



Leica QWin
Quick Start
Guide

Leica
MICROSYSTEMS

Leica QWin Quick Start Guide

This document describes the installation procedure for Leica QWin, the minimum system requirements and information relating to this release of the product. You should read this document before installing your copy of this CD.

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Chapter One: Introduction

Chapter Overview

This chapter contains the following topics:

- ◆ Introduction
- ◆ Style Reference
- ◆ Welcome
- ◆ What is Leica QWin?
- ◆ Minimum System Requirements
- ◆ Software Requirements

Introduction

This document describes the V2.6 release of Leica QWin image processing and analysis workstation. You should read this document before installing your copy of this CD.

This document is intended to guide you through the installation process, setup information and provides an overview of the program and its features.



Refer to: For further information you should refer to the Leica QWin User and Reference Manuals provided with your system.

If you have just received a new imaging workstation from Leica, the software will have been installed and configured and you should ignore the sections on Installation and Configuration, but please take the time to read through the remaining sections, and the README.HLP file on the CD-ROM.



Refer to: the Release Notes provided on the CD for the very latest product enhancements and a release history.

Style Reference

The following conventions have been used to make this manual easier to read:

Menus	FILE (bold, capitals).
Menu Commands/ Buttons/ Dialogs	Open, OK (bold).
References	<i>Chapter 1</i> (italics).
Notes, Tips, Warnings, References and Instructions	Appear as follows and contain additional information



Note: Additional information that should be noted.



Refer to: References to other relevant material.



Tip: Tips to help you use to use the program more productively.



WARNING: Important information to which you should pay careful attention.



One Step instructions: Operations that can be performed in a single step.



Step-by-step instructions: numbered instructional steps.

Information that only applies in certain situations is enclosed in boxes.

Welcome

Welcome to your new Leica Quantitative Image Analysis Workstation.

We at Leica Microsystems are sure that you will be pleased with your new system. We hope that you find the software both intuitive and easy to use.

This guide, along with the user and reference manuals, outline the standard tools you will need to carry out the routine, everyday tasks. In addition, we have included some helpful tips and hints to help you get the most out of your workstation.

However, we are sure that there will be some things that you would like to do that are not covered by this manual. If so, please let us know your requirements and, if it is possible, we will certainly point you in the right direction. If your request is not currently covered by the software functionality, letting us know will help us determine future product development.

If there is any aspect of the system that you are concerned with, please do not hesitate to let your local specialist know. Alternatively, you can e-mail us on imaging.support@leica-microsystems.com and we will do our very best to help you.

We are always keen to hear about the successes you have had using our system. If you have any publications in which you have used a Leica Imaging System we would love to hear about them.

What is Leica QWin?

Leica QWin is a modular image processing and analysis software package, with versatile architecture, designed to solve demanding quantitative analysis tasks. The modular nature of the entire system means that it may be customised exactly to meet your needs in terms of image resolution, image memory and computer power.

Leica QWin provides several classes of measurement ranging from interactive manual measurement of objects to fully automated 'hands-off' analysis.

Examples are:

- ◆ Planimetry of Length, Distance and Area
- ◆ Phase percent, Area Fraction and Volume Fraction
- ◆ Calibrated Densitometry
- ◆ Particle shape and size analysis
- ◆ Grey Profiling

Leica QWin is available in four different configurations:

- ◆ Leica QWin Lite for interactive feature measurement with image annotation, printing, documentation, storage and review.
- ◆ Leica QWin Plus for measurement of multiple image features with grey and binary image processing, image editing and automatic detection. Additional application modules including Time lapse, Mosaic, Extended focus and Multi-site images can be added to Leica QWin Plus.
- ◆ Leica QWin Standard provides automatic, multiple parameter measurements. The richness of the image processing combines with Leica QUIPS macro programming language to provide solutions for a diverse range of imaging tasks.
- ◆ Leica QWin Pro contains all of the features of Leica QWin Standard and extends the capability of the suite with more advanced facilities including, Fast Fourier Transformation with the Leica FFT module, Image visualisation and data interpretation through the Leica QFAB module, the ability to view feature data

in a gallery with relocation, the ability to edit, sort and classify individual features and a specimen map view.

To each of these versions you can add one or both of the following two options:

- ◆ Acquisition allows you to acquire a live image from a camera.
- ◆ Peripheral Control This gives you control over the microscope and the stage from within Leica QWin.

These two options are described in detail in the User Guides for the '*Image Server*' (Acquisition) and '*Peripheral Server*' (Peripheral Control).



Note: This User Guide will refer to all of the features (i.e. menu items) available, although some of these might not be included in the version of Leica QWin you have purchased.

Minimum System Requirements

It is strongly recommended that the following basic system requirements are correct before installing any Leica software.

- ◆ Microsoft Windows 2000 is required.
- ◆ This product requires approximately 200 Mbytes of disk space for a full installation and an additional free space of 500 Mbytes for efficient operation. Further space is required for data and image storage, which depends on the application and frequency of use. The free space must be checked regularly.
- ◆ At least 512 Mbytes of system RAM is installed and a processor speed of at least 1GHz.
- ◆ A monitor to display 1024 x 768 32 bits minimum.

Software Requirements



Note: A back-up device and a back-up strategy for images and data are essential. The user must ensure that regular and reliable back-up of important files is performed.

For Leica Software to function correctly the following Software is required.

- ◆ Microsoft Windows 2000 service pack 2 with Internet Explorer 5.5 or later installed.
- ◆ Leica Server software Version 2.1 or later is required to support image acquisition and peripheral hardware.
- ◆ Leica DC Camera software is required if you are to use one of these cameras.
- ◆ A dongle licensing the applications purchased to run.
- ◆ Adobe Acrobat Reader is required for Release Notes, Manuals and Help files, this can be installed from the Adobe Directory on the CD.



Chapter Two: Installation

Chapter Overview

This chapter contains the following topics:

- ◆ Introduction
- ◆ Installation Procedure

Introduction

If you have just received a new image analysis workstation from Leica, the appropriate software will have already been installed and configured. This configuration will enable the applications that you are licensed to use to operate in a fully functional manner; please do not change this configuration.

This CD along with the Leica Q550 Servers CD, contains all the software that you need to run the Leica range of imaging applications solutions. These instructions outline the actions needed to re-install the software or to upgrade an existing system.



WARNING: The installation of Leica Servers and Leica PC interface cards is a task that should only be undertaken by, or under the direct instruction of, trained Leica personnel. Installing incorrect options can cause significant problems that may be difficult to rectify.



Note: Interfering with the factory-set Server options may invalidate the warranty.



Note: You should have 'Administrator' privilege in order to install software on Windows 2000.

Installation Procedure

If you have a Software Protection Device ('Dongle'), install it in the parallel port or USB port of your PC. If you have a USB dongle, ensure that the USB dongle support is installed from the Leica Q550 Server CD, part number 723791. If you do not have a dongle, the application will run in 'Preview Mode' only, with some functions disabled.



Note: The Leica DC Twain driver must be installed if you are using a Leica DC camera (DC 100 – 350F) with Hotlink PCI4 or DC 500 with Firewire. This software should be installed from the Leica Server CD V2.2, not from the CD supplied with your camera.

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Installation procedure:

1. Before installing this CD, you must install the Leica Q550 Server CD Version 2.1 or later if you have any Leica Microscope or Image Acquisition peripherals connected to your PC. Then you must restart your PC.
2. Ensure the 'Leica QWin' CD is correctly loaded into your CD-ROM drive, and allow the 'autorun' facility on the CD to bring up the Leica Installation screen. If this screen does not appear when you insert the CD, you should run the INSTALL.EXE program on the CD by selecting the 'Start' menu 'Run...' option and typing 'D:\INSTALL.EXE' in the 'Open:' box (where 'D:' is the drive letter of your CD-ROM drive).
3. Select the software options you require. If you have an installed dongle, the software options will be automatically set to match the items defined in the dongle. If you do not have a dongle then you should select the options that you wish to preview.
 - ◆ Select Leica QWin.
 - ◆ Select Leica QGo if you have a Leica QWin Standard, Leica QWin Plus or Leica QWin Pro dongle.
 - ◆ Select Leica QGallery; this option is available to all users.
 - ◆ Select Leica QForm if you have a Leica QWin Standard or Leica QWin Pro dongle.

- ◆ Select Leica QFab if you have a Leica QWin Pro dongle.
 - ◆ Select Leica QFFT if you have a Leica QWin Pro dongle.
4. Press the 'Install Leica QWin' button to start the installation process.



Chapter Three: Using Leica QWin

Chapter Overview

This chapter contains the following topics:

- ◆ On-Line Demo
- ◆ On-Line Help
- ◆ The Leica QWin Desktop
- ◆ Menus and Toolboxes
- ◆ Using the Mouse
- ◆ Keyboard Commands
- ◆ Setting up your Equipment: Calibration and Frames
 - Calibration
 - Frames
- ◆ Opening Images
- ◆ Saving an image
- ◆ Grey Image Processing
- ◆ Binary Image Processing
 - Improving the Quality of Binary Images
- ◆ Three Basic Measurement Types
 - Measure Field
 - Measure Feature
 - Manual Measurements
- ◆ QUIPS
- ◆ Sample Applications

On-Line Demo

The On-Line Demo will give you a quick overview of the functions within Leica QWin. You can access the demonstration by clicking on Demo in the HELP menu. This will display the Leica QWin Demonstration Dialog (see below). This dialog allows you to run the demo in normal speed or in Fast Speed, to go to the next step, to continue and to quit the demo at any point:



The demo loops through a number of system functions unattended, and will repeat the sequence until stopped. To stop the demo, click on Quit, or press the Escape key (ESC) on the keyboard. The demo pauses at each stage to allow the descriptive text to be read and a 'Waiting...' bar shows you the pause time left. You can select 'Fast Speed' to reduce the length of this pause, or you can select 'Pause' which will stop the demo until you press 'Continue'. You can also press 'Step' which will take you straight to the next stage of the demo.

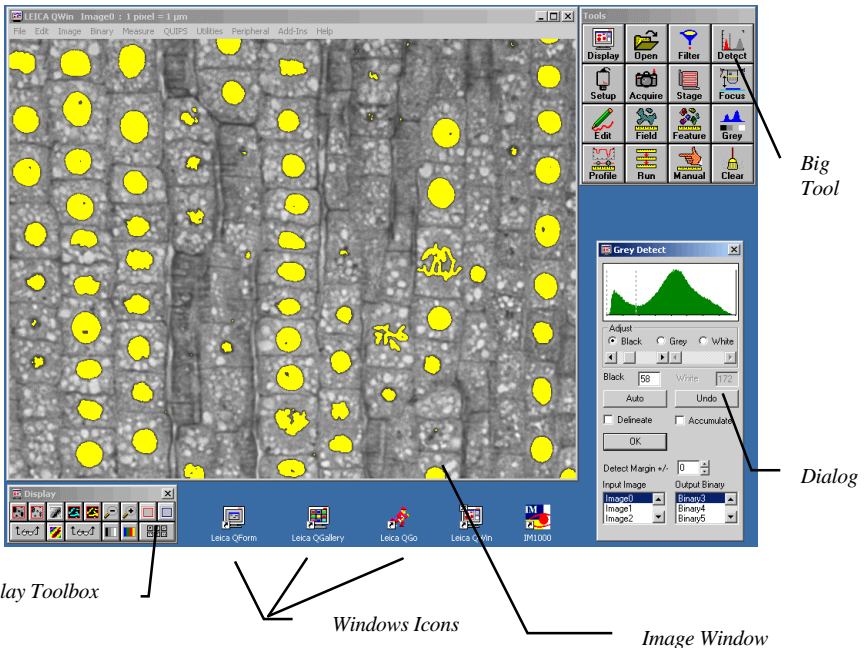
On-Line Help

There are several ways you can get help in Leica QWin:

- ◆ You can use the Standard Windows (context-sensitive) Help which is accessed from the keyboard by pressing F1 or by opening the HELP menu in Leica QWin's menu bar and clicking on the appropriate command. F1 will also give you help on a currently selected dialog.
- ◆ Alternatively, you can press the SHIFT+F1. This will change the mouse cursor to the Help Cursor. If you click with the Help Cursor on a command or button a little description will pop up to explain how to use the command. ESC will cancel the Help Cursor.
- ◆ To run the On-Line Demonstration open the HELP menu and click on Demo.

The Leica QWin Desktop

At start up, the display should be similar to the diagram shown below. You can see the drop-down menu bar at the top of the screen, with the Big Toolbox at the right.



Note: If you get a message 'QWin dongle not found...' you should check that you have fitted the 'Dongle' correctly, and that the printer, if fitted, is switched on.

Leica QWin may be operated in a number of ways, according to the needs of the user. Image analysis operations may be performed using any of the following system features:

- ◆ Pull-down menus
- ◆ Shortcut menus
- ◆ Big and Small Toolbox
- ◆ Display Toolbox

Menus and Toolboxes

You will find up to ten menus in your Leica QWin menu bar. The number of menus depends on your equipment and the options you have installed. The basic menus FILE, EDIT and HELP are similar to those in other Windows based programs:

- ◆ The FILE menu allows you to Open, Save and Print files (images) and you also can Exit the program with the Exit command in this menu.
- ◆ The EDIT menu contains the commands Copy and Paste.
- ◆ The HELP menu offers you a variety of commands to access certain topics in the On-Line Help.

The Toolrack is displayed in a fixed position and cannot be moved, but the two Toolboxes can be customised. The main option is to choose the number of columns for the buttons in the toolbox. These settings can be changed in the UTILITIES menu. The Big Toolbox defaults to 4 columns of 3 rows but this may be varied from one to six columns. The Small Toolbox defaults to two columns and this may be varied from one to eight. The default positions may also be defined.

Menus and Tools are the two methods of accessing the image analysis functions. The toolboxes and toolbars provide a quick method of using Leica QWin commands.

Using the Mouse

General Usage

In general, you move the mouse pointer to an object and click the left mouse button to make things happen. However, there are a few cases where clicking the right mouse button causes an alternative event to occur.

For example, if you click with the right mouse button on the *Image Display Area*, a shortcut menu will appear which allows you to access the menus from the menu bar. You can then use the left mouse button again to select a command. This is an alternative to clicking with the left mouse button on the menu bar, which causes the appropriate drop-down menu to appear.

With the Toolboxes

The Toolbox buttons behave differently according to whether they are clicked with the left or right mouse button. Clicking with the right mouse button brings up a dialog, which lets you set up an Image Analysis operation *interactively*. Clicking with the left mouse button causes immediate action of the same function.

Once you have set up Leica QWin to do what you want, it is easy to perform your analysis with just a few button clicks.



Big Toolbox, Toolbox and Toolrack

Keyboard Commands

You can use the keyboard to enter 'short-cut' commands directly. Most of these commands enable you to control the display of images and tools:

Key(s)	Function
CTRL+B	Toggles the display of the binary images.
CTRL+D	Toggles the display of the current Dialog box.
CTRL+F	Toggles the display of the Image and Measure Frames.
CTRL+G	Toggles the display of the grey image.
CTRL+L	Switches Tool 'Levels'. This key cycles between the Big Toolbox, the Small Toolbox and the Toolrack.
CTRL+T	Toggles the display of the Toolbox or Toolbar on and off.
SPACEBAR+Left Mouse Button	(in Binary Edit Dialog only) Toggles the display of the binary image.

The following commands enable you to save and print the Windows screen:

CTRL+SHIFT+D	Saves the current screen to disk in windows bitmap form.
CTRL+S	Saves the current screen to disk in TIFF form.
CTRL+P	Print the QWin screen to the currently selected printer.
ALT+PRINT SCREEN	Copies the currently active window to the clipboard.
CTRL+V	Copies an image from the clipboard.
CTRL+X	Copies the current image to the clipboard.

Finally, these commands provide general utilities:

F1	Gives you help on the selected menu, dialog box option, or system message.
CTRL+C	Cancel the current image processing operation.

Setting up your Equipment: Calibration and Frames

Before you can begin with the actual Image Analysis you will need to set up your system. This process will depend on your equipment:

- ◆ If you are using a Microscope and a Camera the settings should not change once you have set up your system.
- ◆ If you are using a Macro Viewer the lens settings of the camera will change according to the size of the sample you wish to analyse, therefore the calibration will have to be done every time you change the lens settings.
- ◆ If you are using Stored Images you will need a reference within the image for measurement, this means, you need to know the size of one of the features to have a reference for the calibration process.

Calibration

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Setting Calibration:

1. Select the **MEASURE** menu and click on Calibration; the **Calibration** dialog appears.
2. In the **Units** list box select the units you want to use, e.g. *microns*.
3. In the **Units** list box select the units you want to use, e.g. *microns*.
4. Select **Local** or **System**.



Note: Depending on your choice (**Local** or **System**) the dialog will appear with different options.

5. Choose all other options you wish to apply.
6. Click on the **Calibrate** button. The **Calibrate** dialog appears.
7. Choose the required settings. These settings will depend on the equipment you are using.
8. Click on **Apply** to change the settings for the calibration.
9. Click **Cancel** to close the **Calibration** sub-dialog again.
10. Click on **OK** to close the main **Calibration** dialog.

Frames

The Leica QWin Image Window contains two types of Frames: The Image Frame and the Measure Frame. By default the Image Frame will be displayed red and the Measure Frame blue. The settings (size, position and colour) for both frames can be customised.

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To change the Image Frame:

1. Select the **MEASURE** menu.
2. Click on the command **Frames**; the **Frames** dialog appears.
3. Click the radio button beside the word '**Image**' and change your settings either by using:
 - ◆ The **Standard** button which changes the size and position to the default size and position.

- ◆ The Buttons below the Standard button (**Quad1** to **Quad4** and **Centre**) to position the frame either in one of the corners or in the centre of the Image Window.
 - ◆ The text boxes which allow you to change the **X** and **Y** position of the frame or the width (**W**) and the height (**H**) of the frame.
4. Click on **OK** when you are satisfied with the size and the position of the Image Frame.



By selecting either Image or Measure you can choose the type of frame you want to modify.

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- To change the measure frame:
1. Select the **MEASURE** menu.
 2. Click on the command **Frames**; the **Frames** dialog appears.
 3. Select the radio button beside the word '**Measure**'.
 4. Then follow steps as shown above.
 5. Click on **OK**.



Tip: To adjust the size and position of either frame you can also use the mouse. Within the MEASURE menu select the frame you want to customise. Then drag the mouse on the Image Window to mark the position and size of the frame.

Opening Images

To show the different features of the program you will now need to open a file which will be used in the following parts of the tutorial.

1,2,3

To open an image:

1. Select the **FILE menu** and click on **Open**.
2. Select the main folder of the Leica QWin program (by default this will be C:\Program Files\Leica\QWin\Leica QWin).
3. Select the sub folder IMAGES.
4. Select Diamonds.tif.
5. Click on **Open**.

Or:

- ➔ Click on the **Open** button in the Toolbox to display the **Open** dialog.



Note: If you cannot see the file Diamonds.tif in the files window, click on the list box "Files of Type" and select "All Files".

Saving an image

1,2,3

To save an image:

1. Select the **FILE menu** and click on **Save**.
2. Select the drive and folder where you would like to store your image.
3. Select a file format for your image by selecting it from the **Files of Type** list box.
4. Type a file name in the Text box **File Name** or accept the one displayed in the text box, if you want to save an already existing image with the same name.
5. Click on **Save**.

Grey Image Processing

Depending on the quality of your image, you can now either improve the quality of the picture or go straight to the detection of features in your image. The higher the quality of the image, the better the result of the detection and therefore of the measurements will be.

If the quality of the image is not sufficient, you can use any of the following commands in the IMAGE menu to improve the quality:

- ◆ Image Edit
- ◆ Image Transform
- ◆ LUT Transform
- ◆ Convolute
- ◆ Grey Watersheds
- ◆ Image Utilities
- ◆ Image Arithmetic
- ◆ Colour Transforms.

Or:



Use the Edit button in the Toolbox to open the Image Edit dialog.

Binary Image Processing

As soon as you are satisfied with the quality of the image you can start to detect specific areas in it. With this process the image will be converted into a Binary Image.

1,2,3

Binary image processing:

1. Select the **IMAGE** menu.
2. Click on **Detect**; the **Grey Detect** dialog will be displayed.
3. Select features in your image in one of the three different methods:
 - ◆ Click on the **Auto** button so the program autodetects the main features of the image for you. This is only recommended if the image quality is high and the contrasts are strong.
 - ◆ Use the slider bars and the histogram to set the exact *Grey Level* for those features of the image you want to analyse. Whilst you drag the sliders the detected areas will be highlighted in colour in the Image Window.
 - ◆ Click in the Image Window on the feature you want to be detected. The exact *Grey Level* is then shown in the **Grey Detect** dialog.



Note: Right-clicking once on the image in the Image Window will **undo** the last detection command, Right-clicking twice will **reset** the thresholds.

Or:

- ➔ Right-click on the **Detect** button in the Toolbox to bring up the **Grey Detect** dialog.



Improving the Quality of Binary Images

In the **BINARY** menu you will find seven commands to improve the quality of your *Binary Image*. We suggest that you try out all commands to see the effect they have.

Or:

- ➔ Click on the **Edit** button in the Toolbox instead of selecting the command **Binary Edit** from the **BINARY** menu.



Three Basic Measurement Types

The measurement type you use will always depend on your sample and the detection of the sample (refer to the previous topic for information about detection).

Measure Field

Open the file *Pyrite20.tif*. You will find the file in the sub-folder **IMAGES** in the main folder of the program. Detect the features you want to measure and then follow the steps below.

1 2 3

To measure field:

1. Select the **MEASURE** menu.
2. Click on the command **Measure Field**. The **Measure Field** dialog appears.
3. Click on the **Parameters** button to select the parameters for your measurement.
4. Click on **OK** to apply your selections and return to the **Measure Field** dialog.
5. Click on the **Measure** button to start the measure process. The **Field Results** dialog will appear at the bottom of your desktop.

Or:

- ➔ Click on the **Field** button in the Toolbox to display the **Measure Field** dialog.





Note: Depending on the detection the area being measured will vary. Therefore, the more precise your detection is the more precise the measurement will be.

Measure Feature

Open the file Diamonds.tif. You will find the file in the sub-folder IMAGES in the main folder of the program. Detect the features you want to measure and then follow the steps below.

1 2 3

To measure features:

1. Select the **MEASURE** menu.
2. Click on the command **Measure Feature**. The **Measure Feature** dialog appears.
3. Click on the **Parameters** button to select the parameters for your measurement.
4. Click on **OK** to apply your selections and return to the **Measure Feature** dialog.
5. Click on the **Measure** button to start the measure process. The **Feature Results** dialog will appear at the bottom of your desktop.

Or:



Click on the **Feature** button in the Toolbox to display the **Measure Feature** dialog.



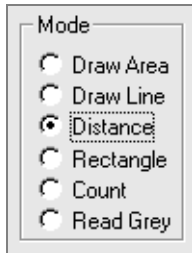
Note: To make the identification of the detected features easier, you can click on the **Label** button to give each feature its own label. The button to the right of the **Label** button tells you how the features are labelled. You can click on the button and change the **Parameters** for the labels.

Manual Measurements

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Manual measurements:

1. Select the **MEASURE** menu.
2. Click on the command **Interactive**; the **Interactive Measurements** dialog appears.
3. Click on one of the radio buttons in the group box **Mode** to select the mode for your measurements.



4. Click on the **Params** button to select the parameters for your measurement.
5. Depending on the **Mode** you select you can then click on the features you want to analyse to **Count** them or drag the mouse from one feature to another feature to measure the **Distance** between the two features. Whilst you click and drag the mouse in the Image Window the measurements in the **Interactive Measurements** change according to the movements of the mouse.
6. Click on the **Measure** button to display the results; the **Manual Results** dialog appears.

Or:

- ➔ Click on the **Manual** button in the Toolbox to display the **Interactive Measurements** dialog.



Tip: To remove all open dialogs from your desktop click on the **Clear** button in the Toolbox.

QUIPS

QUIPS will help you to record routines so you can use them again with similar specimen. To get you started with QUIPS the following steps will show you how to open a routine, how to record a routine whilst you are performing the operations and how to view the results of this routine.



Note: QUIPS is only available in Leica QWin Standard and Leica QWin Pro.

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To open a routine:

1. Select the QUIPS menu in Leica QWin.
2. Click on **Setup** in the **QUIPS** menu. A new window called '**Routine [untitled]**' appears on the bottom of your desktop.
3. Click on **FILE** in the **QUIPS** menu bar.
4. Select the command **Open**; the **Open** dialog appears.
5. Select the drive and the folder where you have stored your QUIPS routines.
6. Click on **Open** to open the selected file.



Note: All QUIPS Routines are saved in files with the extension: .Q5R.

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2
3

To record a routine:

1. Select the **QUIPS** menu.
2. Click on **Setup**. A new window called '**Routine [untitled]**' appears on the bottom of your desktop.
3. Tick the box in front of **AutoInsert**. This will cause QUIPS to record all commands you are performing from now on and to display them in the **QUIPS Command Line Window**.

1 2 3

To view the results:

1. Select the **Results** menu in the QUIPS menu bar.
2. Click on the command **Feature**.
3. You can choice to Display your results, to Print them or to Save them to a file.



Refer to: the QUIPS User Guide for more information.

Or:



Use the Run button in the Toolbox:

- ◆ Right-click to open QUIPS
- ◆ Left-click to run the routine in the QUIPS Command Window



Note: You will find several example routines in the QUIPS folder.

Sample Applications

The most basic method of measurement in Leica QWin is to use it as a *Video Ruler* to obtain quick manual measurements of a variety of parameters.

Manual Results 3 : Image1

Object	X Coord	Y Coord	Distance	Angle	Width	Height
1	286	176	62.37	221.10	47.00	41.00
2	274	276	62.30	341.27	59.00	20.00
3	109	236	78.55	328.54	67.00	41.00
Total	669.00	688.00	203.22	890.91	173.00	102.00
Mean	223.00	229.33	67.74	296.97	57.67	34.00
Std Dev	80.76	41.10	7.64	53.90	8.22	9.90
Std Err	46.63	23.73	4.41	31.12	4.75	5.72
Max	286.00	276.00	78.55	341.27	67.00	41.00
Min	109.00	176.00	62.30	221.10	47.00	20.00
2-s Ran	323.04	164.38	30.58	215.60	32.88	39.60

Interactive Measurements

Mode: Count 3

- Draw Area X 109
- Draw Line Y 236
- Distance
- Rectangle Red 70
- Count Green 70
- Read Grey Blue 70

Distance 78.55 pp
 Angle 328.5 deg
 Width 67.00 pp
 Height 41.00 pp
 Area 2747.0 pp²

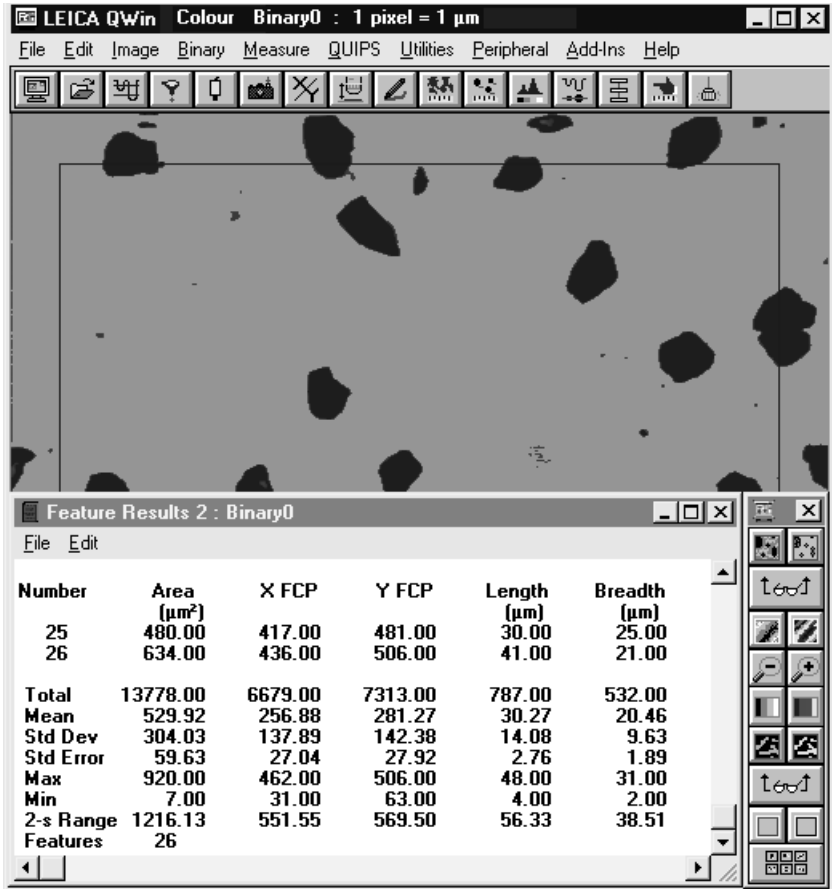
Measure Reset Clear disp

OK Params

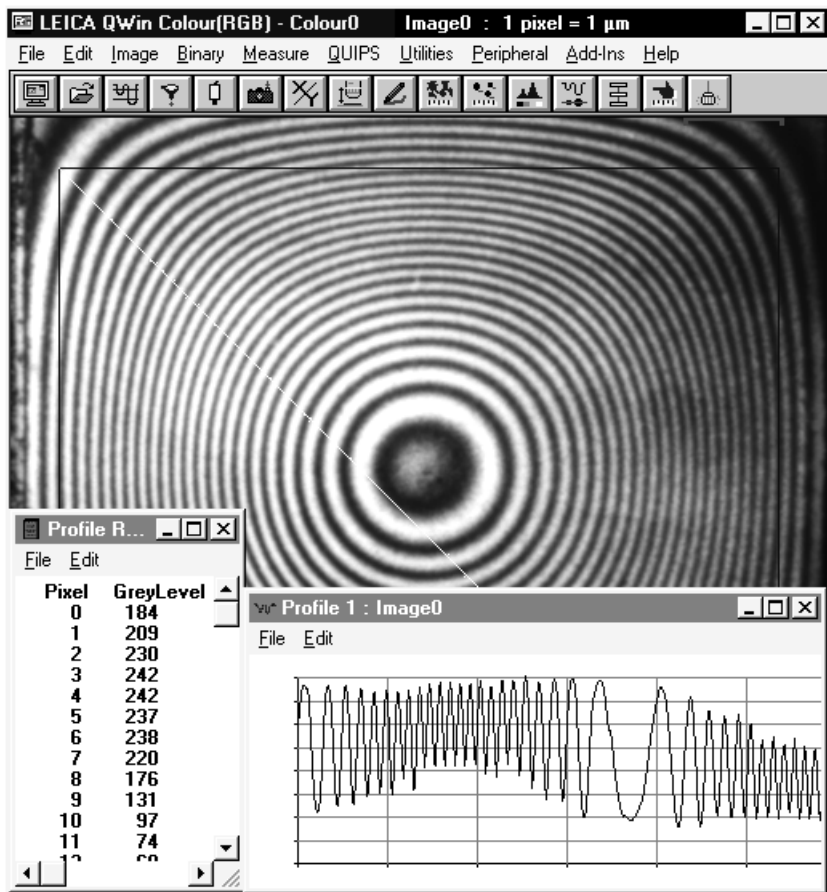
Image Auto measure
 Colour0 Auto clear data
 Colour1 Auto clear disp
 Colour2 Accumulate

The Interactive Measurements dialog allows you to use the mouse to define the region of image that you are interested in, and then make simple measurements on that region. In the example above we have performed three interactive measurements using the facility in *Distance* mode. This has given us a selection of results as shown as well as some statistics on the relation between the two measurements.

The next example shows a series of *Feature Measurements* made on a sample of industrial diamonds.



This example shows the *Grey Profile* across a fringe pattern. The data can be displayed in a variety of ways including the graphical and textual methods shown here. From this data, measurements such as the difference between the grey levels can be calculated.



Finally, this example performs a *Field Measurement* on a sample of glass fibres giving us details about the count and the areas within the sample.

The screenshot shows the LEICA QWin software interface. The main window displays a binary image of glass fibers with a rectangular field of interest. A 'Measure Field' dialog box is open, showing various statistical parameters. A 'Field Results 3 : Binary0' window shows a table of results for three individual fields and their totals.

Field #	Area	Intercept H	Intercept V
1	11048.00	1693.00	2244.00
2	11048.00	1693.00	2244.00
3	11048.00	1693.00	2244.00
Total	33144.00	5079.00	6732.00
Mean	11048.00	1693.00	2244.00
Std Dev	0.00	0.00	0.00
Std Err	0.00	0.00	0.00
Max	11048.00	1693.00	2244.00

The 'Measure Field' dialog box shows the following parameters:

- Area: 11048.0
- Intercept H: 1693.0
- Intercept V: 2244.0
- Perimeter: 6397.0
- Count: 64
- Area Fraction: 0.055
- Anisotropy: 0.754
- Area Fill: 0.058
- Mean Chord: 6.526

These are only a few examples to give you an idea of the range of applications and problems that Leica QWin can handle.