601-1-1, FDA and FDI (USA), or with medical products regulations. They may therefore only be used in areas of surgical microscopy where the regulations stated above do not apply.

Use contrary to intended use

The use of Leica DFC Cameras in a manner other than that described in this user manual could result in personal injury and damage to property. Only use the plugs and cables provided. Do not attempt to disassemble Leica DFC Cameras.

Maintenance

Only Leica-trained service technicians may carry out maintenance.
Only original Leica replacement parts may be used.

Power Cables

Inspect cables regularly for damage. Defective cables may endanger personnel directly or make the camera and accessories electrically live, thereby endangering personnel.

Cable Routing

Route cables with care, so that users do not become entangled, causing damage to the camera, damage to other equipment or cause personal injury.

Liquids

Handle liquids with care to avoid spillage on any equipment. It may cause damage to the equipment and make the camera and accessories electrically live, thereby endangering personnel.

Installation in third-party products

When installing Leica products into third-party products, note the following:

The manufacturer of the complete system or its dealer is responsible for following all applicable safety instructions, laws and guidelines.

Disposal – The product must be disposed of in accordance with locally applicable laws and regulations.

Legal requirements - Adhere to general and local regulations relating to accident prevention and environmental protection.

Legal regulations

Observe the valid legal and country-specific regulations relating to accident prevention and environmental protection.

Additional note

This user manual is also available on the Leica DFC Camera CD supplied with your Digital Camera system. Visit our website regularly:

<http://www.leica-microsystems.com>

There you will find the very latest software drivers and additional information along with the most recent user manual and FAQs.



EC declaration of conformity

Leica DFC Cameras and their accessories are produced with state-of-the-art technology and are supplied with an EC declaration of conformity.

FCC Compliance Note (for IC 3D and IC D only)

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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Introduction

Notes for the user

Before fitting a Leica DFC Camera and putting it into operation, pay attention to the following points:

- ▶ Read this user manual and follow the directions for safety and care.
- ▶ Read the user manual for your stereomicroscope, surgical microscope, macroscope or optical microscope, and observe the notes on safety and care.
- ▶ Ensure that the Leica DFC Camera is used only by persons authorized to do so.
- ▶ Ensure that the Leica DFC Camera user manual is always available.
- ▶ Check regularly that the users are complying with safety requirements
- ▶ If a fault that could cause personal injury develops in the product, inform your local Leica agency or Leica Microsystems (Switzerland) Ltd, Cambridge, UK.
- ▶ Ensure that no electrical connections come loose during use.



Illustrations, descriptions and technical data are not binding and may be changed without notice. You will find the latest release of this user manual and other information on our home page:

www.leica-microsystems.com

Computer and Camera Requirements and Conditions

Processor	Pentium class, 3 GHz or higher
Operating System	Windows XP or, Windows 2000 + Service Pack 4.
FireWire Connections	1394a (400Mb/s) OHCI compliant FireWire port, or available space to insert a FireWire card in a desktop or laptop
Graphic adapter	Min: 128mb graphic memory
Graphic mode	Best performance with 32bit true color
Main Memory	1 Gb RAM or higher recommended
Media	CD-ROM drive and a hard disk to install the Leica DFC Camera software.
Monitor	Min: 19 inch, Resolution: 1280x1024
Storage + transport temperature	-20°C - +55°C
Operation temperature	+10°C - +40°C. For long time integration best signal to noise ratio is achieved with operating temperatures lower than +25°C.
Humidity	Below 80%



Please see the section regarding FireWire connections in [Installation of Leica Camera Hardware/Connections on the Computer](#)



Windows 9x, ME and Windows NT are not supported

Overview of Leica DFC Cameras and components

Cameras

This user manual refers to Leica DFC Cameras DFC280, DFC290, DFC320, DFC300 FX, DFC340 FX, DFC350 FX, DFC420, DFC420 C, DFC480, DFC490, DFC500, IC 3D and IC D cameras

Leica DFC cameras are supplied with a 6pin – 6pin FireWire cable, software and manual on CD



Earlier models of camera using a PCI Hotlink board are no longer supported on the Leica DFC Camera CD.

Camera Heads



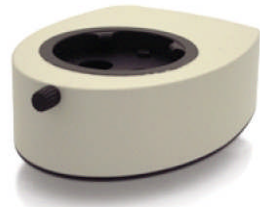
DFC280, DFC290, DFC320, DFC420



DFC300/340/350 FX, DFC420 C,
DFC480, DFC490



DFC500



IC D, IC 3D

Laptop Power Kits

FireWire Camera Laptop Power kits are available as optional extras for users with laptops and PCs that require an external source to power the cameras.

Please follow the instructions contained within the kit.

Overview of Hardware and Software Installation

1. Check for FireWire port or available space to add a FireWire card in your desktop or laptop computer.
2. If necessary, install FireWire PCI card in a PC or a PCMCIA card in a laptop.
3. If you have a Leica DFC camera already connected to your computer, you will be asked to disconnect it before software installation.
4. Install DFC Twain from the Leica DFC Camera CD.
5. If using with a microscope, fit your Leica DFC camera to it with the appropriate C-mount.
6. Connect (or reconnect) the camera to your computer with the appropriate FireWire cables provided.
7. Windows® will detect the camera and install the driver for it and each Leica DFC camera connected for the first time.
8. After the driver has been successfully installed the camera should be ready to use.

Instructions for installing the FireWire card and cables and fitting microscope mounts follow below.

Installing Leica DFC Twain Software

Introduction Leica DFC Twain software is a program for controlling Leica DFC Cameras. Leica DFC Twain software is unable to run on its own. It forms the interface between host application software and the camera, and enables you to set the camera parameters. Host application programs such as Leica Application Suite, Leica IM, Leica QWin, Imaging ®, Photoshop ®, PaintShopPro ® etc., use Leica DFC Twain software to view and capture digital images.

More detailed information on using DFC Twain is available in the Leica DFC Acquisition manual. This and other manuals can be found on the Leica DFC Camera CD, and are also installed in the Leica Microsystems/DFCTwain folder in Program Files.



Before installing any software, please ensure that your computer meets the minimum system requirements for [Leica DFC Cameras \(see Requirements & Conditions\)](#). Install service packs to update your operating system, add memory, and, if necessary, clean up your hard drive. Install the software and hardware only on a stable and well organized computer system. To prevent any data loss, always make backup copies of all your important data before you start installing.



Before you can use any DFC cameras, check that the camera is connected properly to a FireWire port on your computer.



If you have other FireWire peripherals connected to your computer. These may reduce the performance of Leica DFC Cameras. It is recommended that you do not use these peripherals at the same time as using Leica DFC Cameras.



For Windows 2000 and Windows XP, you are required to have Administrative or Power-User privileges to be able to install this software. If in doubt consult your System Administrator.

**Installing Leica DFC
Twain Software**

Insert the Leica DFC Camera CD into the CD-drive.

If the CD does not run automatically, open the CD using Windows Explorer and double-click on "Autorun.exe".

You can explore the CD to view any user manuals and camera brochures.

Installation of Leica Camera Hardware

Leica DFC Cameras

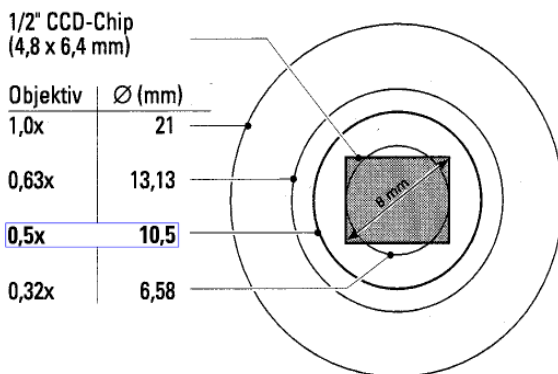
Fitting the camera to the microscope

Use a suitable video objective Leica DFC Cameras can be fitted to any microscope with a C-mount interface and a video lens.

Leica DFC280, DFC290, DFC320, DFC420 & DFC340 FX

These Leica DFC cameras can be used with a 0.5x video lens, but a 0.63x video lens is preferred.

The image areas obtained with the 0.32x, 0.5x, 0.63x and 1.0x video lenses are illustrated below:



Leica DFC300/350 FX, DFC 480, DFC490 & DFC500

These Leica DFC cameras are normally used with a 0.63x video lens. If vignetting or color variation occurs, then use the 1.0x video lens.

Fitting in surgical microscopes

Please read the safety notes in the surgical microscope manual.

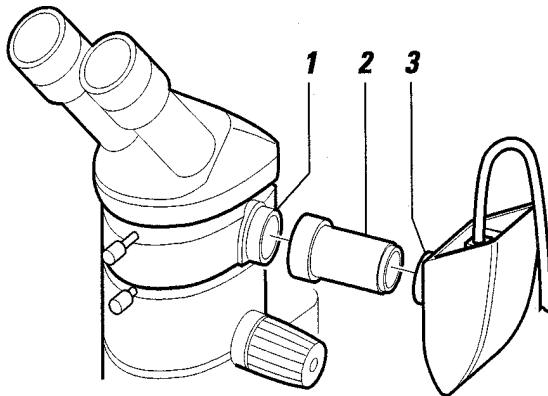


Leica DFC Cameras may only be used in conjunction with surgical microscopes in applications where neither the IEC 601-1-1 (FDA and FDI (USA) standards), nor the medical product regulations, are mandatory.

For assembly instructions please refer to the user manual for your surgical microscopes.

Fitting to stereomicroscopes

- ▶ Using the C-mount, attach the video objective (2) to the Leica DFC Camera (3).
- ▶ Screw the video objective (2), with the Leica DFC Camera attached (3), to the photo device (1).

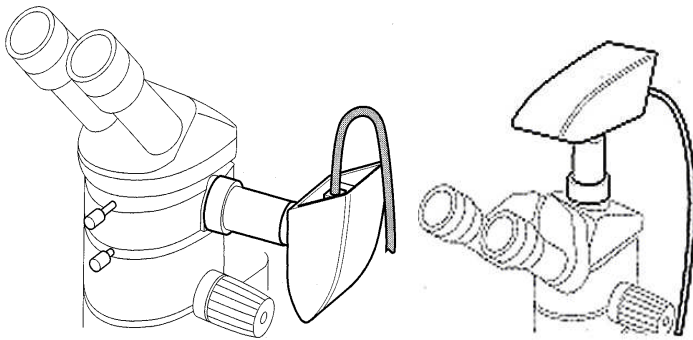


Positioning the Leica DFC Camera

To view the image upright and the right way round on the monitor, you must first position the Leica DFC Camera correctly.

The Leica DFC Camera fits onto the side of the HD videotube or phototube and onto the top of all other videotubes or phototubes (HV, HU and A) and trinocular heads.

- ▶ Position the camera so that the connecting cable points upwards or backwards.

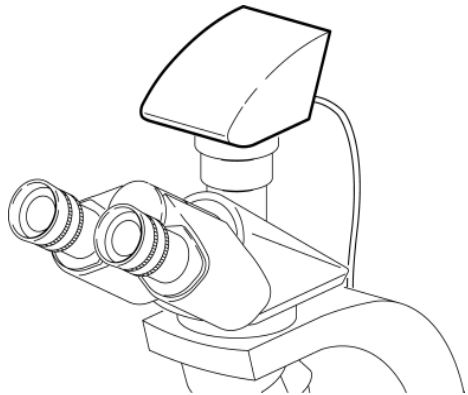


Fitting to research microscopes Leica DFC Cameras are also suitable for use with upright and inverted microscopes (Leica DM-series).

For assembly instructions and the correct choice of C-mount adapter, please refer to the user manual for your microscopes or consult your Leica adviser.

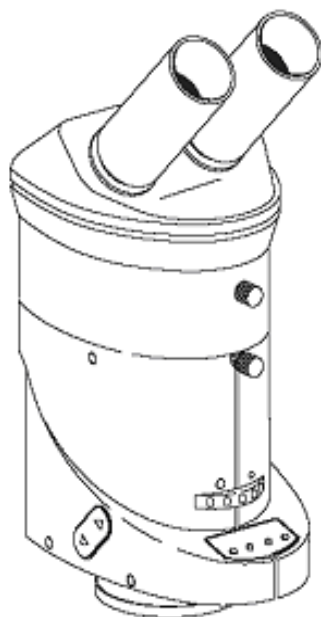
You can obtain more information about Leica DM-series microscopes on our website

www.leica-microsystems.com



Leica IC 3D and IC D Cameras

The Leica IC 3D and IC D camera can be fitted to any Stereomicroscope of the M-Series without any additional accessory.



Connections on the computer



Windows 95/98/ME and Windows NT
These operating systems are not supported. Please update to Windows 2000 or Windows XP.



FireWire compatibility

The minimum requirement for Leica DFC Cameras to work correctly on your computer is that the computer must have a “**1394a**” OHCI-compliant FireWire controller (port).

It must be 1394a and not just 1394 standard.

Windows does not display a difference between the two standards in Hardware Device Manager.

If in doubt contact your Leica dealer or Leica Support.

Your camera may not display a live image otherwise.

- ▶ If you have an onboard FireWire port or FireWire PCI card in your computer, the connections should look like this:

6 pin



or

4 pin



If you do not have a FireWire port on your computer you can install a PCI FireWire card in a vacant PCI slot in your desktop computer,



or a PCMCIA FireWire adapter in a laptop.



► Installing PCI FireWire cards in a desktop computer



Before installing the PCI card, follow all relevant instructions provided by your computer manufacturer.



The computer must be switched off and the power cord unplugged before and while you are installing the PCI card.



The electronic circuits on the PCI card and the circuits of your computer are sensitive to static electricity and surges.

Take the following precautions:

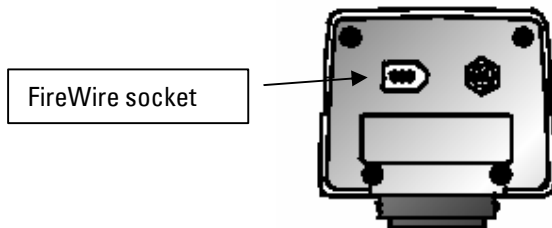
- ▶ Switch off your computer and all peripheral equipment (including the monitor).
- ▶ Pull out the power cord.
- ▶ Open the computer case in accordance with the instructions provided by the manufacturer.
- ▶ Discharge static electricity from your body by touching an earthed metal object before installing the PCI card.
- ▶ Avoid touching the components, conductor paths and contact pins.
- ▶ Find a suitable vacant PCI slot and remove the slot cover if still attached.
- ▶ Carefully insert the PCI card into the slot.
- ▶ Ensure that the card is correctly inserted, that all pins on the card have made contact and that the PCI card does not touch any other card.
- ▶ Secure the PCI card to the computer with a screw or retaining bracket.
- ▶ Close the computer case in accordance with the instructions provided by the manufacturer.
- ▶ Reconnect the power cord.

Connecting Leica DFC Cameras to the computer



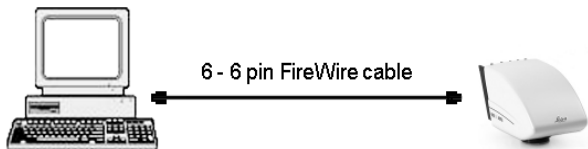
If you are connecting a Leica DFC camera for the first time on your computer make sure you install the software **before** connecting the camera to the computer.

The FireWire connector at the back of the camera



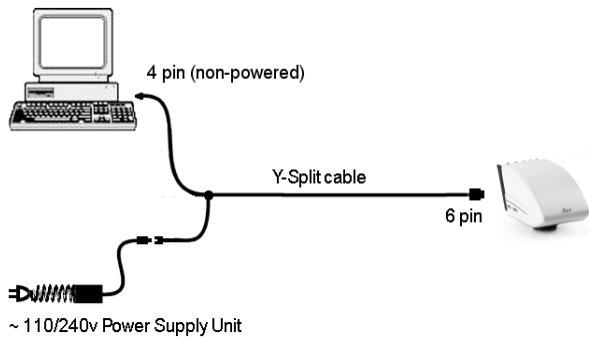
6-pin FireWire port

- ▶ If you have a 6-pin FireWire port on your computer use the standard 6pin – 6pin FireWire cable provided. Connect one end to the camera and the other to any available FireWire port. (The cable end plugs are identical.)



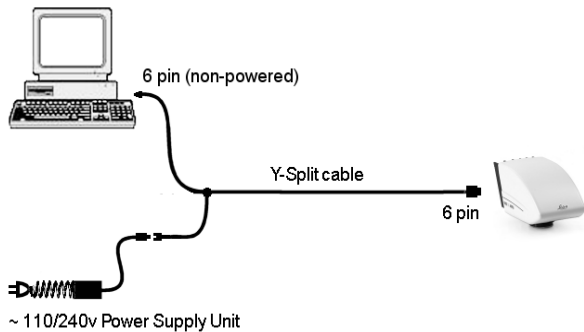
**4-pin FireWire port (eg. I-link)
(requires the optional FireWire Camera Laptop Power Kit)**

- ▶ If you have a 4-pin FireWire port on your computer your camera will not receive any power from the computer to power the camera. In this case, use the Y-Split cable and the mains Power Supply Unit provided.
- ▶ Connect the 6-pin plug of the Y-Split cable to the camera and the 4-pin plug (with trailing power jack) to the computer.
- ▶ Connect the DC output plug of the Power Supply Unit to the DC input socket of the Y-Split cable, and connect to the mains electricity supply via the plug provided.



6-pin non- or low- powered FireWire port (requires the optional FireWire Camera Laptop Power Kit)

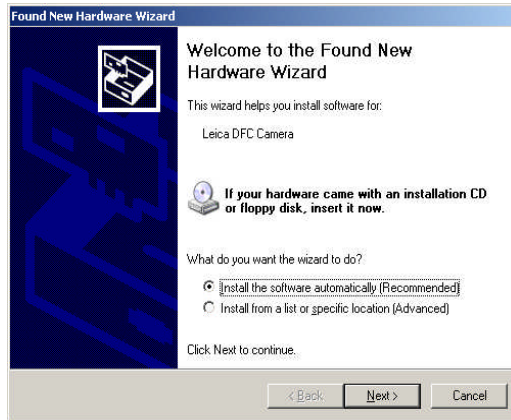
- ▶ If you have a non-powered 6-pin FireWire port on your computer or not enough power (approx 8 watts is required), you must use the 6pin - 6pin Y-Split cable and mains Power Supply Unit as described below.
- ▶ Connect the 6-pin plug (with trailing power jack) of the Y-Split cable to the 6-pin socket of the computer.
- ▶ Connect the other 6-pin plug (free end) of the Y-Split cable to the camera. Do not connect this plug to your computer!
- ▶ Connect the DC output plug of the Power Supply Unit to the DC input socket of the Y-Split cable, and connect to the mains electricity supply via the plug provided.



Only connect the 6-pin plug with trailing power jack of the Y-Split cable to your computer. Connecting the free 6-pin end (ie the end that will now contain additional power) to your computer may cause permanent damage to your computer.

DFC280 – DFC490 IC D IC 3D: After connecting a Leica DFC or IC camera for the first time, the operating system will detect the new hardware.

Windows XP Select to install the software automatically and click “Next”.



This will automatically install the new drivers. Click “Finish” at the end.

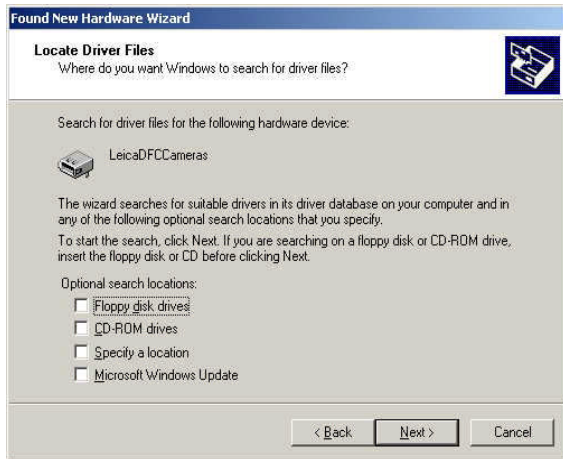
Windows 2000 Click “Next” to continue with the Found New Hardware Wizard. It will search for the Leica DFC camera drivers.



- ▶ Select “Search for a suitable driver...” and click “Next” to continue with the wizard.

The Found New Hardware Wizard displays a search dialog box in which you can enter the location of the new driver.

For normal installation do not select any of the checkboxes.

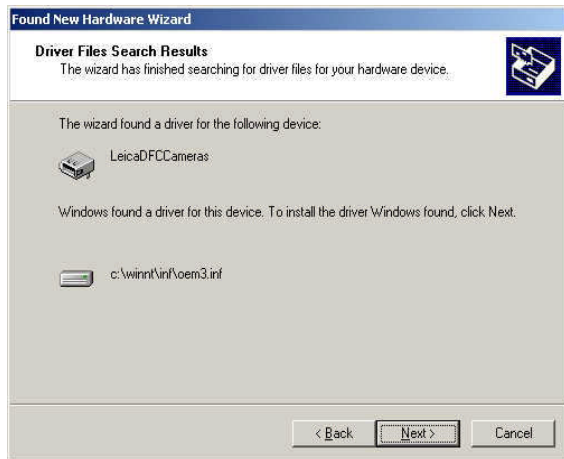


However to install manually, the location of the camera driver will be on the root of the Leica DFC Camera CD. Select the “CD-Rom drives” checkbox.

If the CD is not available, the driver can also be found in “\Program Files\ Leica Microsystems\DFCTwain” - select “Specify a location”.

Click “Next”.

A confirmation informs you that the correct driver was found.



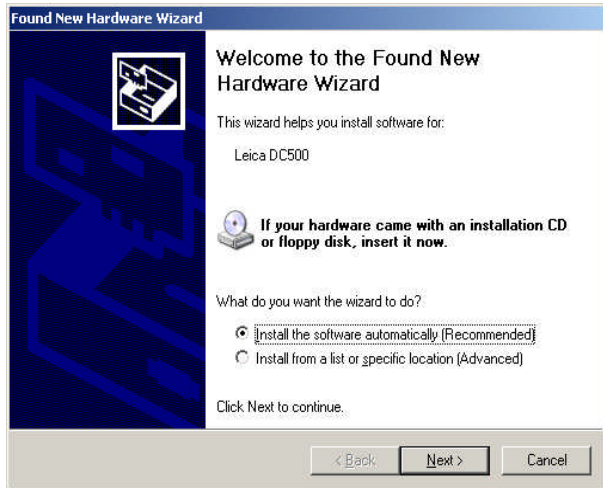
Click "Next".



At the end of a successful installation, click "Finish".
The camera is now available for use.

DFC500: The operating system will detect new hardware.

Windows XP



Select to install the software automatically and click “Next”.

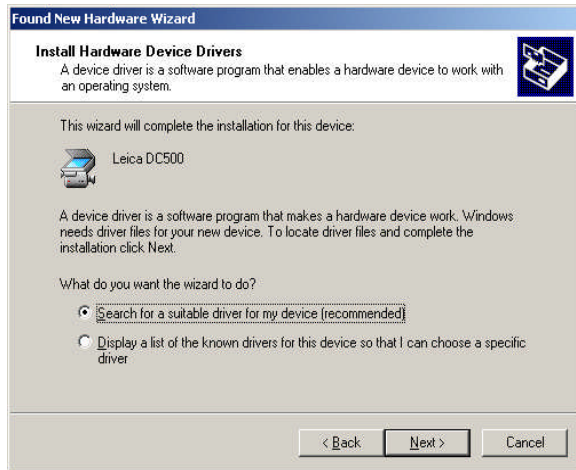
During installation you may get a question about a digital signature for the software. (This is the case when any driver it is not verified explicitly by Microsoft.) Click “Continue Anyway”.



This will automatically install the new drivers.

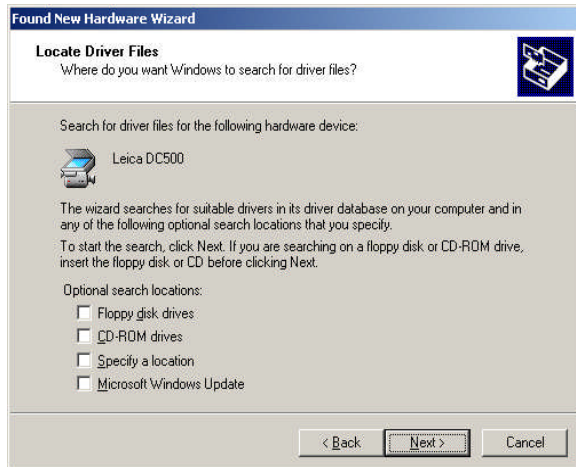
Click “Finish” at the end.

Windows 2000 Click "Next" to continue with the Found New Hardware Wizard. It will search for the Leica DFC500 drivers.



► Select "Search for a suitable driver..." and click "Next" to continue.

The Found New Hardware Wizard displays a search dialog box in which you can enter the location of the new driver.



For normal installation do not select any of the checkboxes.

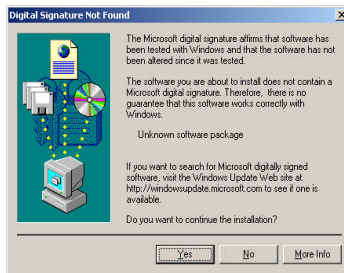
However to install manually, the location of the camera driver will be on the root of the Leica DFC Camera CD. Select the “CD-Rom drives” checkbox.

If the CD is not available, the driver can also be found in “\Program Files\ Leica Microsystems\DFCTwain” - select “Specify a location”.

Click “Next”.

During installation you may get a question about a digital signature for the software. (This is the case when any driver it is not verified explicitly by Microsoft.)

Click “Yes” to continue.



A confirmation informs you that the correct driver was found.



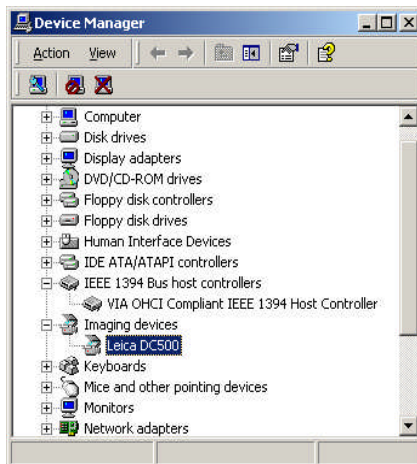
Click “Next”. The driver will now be installed.



At the end of the driver installation, a confirmation informs you that installation was successful.

The DFC500 is now ready for use.

The camera appears in the Hardware Device Manager under Imaging Devices as a Leica DFC500.



Uninstalling Leica Camera Software

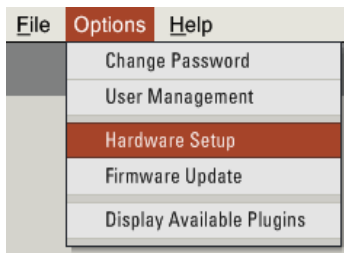
There are two ways to uninstall the software:

1. Start>>Programs>>Leica DFCTwain,
and select "Uninstall",
2. Start>>Settings>>Control Panel>>Add or Remove
Programs,
and select "Leica DFCTwain.." and Remove,

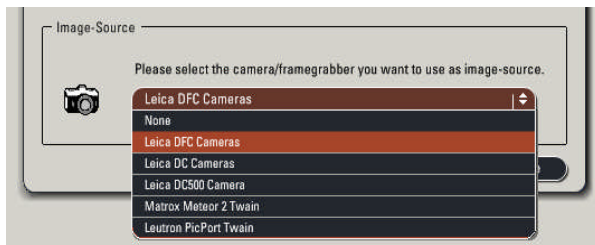
Setting up DFCTwain to view and acquire images

Using Leica Applications: Leica applications should automatically detect your camera. If not follow these next steps:

In Leica Application Suite (LAS), select "Options>>Hardware Setup".



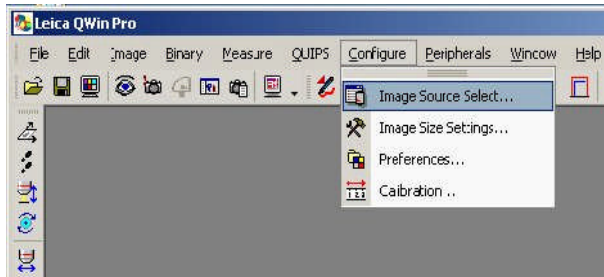
Select Leica DFC Cameras or Leica DFC500 Cameras,



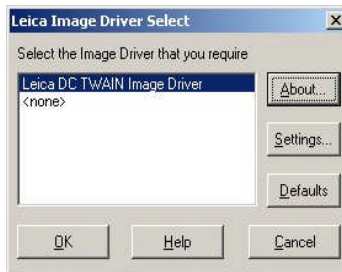
and then start LAS.

The live image will show directly in LAS.

In Leica QWin or IM,
select “Configure>>Image Source Select”



Select “Leica DC TWAIN Image Driver”
and click “Settings”.

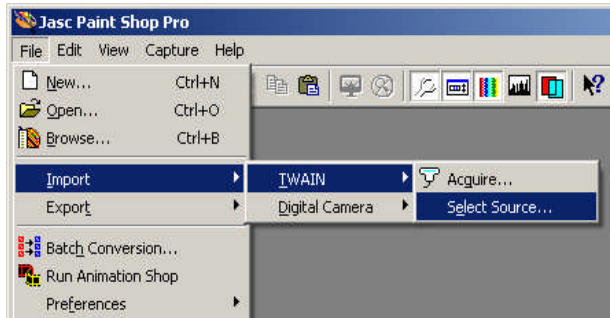


Select the “Leica DFC280...DFC490” or “Leica DFC500”
source and click OK

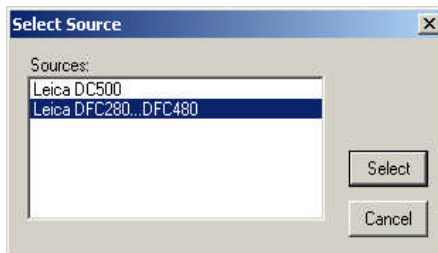
The live image should then appear on your screen.

Using third-party Applications: Open your image editor and select an image source, eg. “File>>Import>>Twain>>Select Source”.

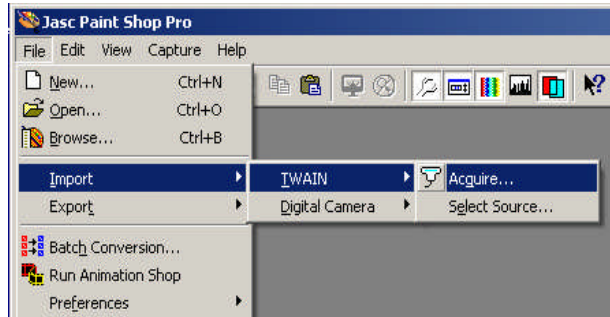
(Image sources are sometimes identified as “Scanner”, and menu items will be different depending in your image editor.)



There may be other camera or image sources available. Select the “Leica DFC280...DFC490” or “Leica DFC500” source and click OK.

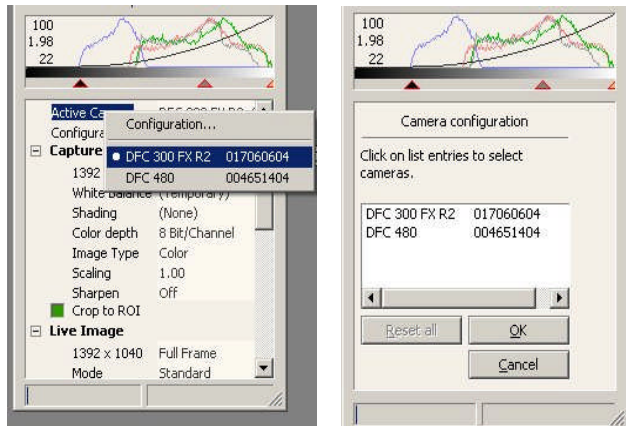


Open the image source in your image editor, eg by selecting “File>>Import>>Twain>>Acquire”.



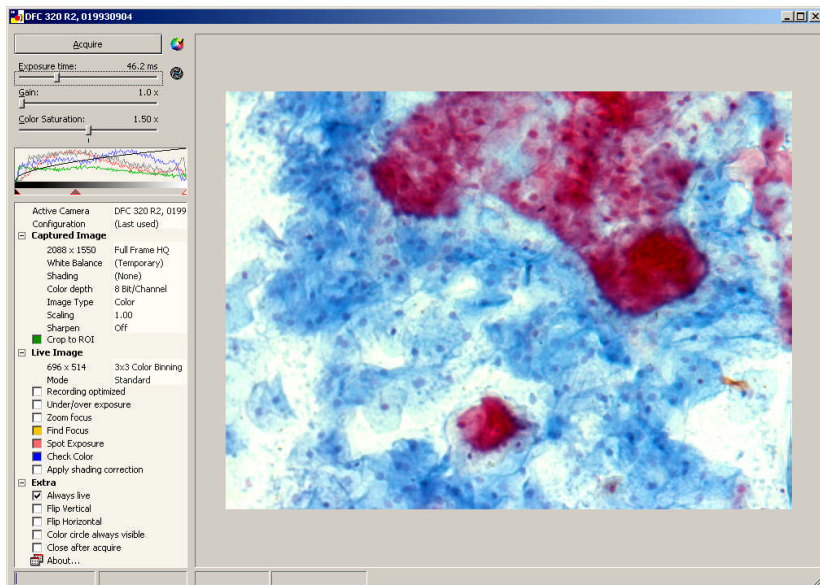
Normally your camera will automatically display a live image of the currently active camera.

If you have more than one camera connected, select either “Active Camera” and choose one from the list, or select “Configuration” and then choose a camera and click “OK”.



The live image should then appear.

DFCTwain User Interface: The picture below shows the user interface of the Leica DFC Twain software:



For instructions on how to use this software, please refer to the "Image Acquisition" manual, which can be found on the Leica DFC Camera CD.

Hints and tips

Navigation within DFC Twain Navigate within the control panels using the "TAB" key.

Automatic Exposure As a basic setting, we recommend using the "Automatic exposure" mode, which will provide you with near optimal exposure settings. Exposure can then be optimized using the brightness control.

Best Focus The "Find Focus" tool is very useful for obtaining the correct focus. For optimum screen refresh rates, we recommend switching off the "Find Focus" tool once you have found the best focus level.

Fine adjustment of exposure and region of interest. Once exposure time, focus and image area are determined, carry out the fine adjustments in the measurement window. Optimize the image by varying the exposure time. To avoid under- or over-exposure, use the "under /over-exposure" tool.

Adjustment of the color First, select an appropriate "White Balance" reference from the list (if available) or define a new white balance. With a suitable white balance reference, the color will closely match the specimen. It is possible to adjust the color to your requirements using the Color Wheel. Hold down the left mouse button while dragging the square inside the Color Wheel in the required direction. You will see the result immediately in the live image.

For bright-field specimens use a Daylight Filter (DLF) in the light path.

Troubleshooting

The live image window is completely gray ▶ Check that your FireWire controller is not only OHCI compliant but is also to 1394a (400Mb/s) standard.

- ▶ Check that you have selected a camera. If “No Camera” is displayed, select a connected camera using the right mouse button.

The live image window is black ▶ Check that any cables are correctly connected.

- ▶ Ensure that the port to which the cable is connected and the port you have selected in the camera configuration match.

- ▶ Check the light conditions and the microscope settings. Ensure that light reaches the camera.
- ▶ Inspect the shutter settings, if necessary increase exposure time.

Image is too dark ▶ Check the exposure time, if necessary increase the exposure time.

- ▶ Check the microscope settings.
- ▶ Check the lighting settings.

Image is not in focus ▶ Check the microscope settings; follow the instructions in the microscope operating manual.

- ▶ For optimized live image focus adjustment, activate the "Find focus" tool.

Poor image quality – bad color ▶ Check the microscope settings.

- ▶ Check the exposure settings to avoid under-exposure or over-exposure.

- ▶ Check the histogram settings. The histogram should spread across the middle of the field. Ensure that the black/white points do not restrict the histogram.
- ▶ Repeat the white balance procedure.
- ▶ Reset the white balance to start from the defined factory setting by selecting "Reset" from the White balance menu.
- ▶ Adjust the color settings by eye using the "Check Color" tool.

**Poor image quality
- noise**

- ▶ Check the microscope settings
- ▶ Ensure that the eyepiece fits snugly around the eye.
- ▶ Check the histogram settings. Adjust the settings so that the histogram spreads across the middle of the field. Ensure that the black/white points do not restrict the histogram.
- ▶ Adjust the illumination.
- ▶ Check the Gain setting. If you increase the Gain setting, you should expect an increase in noise. If you reduce the Gain setting, you should increase the exposure time by way of compensation.

Service

Service request If technical problems arise or you need help using your Leica DFC Camera, contact our hotline:

DI.Support@leica-microsystems.com

To answer your questions effectively, please provide as much detailed information as possible. The following information is particularly important:

- Computer: type, model, speed, memory.
- Operating System: version.
- Software: version, language.
- Screenshot of the error message.
- Description of exactly when and where the problem arises.



Mechanical, electronic and/or optical maintenance may only be carried out by Leica-trained maintenance technicians.



Only original Leica spare parts may be used.

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