Q.E.D. LIFE SCIENCE DISCOVERIES

CrysCam™ User's Guide

Table of Contents

Chapter

1

Installation

Thank you for buying a CrysCam. Please follow the unpacking instructions in the shipping carton and make sure you have found and identified all components.

Post and base plate assembly

Post. The ¾ inch stainless steel post needs to be **screwed tightly into the base** plate. The collar is already adjusted so that even at the lowest focus settings, the optics will not crash into a Linbro-type plate. If you need to adjust the collar for some reason, a **1/8 hex wrench** is included in the spare parts bag.

Base Plate. The microscope base plate is preassembled with the LED driver board and the battery attached. The sorbothane cushioning feet are attached with double sided tape which can be easily replaced should the feet ever come loose. There is enough clearance of the cushioned PCB board and the battery case if the **base is placed on a clean and level surface**. Make sure there are no **protruding parts on the working surface** that could damage the board when you set down the microscope base.

Battery and Power Supply. The battery case located below the base houses 4 AA batteries, and is attached with Velcro tape. To replace the batteries, carefully detach the lead connector from the battery case, pull the battery case off and install new batteries. The AC power adapter connector is located directly on the LED board and faces towards the steel post. Both the AC adapter and batteries can be used at the same time, the AC adapter then overrides the batteries.

Brightness Control. The LED board has a variable lighting circuitry which is controlled by the knob on the top right of the camera. The potentiometer also has a switch that turns the power off. Make sure to turn the knob all the way to the left until it clicks and the LEDS switch completely off. Should a LED fail, the diodes can be replaced if necessary (described later).

Lighting Base Inserts. The base plate has a 25.3 mm recess that can accept any variety of inserts. The rim of the opening has 3 set screws that allow adjustment of the inserts so that they level with the surface of the plate. **A small hex wrench and extra set screws** are included in the spare part bag.

The recess is originally adjusted for the thin frosted acrylic diffuser plate **and** the polarizer insert together in standard and advanced systems, and the frosted insert only in systems without polarizer. **Make sure the polarizer is placed ABOVE the frosted insert.** For use with top lighting only, the black Delrin insert can be used. You can use any combination of inserts to achieve optimal lighting for your purpose, even a small mirror or any 25mm insert of your own design. Use the set screws to adjust the inserts to be **slightly lower and level** with the base plate.

Initial camera assembly

Mounting the Camera and Optics. The camera, optics and polarizer are preassembled in the rack and pinion z-drive (focus) mount, which slides onto the steel post. Note that the **camera cable needs to extend towards the observer**, away from the post, for proper orientation of the image on the computer screen.

After installation of the software, fine adjust the camera above the center of the light source using the live image.

Adjusting the Rack and Pinion Drive. The rack and pinion mount needs to be secured so that the polarizer is approximately 50 mm above the drops (80mm on the advanced system) with the large set screw in the back of the mount. **Align the optics above the lighting port**. **Once the software has been installed**, the small set screw on the rack and pinion focus drive that secures the entire camera and optics assembly can be used to **fine-adjust the optics** so that they are **perfectly centered** above the base light source.

In case you need to remove the camera from the rack and pinion drive, it is necessary to first **detach the polarizing adapter by loosening the 3 thumb screws** which secure the polarizer adapter to the optics. Then the whole optics assembly can be removed from the rack and pinion drive by loosening the **small thumb screw on the rack and pinion drive** to release the camera. **NEVER OVERTIGHTEN ANY OF THE SMALL THUMB SCREWS.**

The smallest of the 3 hex wrenches (1.5 mm) fits the set screws used to hold the components of the optical assembly together and to secure the large 50 mm adapter ring to the optical tube. Exercise care and do not over-tighten the fine threads.

Cleaning the optics. Use can duster (available at office supply stores) to remove lint and dust, and never rub the linear polarizer – the film coating is sensitive. Use only soft optical lens cloth.

Camera driver installation

Computer Requirements. Laptop or Desktop, Windows XP SP2, Pentium 4, 1 GHz or above processor (or AMD Athlon 2600 XP), 256 MB RAM, 400 MB free disk space, USB 2.0, 32 MB video card and CD-ROM drive. For some desktop computers, you will need to install the USB 2.0 card as your computer may not be able to supply sufficient power to drive the camera.

Desktop Computer: If you have a desktop computer with low power USB ports that cannot drive the camera, you may need the optional PCI USB-2 board. Please follow the separate instructions included in the box with the board and drivers. **USB1.0 DOES NOT WORK.**

Windows XP Driver installation: Plug the camera in the USB2 port of your laptop. The following window will appear.

Insert the CD before you click next. The CD will load. Ignore the following warning and click 'continue anyway'.

Hardware Installation

⚠ The software you are installing for this hardware:

Motic MC Camera V2

has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)

Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.

Continue Anyway   STOP Installation

The driver installation will continue until finished. Proceed to the software installation.

Software installation

Software Installation: Double click your CD drive icon and the software installation wizard will open. Follow the instructions, details are provided in the separate software installation manual. If the install wizard does not open, run setup from the CD. **The serial number of the software is printed on a label on the CD case**.

IMPORTANT: Select the correct camera type in File/Settings or the software will not work.

Camera selection: Select the correct camera type or the software will not work. Open the Motic Images software by double clicking the program icon. Pull down the File menu, and select Setting.
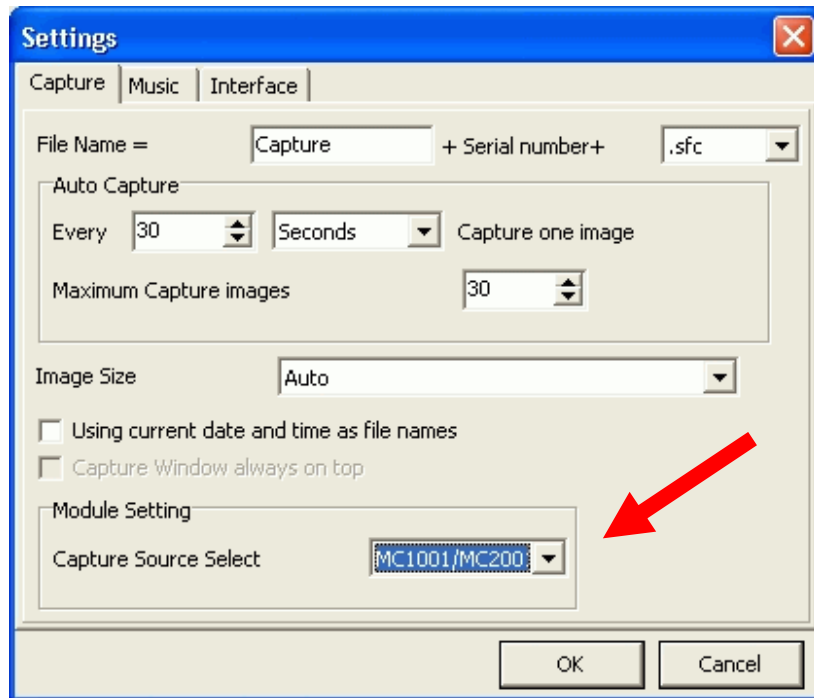
You must select the MC1001/2001 camera in the File/Setting menu .

Optional Twain Driver Installation: Twain compliant drivers are available from the q.e.d. website and from Motic USA directly. You need those drivers only if you wish to use the camera directly from other, Twain compliant software such as Photoshop or Acrobat, or if you wish to write your own interface.

Capture file location: The default capture file location is hidden deeply in the My Documents subfolders which is probably not practical. To reset the capture file directory, open File/Album and **right click the 'Capture Folder'** to select a new default directory.
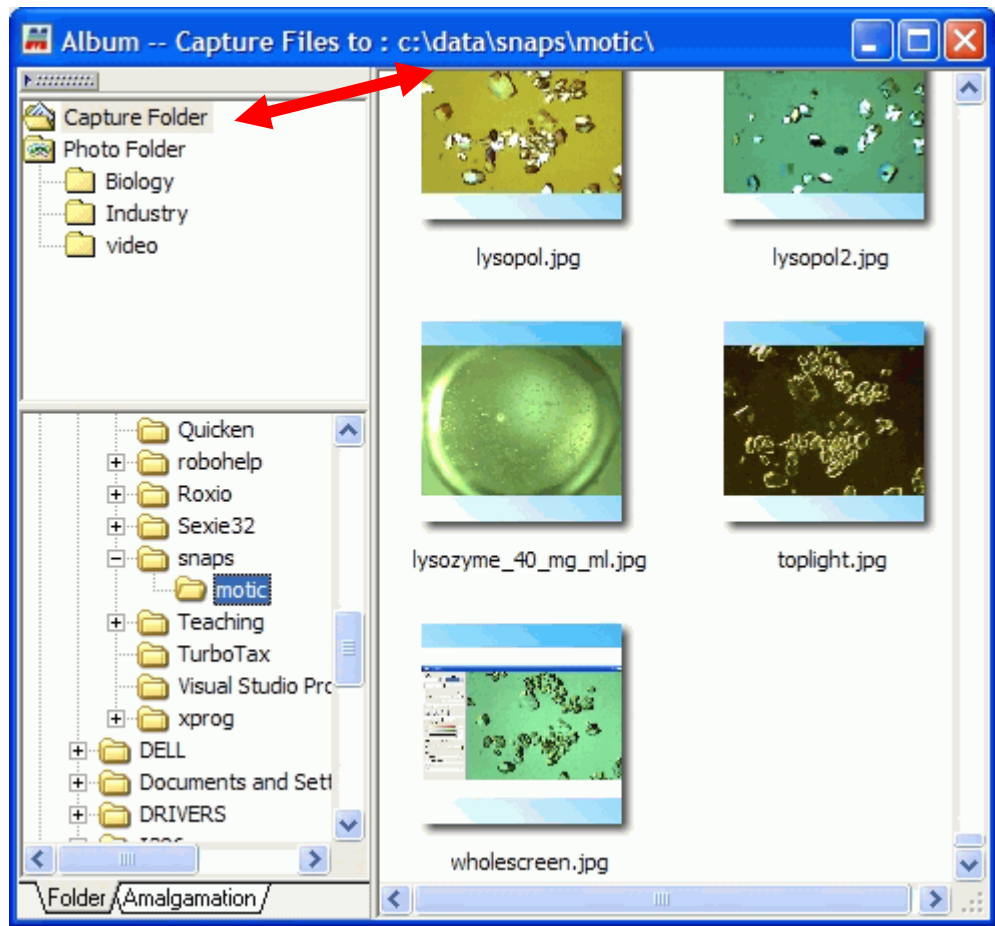
Capture directory selection in the File/Album menu

Imaging with CrysCam^{TM}

Imaging with the CrysCam is easy and intuitive. After learning how to take and save pictures, explore the other software options as described in the software manual and on the software CD.

Taking pictures

Assuming that you have properly installed the camera as described above, open the Motic Images software and make sure the proper camera type in **File/Setting** is selected, if not yet set to MC1001/2001.

Next, click the **live capture icon** (the small movie camera) and the live capture window appears. Any error message would indicate that the drivers are not properly installed. At this point, a fuzzy image frame should be visible. Use any crystal trays or the calibration slide in the camera accessories box to find the focus and zoom settings. Note the '**enhance**' click box and use the **auto-adjust** feature to optimize exposure. Adjust the lighting so that you get reasonable gain and exposure settings.

To work with maximum capture resolution when higher than the screen resolution, center the slides (yellow arrows) so that the image remains centered when you zoom.

Selecting capture and screen resolution (**blue arrow**). For high quality images, high capture settings are ok, but be aware that live and time lapse video clips become huge if you select to high capture resolution. For capture resolutions exceeding the available screen resolution, click '**Fit to Window**' or **adjust the sliders** as described in the box.

You can **select the file names and image file formats from the settings menu**. The File/Settings menu (figure above) is also used to select the **time lapse and total number of frames** for the timed capture to be selected.
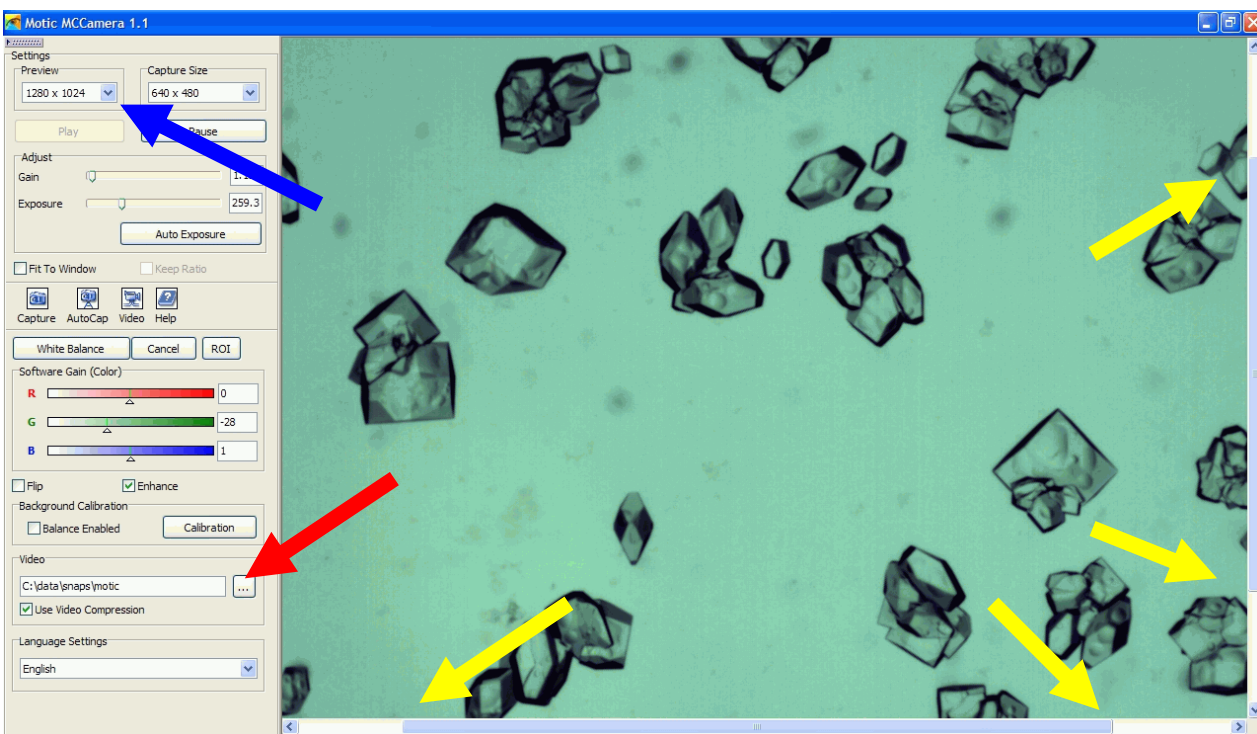
Note
• **Note that the live video image destination directory (but not the capture directory) is set with the 'Video' selection box (short red arrow).**

How to record a time lapse video

See sample movies on the qedlife website

Using the CrysCam and the Windows MovieMaker (comes with Windows XP) you can actually make crystallization movies. First, get an estimate of how long it will take to grow your crystals. Then, decide how long the movie should be. The fastest setting in Movie Maker is 8 frames/second. Example: You want to make a 20 second movie. You need thus 160 frames. Assume that the crystals grow in 12 hrs. Thus, we need about 13 frames per hr, or one frame every 4.5 minutes.

At the minimum capture resolution, 320x240, a frame is about 10-13 kB in WMV format. Thus, our movie would be 1.6-2 MB, a reasonable size for web streaming.

Set the capture options accordingly in the **File/Settings** window, optimize the image and then click **Autocapture** in the capture window. After 12 hrs, the 160 images should be captured in the directory you selected in the **Video** box of the capture window.

Open Windows MovieMaker. Go to **Tools/Options**, and select the image duration time to lowest available (0.125 sec). Close with ok. Then drag or load (**File**) all images in the image collection panel, select all, and drag them into the storyboard. You can select title images, transitions, etc from corresponding menus, and remove uninteresting leading or trailing frames. If growth slows, you can also remove every other frame or more if necessary. Preview the movie and save it.

Using the polarizer

See sample images on the qedlife website

The polarizing adapter is attached to the optics assembly with **3 thumb screws**. **NEVER OVERTIGHTEN ANY OF THE SMALL THUMB SCREWS.** The rotating polarizer itself is screwed into an adapter ring which connects to the threaded insert of the lens adapter, secured by another thumb screw. You must use the linear **polarizing insert above the thin frosted acrylic insert** in the base plate. I can be used with or without the frosted diffuser, but the polarizer must be on top of the diffuser disk. Adjust the 3 set screws so that the polarizer is slightly lower than the base to avid scratching the coating. Turn the polarizer on the lens adapter until you achieve the desired effect. The polarizers are high quality linear type and allow full extinction when crossed for great dark field pictures.

Using the base plate inserts

Lighting Base Inserts. The base plate has a 25.3 mm recess that can accept a variety of inserts. The rim of the opening has 3 set screws that allow adjustment of the inserts so that they level with the surface of the plate. A small hex 1/16 wrench and extra set screws are included in the spare part bag.


The recess is originally adjusted for the frosted acrylic diffuser plate and the polarizer in standard and advanced systems, and the frosted insert only in systems without polarizer. **Make sure the polarizer is placed ABOVE the frosted insert.** For use with top lighting only, the black Delrin insert can be used. You can use any combination of inserts to achieve optimal lighting for your purpose, even a small mirror or any 25mm insert of your own design. Use the set screws to adjust the inserts to be **slightly lower and level** with the base plate.

Base plate electronics

The base plate circuit board provides the option of **adjusting the maximal brightness of the LEDs**. This may be desirable in certain settings for limiting overexposure or to extend LED life. Turn the lighting knob on the base plate to max intensity. Then insert a **non-metallic small screw driver** in the hole in the PCB, and adjust the potentiometer until the desired max brightness is set.

Plug for AC adapter

Access to max brightness potentiometer
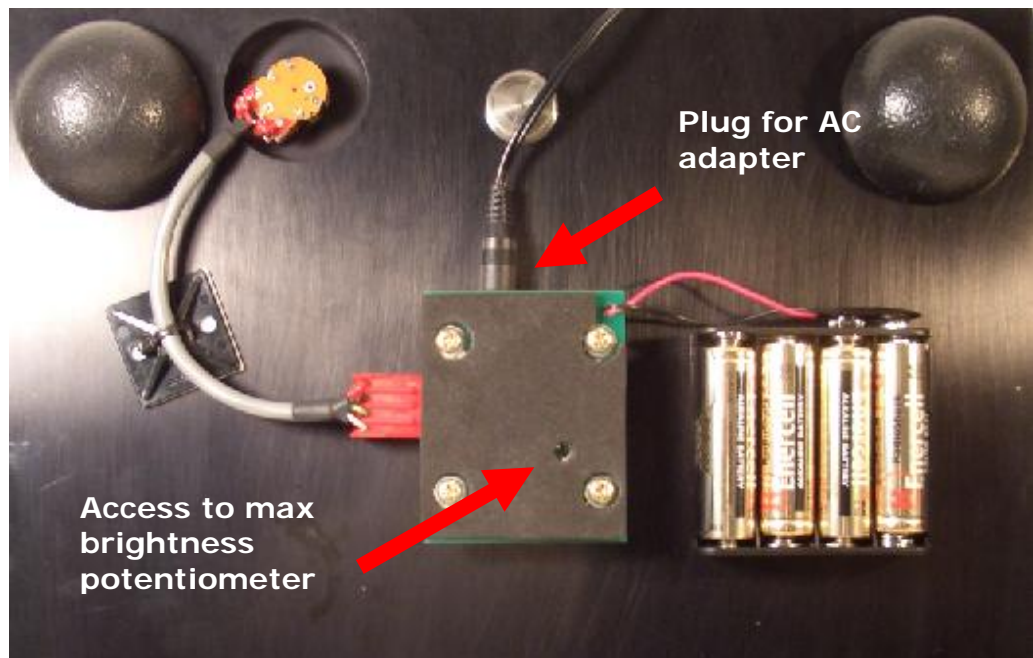
The entire electronics assembly can be replaced if necessary by unplugging the brightness control connector, the battery case, and loosening the 4 pan head screws. Then the LEDs can be replaced as follows.

LED replacement

The **LEDs can be exchanged** by removing the PCB from the base plate and pulling the LEDs from their sockets. The long or red painted leg of spare LEDs is opposite the flat spot on the LED case. The board clearly indicates the LED position for proper installation. Cut the leads to about 3 mm length past the stop (use the old LEDs as a sample). **Polarity is critical for function**, but inserting the LEDs the wrong way will not destroy the board. The standard LEDs are warm white with tint type D. Additional spare LEDs, boards and parts are available from q.e.d. labs.

LED sockets. See text for proper replacement procedure.

Warranty and replacement parts

There are **no user serviceable components** in this **practically indestructible** instrument. Each instrument is run for 24 hrs and a set of calibration images is recorded with it during quality assurance testing. If something breaks, or you cannot install the software, its is probably because you did not follow the instructions. Please read the instructions, **all of it**, in the right sequence. If you still hate it, send the instrument back, at your cost, properly packed (no, we do not insist on 'original packaging') for a full refund within 10 days. No questions asked.

- Optics: 90 days warranty. If it breaks, you must have dropped it, stepped on it, or thrown it at somebody, all of which voids the warranty.

- Lighting: 30 days. That is about the time it takes until someone figures out a way to improve the circuit, power it with solar cells, replace the LEDs with light bulbs, or put the microscope into an acid filled sink. All of which voids the warranty. We ship cheap spare modules in that case.

- Camera: 90 days. A CMOS color camera can be destroyed by a variety of hostile actions, like poking into the chip, zapping a laser into it, dropping it, tapping on it with hard objects, or using it as a missile. All of the above and even remotely associated actions, including detaching it from the optics, void the warranty. There is UV fluorescent Loktite on all optics threads. A few weak pixels visible at extremely low lighting are normal for those CMOS chips.

- Base, post and Z-drive: One year warranty. These sturdy metal pieces can only be destroyed by willful abuse, which voids the the warranty in any case.

- Image capture software: 30 days original manufacturer warranty.

If any of these warranty claims apply to you, please mail us (sales@qedlife.com) or call the US phone number (925) 209 7429 (9:00 to 17:00 PST). Due to technological advances changes design details are possible without explicit notice.

q.e.d. life science discoveries, inc.
Attn. CrysCam
6487 Half Dome Court
Livermore, CA 94551
USA
(925) 209 7429

Downloads:
http://ruppweb.dyndns.org/cryscam/
http://www.qedlife.com/