

MicroXplore CM-1 Compound Biological Microscope

#51857

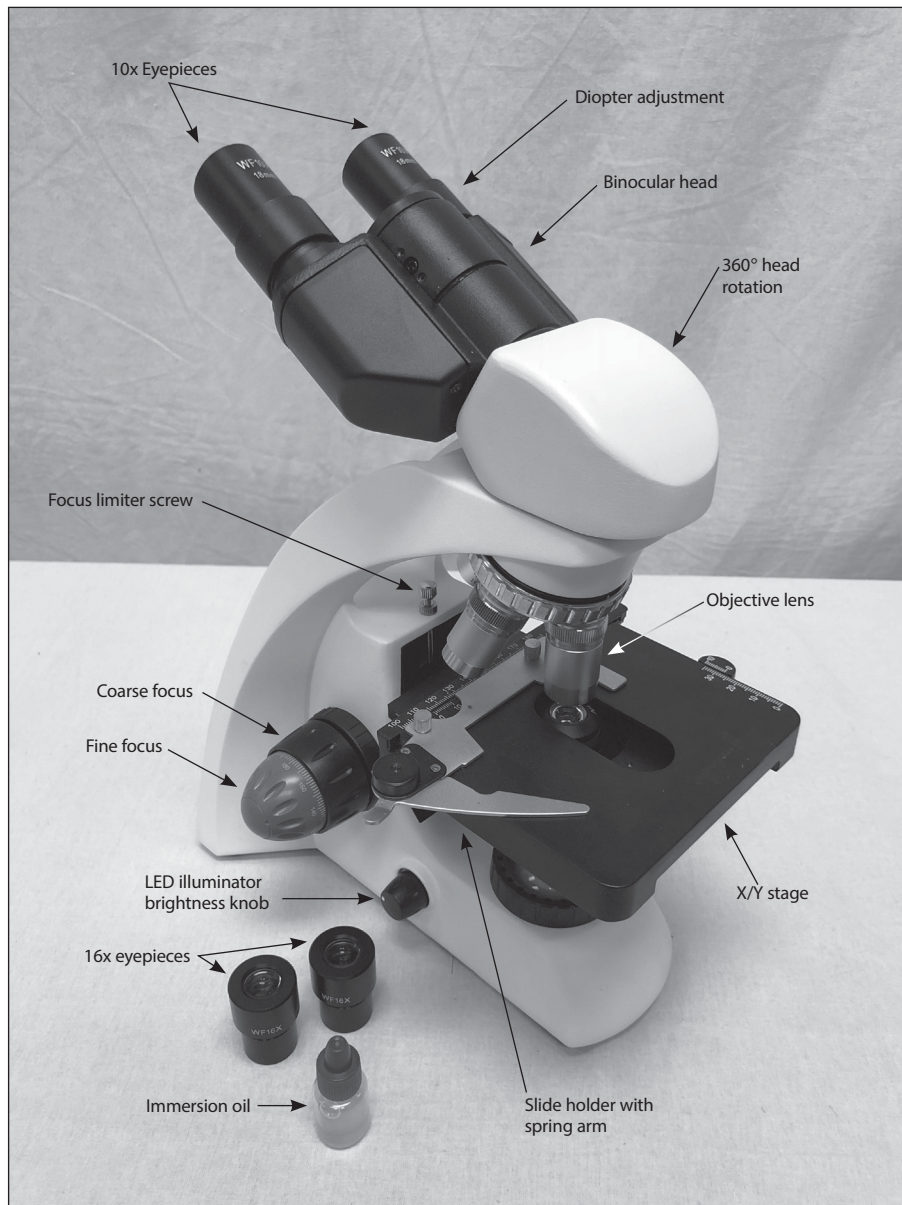


Figure 1. *The MicroXplore CM-1 Compound Biological Microscope*

Copyright © 2018 Optronic Technologies, Inc.

All Rights Reserved. No part of this product instruction or any of its contents may be reproduced, copied, modified or adapted, without the prior written consent of Optronic Technologies, Inc.

Welcome to a new world of adventure! With your new MicroXplore CM-1 Compound Biological Microscope, you'll be able to view detailed, high resolution images of the microscope world! Your CM-1 features a mechanical X/Y stage, dual speed focuser, a swing out filter holder, and a binocular head which includes two sets of eyepieces. 4 objective lenses are installed, including a high power oil immersion lens, to provide a magnification range of 40x-1600x power!

Included items

- Microscope
- AC cord
- Set of 10x eyepieces
- Set of 16x eyepieces
- Immersion oil
- Blue filter
- Instruction manual

Setup and first time use

Your CM-1 comes mostly assembled, and only requires attaching the eyepieces to get started.

1. Insert three AAA batteries into the bottom of the base, or plug the AC cord into the back of the unit and into the wall.
2. Choose a set of eyepieces to start. Hint: start with the 10x eyepieces as they are lower power than the 16x. They will provide a wider field of view, as well as a brighter image.
3. Insert the set of eyepieces into the binocular holder (**Figure 1**).
4. Rotate the focus knob to lower the X/Y stage down away from the objective lenses (**Figure 1**). This will give you some extra room to insert a slide and change objective lenses.
5. Rotate the objective lens housing until the 4x objective clicks into place over the X/Y stage.
6. Place a slide onto the X/Y stage using the spring loaded slide holder to secure the slide in place.
7. Turn on the power switch located on the back of the unit next to the AC input jack.
8. Adjust the LED brightness knob (**Figure 1**) until full brightness is achieved.
9. Adjust the X/Y stage using the motion controls (**Figure 2**), until the specimen on the slide is directly above the light coming through the condenser.
10. Rotate the binocular head to a comfortable location, and look through, adjusting the distance between the binocular eyes like you would a binocular, looking through the eyepieces until a single circle is visible.
11. Turn the focus knob to bring the slide into focus.

Focusing

Focusing is achieved by rotating the large focus knob on either side of the CM-1. There is a course and fine focus section to the knob, so use the course knob for getting close to focus, and then use the fine section to achieve perfect focus. Focus tension can be adjusted using the tension ring, located between the microscope housing and the course focus knob, on the side of the microscope next to the X/Y adjustment knobs (**Figure 2**). Rotate the tension ring away from the housing and towards the focus knob to increase the focus wheel tension, and rotate it towards the microscope housing to decrease tension. If too little tension is used, the X/Y stage may slip down on its own, so make sure these is at least some tension set.

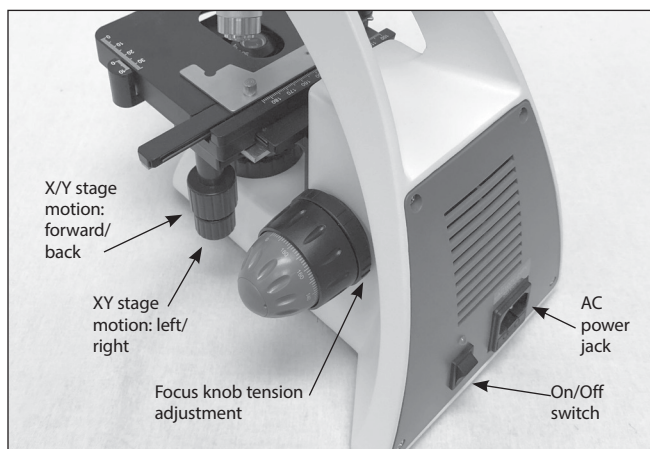


Figure 2. CM-1 controls

There is also a diopter focuser adjustment (**Figure 1**) on the left eye of the binocular head, similar to the way a standard binocular adjusts the diopter setting (note that it is reversed from most binoculars — on the CM-1, the diopter is on the left, not the right). In case one of your eyes has a different prescription than the other, the diopter can be adjusted to correct this. To adjust the diopter:

1. Focus a slide like normal until it looks relatively sharp in the view with both eyes.
2. Shut your LEFT eye, and looking only with your right eye, adjust the main fine focus knob to reach critical focus.
3. Next, shut your RIGHT eye, and examine the image with only your left eye. If a little focusing is necessary, twist the left eyepiece barrel in order to adjust the diopter to reach critical focus.
4. Once the left eye is focused with the diopter adjustment, then both eyes can be used, and only the main microscope focus is needed to adjust focus going forward.

Be aware of the position of the specimen slide when focusing. It is possible to focus the stage high enough where the glass slide comes into contact with the objective lens, possibly cracking the glass slide. The focus limiter screw (**Figure 1**) is designed to keep the slide from making contact with the longer objectives (40x and 100x). The limiter is set at the factory, but may require some adjustment depending on the thickness of the slides you may be using. To adjust, back off the limiter locking nut, and rotate the screw up or down to adjust the position where the stage will stop. Tighten the limiter locking nut to set in this new position.

X/Y Mechanical Stage

The CM-1 features a mechanical stage that is used to accurately position specimens below the objective lenses.

- Place a specimen slide onto the X/Y stage by using the clamp lever to hold the slide firmly in place (**Figure 1**).
- Use the X and Y movement knobs (**Figure 2**) to position the object into the path of the light coming through the condenser below the stage.

Illumination

The illumination LED is controlled by the brightness switch on the side of the base (**Figure 1**). Adjust the knob until the desired light level is achieved.

Figure 3. Condenser, iris diaphragm, and filter holder.

In addition to the brightness level, control of the lighting coming to your eyes can be controlled with the condenser and diaphragm iris located on the underside of the stage (**Figure 3**).

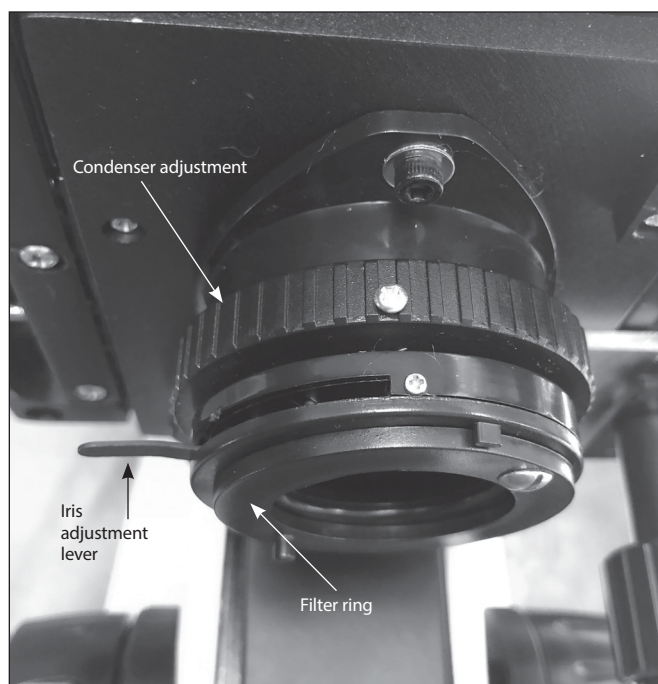


Figure 3. Stage, slide holder, and objective lenses

- Locate the condenser and rotate the housing to change the distance between the condenser lens and your slide. This adjustment changes the concentration of light that hits the slide.
- Locate the diaphragm iris adjustment lever, and rotate it to open and close the iris diameter. Adjusting this aperture changes the background illumination of the view through the eyepieces.
- Experiment with different settings to find the view that works best for the specific slide you are using.
- The bottom ring, (just below the iris adjustment lever), can swing out in order for a color filter to be installed. Insert the filter from the top of the ring, and rotate the ring back into place above the LED housing. Filters can be used to change the color of light passing through the slide, which can have the effect of increasing contrast. Rotate the filter out of the light path if no filtering of the light is desired.

Objective Lenses

The CM-1 includes 4 objective lenses of various magnification. 4x, 10x, 40x and 100x Oil are included. Always start with the lowest power and work your way upwards, depending on the magnification desired. The objectives click into place above the stage when properly positioned. To determine the power, multiply the objective lens being used by the eyepiece magnification. So for example, the 40x objective, coupled with the 10x eyepiece set yields 400x (40 x 10).

The 4x, 10x and 40x objectives are used with an air gap between the objective lens and the slide. Use the focus knob to adjust the distance until the image is sharp. The 100x eyepieces is an oil immersion lens, meaning it provides the best image when there is no air between the objective lens and the specimen being studied. In order to use the 100x objective properly, perform the following procedure.

- Place one drop of the immersion oil directly onto the slide, over the specimen.
- Rotate the objectives until the 100x is in place, and slowly bring the focus up, until the tip of the objective lens comes into contact with the oil.
- Looking through the eyepieces, use the fine focus until the image is sharp.

Note: if you do not use oil between the 100x objective and the slide, the contrast will be very low, and the image will look hazy. When you are finished with your observations, be sure to gently wipe off the oil from the objective lens and the slide, using a clean soft lint free cloth or microfiber cloth. Do not leave the oil on the lens or slide, as it might leave a residue over time.

Troubleshooting

If you have problems in the setup or use, check the following items first:

- Make sure the AC plug is plugged in to an AC power source and attached to the microscope securely and

correctly. If using batteries, make sure a fresh set is installed, and in the proper orientation (springs against the negative end of the batter).

2. Make sure you have the illuminator turned on and the brightness knob rotated to provide enough light.
3. Make sure the objective lens you have chosen is set correctly and it has clicked into the right position.
4. Make sure the specimen slide is correctly fitted into the clamp on the mechanical stage and properly centered.
5. Make sure all lens surfaces are clean of any foreign debris or finger and eyelash oil. Clean eyepieces and objective lenses with ONLY a microfiber cloth, or lens paper and optical lens cleaning fluid.

Create Your Own Slides

Use a dropper to place a drop of pond water onto a blank slide and use the microscope to view any organisms existing in the water.

Adding a cover slip on top of liquid will allow for much thinner viewing surface.

Use of Gum solution will make a permanent slide. The Gum will stick the Cover slips to the slide. Dyes can be used on specimens to bring out more detail much like the included prepared slides. This subject matter goes beyond this manual and further study would be required.

Specifications

Microscope head:	Binocular head, 360° rotation
Eyepieces:	Wide Field 10x (set of 2) Wide Field 16x (set of 2)
Objective lenses:	Apochromatic objectives, 4x, 10x, 40x (spring), 100x (spring, oil immersion)
Mechanical Stage:	110x125mm
Movement range:	75mm x 50mm
Focus knob:	Dual focus, fine divisions: 0.002mm
Condenser:	N.A. 1.25 Abbe condenser with Iris diaphragm
Lighting:	3W LED, adjustable brightness
Power requirements:	AC 100v-220v 50/60Hz fused or 3x AAA batteries

One-Year Limited Warranty

This product is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Optronic Technologies will repair or replace, at Optronic's option, any warranted instrument that proves to be defective, provided it is returned postage paid. Proof of purchase (such as a copy of the original receipt) is required. This warranty is only valid in the country of purchase.

This warranty does not apply if, in Optronic's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights. It is not intended to remove or restrict your other legal rights under applicable local consumer law; your state or national statutory consumer rights governing the sale of consumer goods remain fully applicable.

Optronic Technologies, Inc.

Copyright © 2018 Optronic Technologies, Inc., 89 Hangar Way, Watsonville, CA 95076, USA. All Rights Reserved. No part of this product instruction or any of its contents may be reproduced, copied, modified or adapted, without the prior written consent of Optronic Technologies, Inc.