

# 6600 SERIES STEREO ZOOM MICROSCOPE OPERATIONS MANUAL

## Section 1. Introduction

Congratulations on your purchase. The **6600** series stereo zoom microscopes offer wide field zoom optics in a dependable, full-featured package suitable for a variety of applications.

This operation manual provides a step by step guide to setting up, using and maintaining the **6600** series microscopes.

## Section 2. Getting Started

### 2.a Assembly

Unpack the microscope from its protective foam-shipping container. The box should contain the microscope base, the stereo head, two 10XWF eyepieces, two rubber eyeguards and a dust cover. Remove the protective plastic envelopes from the microscope base and head. Remove the paper covering from the stage plate. Place the microscope base on a firm level surface. Mount the stereo head by inserting it, nosepiece side down, into the circular opening in the focusing mount. The focusing mount is equipped with a head mounting screw. If the head will not fit the mount initially, loosen the head mounting screw to clear the opening. Once the stereo head is in place, secure it by tightening the mounting screw. Remove the dust caps from the eyepiece tubes and nosepiece. Insert the eyepieces into the eyepiece tubes. Place the two eye guards over the eyepieces (if desired).

### 2.b Setting Up

Place the microscope on a level surface at a convenient height for viewing. The inclined eyepiece design of this microscope is intended to allow comfortable viewing for extended periods of time. This feature will only work if the observer does not have to stoop or stretch to reach the eyepiece.

**6600** series microscopes are equipped with a 5-foot (1.5 m) power cord with a standard three-prong connector. A compatible 110V AC outlet or extension cord must be available at the viewing location in order to use the illuminator. Once connected to the outlet, the microscope is ready for operation.

#### **WARNING:**

**Do not disable the ground terminal (3rd prong) on the power cord, it is an important safety feature.  
Do not operate the instrument under damp conditions or allow any portion of it to become immersed in water or other liquids.**

## Section 3. Basic Operation

### 3.a Rotatable Head

The stereo head can be rotated a full 360 degrees. This gives the option of having the eyepieces oriented in a variety of directions. The most common arrangements are to orient the eyepieces towards the front or towards the rear of the instrument. In the rear configuration, the instrument occupies slightly less space. The forward configuration provides better access to the stage. To rotate the stereo head, loosen the head mounting screw, grip the top of the head and turn it to the desired location, then tighten the mounting screw.

The head can also be rotated to allow accessibility by multiple observers. If doing this, it is important to remember that the image will change orientation as the head is turned.

### 3.b Illumination

**6600** series microscopes are capable of operating in four different lighting modes: no illumination, incident illumination (lit from above), transmitted illumination (lit from below base), and a combination of both incident and transmitted illumination.

A rocker switch is located on the upper left-hand side of the microscope base. This power switch activates both the incident and transmitted illuminators. A dimmer wheel located on the left side of the microscope base controls the intensity of the incident halogen illuminator and the intensity of the sub-stage transmitted illuminator. To select between them, use the two dimmer wheels located on the left side of the microscope base:

Switch off: no illumination

Switch on:

Upper dimmer wheel: transmitted illumination

Lower dimmer wheel: incident illumination

The type of illumination to use depends on the nature of the specimen. Clear or translucent specimens such as crystals, thin biological specimens and microscope slides benefit from transmitted illumination or a combination of transmitted and incident illumination. Opaque subjects such as circuit boards, large biological specimens and many mineral samples require incident illumination.

Intense incident illumination of a specimen can sometimes produce a glare that washes out the image. If this occurs, the problem can be relieved by adjusting the dimmer intensity or by repositioning the upper illuminator (**CAUTION: MAY BE HOT!**) and the specimen.

Observe caution when viewing temperature sensitive specimens such as live plants and animals. Prolonged exposure to illumination can cause overheating; particularly when using the transmitted-base illuminator setting. The **6600** series microscopes are equipped with a cool fluorescent base illuminator to alleviate this problem. Always turn the illuminator switch to the off position when the microscope is not in use.

If the microscope is to be used in the field (without electrical power), an external illumination source such as the sun will often suffice.

### 3.c Specimens

**6600** series microscopes have a working distance of about 90 mm (3.5 in.), allowing specimens up to 70 mm (2.8 in.) in thickness to be viewed using the focusing mechanism provided. This is the main limitation to the types of specimens that can be viewed.

Position the specimen in the center of the stage plate. Stage clips are provided to hold standard microscope slides and to hold thin flexible specimens, such as paper, flat.

Certain precautions should be noted when viewing specimens. Specimens that are longer than the stage is wide may require additional support to be stable. Very hard specimens, such as some minerals and metals, may cause scratching of the microscope's stage plate and base if slid across its surface. In these instances, placing a protective sheet of cardboard or plastic over the stage area may be advisable (do not use base illumination while it is in place). As mentioned in section 3.b, avoid overheating living specimens with the illuminators. **WARNING;** Never place liquids or fine particulates directly on the stage plate- If viewing liquids or specimens that must be kept moist, place them in a petri dish or a small beaker. If viewing fine particulates, place them in a watch glass, petri dish, or on a sheet of paper to avoid contaminating the electrical base.

### 3.d Interpupillary Adjustment

Position your eyes in front of the eyepieces near enough that the entire field is visible. You should see a circular image against a dark background. If the image instead forms two partly overlapping circles or a circle in which the edges or center are darkened, it will be necessary to adjust the interpupillary spacing. Move the eyepieces farther apart or closer together until a single circular field is formed. This setting depends on an individual's vision and will vary from observer to observer.

### 3.e Magnification

**6600** series microscopes are equipped with zoom optics providing objective magnifications of 0.7 to 4.5 power. When used in concert with the 10X **WideField** standard eyepieces the microscope will provide a total magnification range of 7 to 45 power (total magnification = eyepiece magnification X objective magnification). Additional eyepieces can be purchased in powers from 5X, 10X, 15X and 20X giving a range of magnifications from 3.5 to 90 power.

Change the magnification by rotating either of the zoom control knobs, located on the sides of the microscope head. The knob will have the numbers .7 to 4.5 on the knob.

### 3.f Focusing

Set the magnification to its highest setting. Rotate the focus control knobs to lower the microscope head towards the sample. If the image observed becomes blurrier, rotate the knobs in the opposite direction. Continue to adjust the focus until the clearest possible image is formed. The specimen should now remain focused at all magnification settings with only slight adjustments required when zooming.

### 3.g Diopter Adjustment

The knurled diopter rings (located on the eyepiece tubes) are used to balance the focus from one eye to the other. A reference scale is provided for each diopter ring. The "0" mark corresponds to no diopter correction and the other numbers on the scale designate different visual corrections. Initially set both diopter rings to "0".

Focus the microscope using only one eye (and eyepiece), then observe the specimen with the other eye (and eyepiece). The image should retain the same focus on both sides. If this is not the case, it will be necessary to adjust the diopter setting. Rotate one of the diopter rings to bring both eyepieces to the same point of focus. The combined image will only appear sharp if both eyes receive images that are in focus. This setting depends on an individual's vision and will vary from observer to observer.

Focus distance has an affect upon the apparent optical alignment of the microscope's objective lenses. If variations in vision from observer to observer require significant changes in focus, the right and left edges of the image may not appear in perfect alignment. If this occurs the problem can be corrected by sequentially adjusting both diopter tubes in the same direction while compensating with the focus control.

#### Note For Eyeglass Wearers:

If you wear eyeglasses, it is recommended you remove them prior to using the microscope. While the eyepiece of the 10XWF eyepieces is high enough to allow viewing through glasses, there is still a chance that their lenses will rub against the eyepiece rims and be scratched. The microscope's focus control and diopter adjustment can compensate for most, but not all, differences in vision. Observers who suffer from severe forms of astigmatism will need to wear corrective lenses. If multiple observers are sharing the same microscope, differences in vision may require each individual to refocus the image and adjust the diopter and interpupillary settings.

### 3.h Trinocular Operation (Models; 6603, 6604 & 6605)

The trinocular tube is activated through the use of a slide control located on the left side of the head. Pull the slide handle out until it stops to use the trinocular tube. This will divert light away from the left eyepiece. Press the slide control completely in for visual use of the microscope.

Video cameras can be mounted onto the trinocular tube through the use of an adapter tube. Standard 35mm SLR cameras can be mounted through the use of a universal mount and photo eyepiece tube or a right angle focusing mount. A T-ring specific to the make and model of camera is also required. Set the focus of the camera equal to that of the eyepieces by sliding the adapter tube up or down in the trinocular mount. Fix it in place with the trinocular set screw. Adjust the orientation of the camera by rotating it in the mount.

## Section 4. Adjustment

### 4.a Focus Tension

If the focus control feels loose and will not maintain focus or feels stiff, it may be necessary to adjust the focus tension control. This is a knurled ring shaped collar located on the right side of the focuser shaft. Increase the tension by turning the ring clockwise. Loosen it by turning the ring counterclockwise.

### 4.b Incident Illuminator Field

The incident illuminator lens can be adjusted by screwing it in or out to produce a broader or narrower field of illumination. A locking ring is provided to hold the lens assembly in place once it is set.

**WARNING: The illuminator assembly is HOT when in operation. Do not attempt adjustment until cooled.**

## Section 5. Maintenance

### 5.a Storage

The microscope should be kept in a dry dust free environment. It is best to cover the microscope when not in use with the provided dust cover. Always turn off the illuminator at the end of a viewing session. The expanded styrene shipping case also acts as a storage case. Do not dispose of case in the event of storage or the need to return.

Avoid storing at temperatures above 105° F (40.5° C).

**WARNING: Do not cover the microscope while the illuminator is turned on**

## 5.b Shipping and Transport

Retain the original packaging for use in shipping if the microscope must be sent in for service or transported through the mail or by air. If transporting by car, brace the microscope so that it does not slide or tip. It can be set on its side in a car seat or on a floorboard if necessary.

## 5.c Cleaning the Stage & Body

The stage, base and arm of the microscope can be wiped clean using a soft cotton cloth or lab wipe moistened with water (and mild detergent if needed). Wipe dry. Do not use excessive amounts of water or harsh solvents.

**WARNING: Always unplug the microscope prior to cleaning.**

## 5.d Cleaning Lenses

In order to realize its full performance, a microscope's optics must be clean. Signs of dirty optics are spots or blotches in the field of view and a general lack of sharpness in the image. The procedures listed below should allow the lenses to be cleaned with a minimum of risk to the optical coatings. The best way to keep lenses clean, however, is to avoid getting them dirty. Use a dust cover on the microscope when not in use and do not splash liquids on the objective tips.

**i. Eyepieces:** Check the eyepiece by rotating it. If the eyepiece is dirty, specks and blotches appearing in the image will rotate as well. The upper surface of the top lens (eye-lens) is where most dirt settles. First, blow or brush away any loose particles of dust using a photographic blower brush, a camel hair brush or an ear syringe. If further cleaning is required, use a piece of lens cleaning tissue, lens cleaning solution and a soft cotton swab. Moisten one end of the swab with a few drops of cleaning solution (DO NOT SOAK) and gently wipe the lens, starting at the center, and working outwards. Follow a circular pattern while rotating the swab to expose fresh cleaning surface to the lens. Dry any remaining dampness from the lens with a folded piece of the lens tissue. Avoid wiping the lens when it is dry; this can cause scratching. Repeat as needed until clean.

If repeated attempts at cleaning do not remove the spots, the dirt may be on another surface. Cleaning of any surface other than the top lens is not recommended and the eyepiece should not be disassembled, except by qualified technicians. A blower bulb may be used to dislodge dirt from the lower lens surface. It is not unusual for a few small spots to persist. This will not adversely affect the performance of the microscope.

**ii. Objectives:** Dirt on objective tips often degrades the image quality at a given magnification and part of the field may appear blurry or darkened. The objective tips can be cleaned with cotton tipped swabs and lens cleaning solution. The objective lenses of this type of stereo microscope are located inside of the nosepiece. They can be accessed by removing the stereo head from the base and turning it upside down. Moisten one end of the swab with a few drops of cleaning solution (DO NOT SOAK) and gently wipe the lens while slowly rotating the swab. Use a clean dry swab to wipe away any excess moisture from the lens. Avoid wiping the lens when it is dry, this can cause scratching. Repeat until the image quality is restored.

**iii. Prism:** If the microscope was stored without eyepieces in place, dirt may have settled on the erecting prisms. This can be seen by looking down the eyepiece tubes. If dust is present, it can be dislodged with a blower bulb. Never attempt to disassemble the microscope head.

**iv. Damaged Optics:** Damage to optical surfaces can occur through accident or mishandling. In most cases the only remedy is to replace the damaged component. Improperly cleaned eyepieces can become scratched. This will appear as a series of white or gray lines in the field of view. Eyepieces that were dropped may suffer from cracks that appear as dark lines (do not confuse with hair or pointers) or lens separation that causes the whole upper lens group to become cloudy. Objectives that were repeatedly exposed to liquids may retain contaminants inside and produce poor images even if the outer lens is clean. If the entire stereo head is dropped, optical misalignment can occur (requiring repair by a skilled technician). The problems listed above can easily be avoided by exercising caution and following the guidelines laid out in this manual.

## 5.e Upper Lamp Replacement

If the incident illuminator (upper) will not function at any dimmer setting but the transmitted light (lower) illuminator functions as normal, the upper illuminator bulb is probably blown. Replace it as follows:

**WARNING, ELECTRICAL HAZARD! Unplug the power cord prior to replacing bulbs.**

**WARNING: HOT! Do not attempt lamp replacement until the bulb has fully cooled.**

First look at the lighting unit. Determine if the lamp is a reflector type, as in a slide projector, or just a small push-in bulb. If you have the newer microscope, within the last year, it is probably the reflector type. If so, just unscrew the front ring and lens. Grasp the reflector by the edges and pull straight out. The replacement part is #6600BUR. To install the new lamp unit, grasp the reflector by the edges and align the two pins in the back and push straight in. Reattach the outer ring and lens by screwing it back on.

If the upper lamp does not look like above follow the next set of instructions. The replacement part for the upper push-in two-pin halogen bulb is #6099B. Loosen the two knurled knobs, located on either side of the incident illuminator housing. Carefully remove the illuminator housing. Electrical leads will remain attached to it. Located inside the housing is the illuminator socket. This is held in place by two small phillips screws. These must be removed to gain access to the bulb. Exercise caution to avoid misplacing the screws. When the socket is free, grip firmly and extract the old bulb by pulling it straight out of the socket.

**Do Not Handle the Bulb With Bare Hands!** Using gloves or a piece of paper, remove the new bulb from its protective envelope. Avoid touching the bulb with bare hands; doing so can shorten its life. Align the two pins of the bulb with the holes in the socket and press it straight in. Reattach the illuminator socket to the housing and fasten the bracket back in place.

## 5.f Lower Lamp Replacement

**WARNING: ELECTRICAL HAZARD! Unplug the power cord prior to replacing bulbs.**

**WARNING: HOT! Do not attempt lamp replacement until the bulb has fully cooled.**

### Incident Fluorescent Base (lower)

If the incident illuminator functions as normal but the transmitted illuminator will not function, flickers excessively or takes over 30 seconds to activate, the lower illuminator bulb is probably worn out. Replace it as follows, Remove the microscope head from the focusing mount and turn the microscope base upside down to reveal the base plate. Remove the four screws from the rubber feet and remove the base plate. Grip the old bulb firmly and extract it by pulling it straight out

Remove the new bulb #6600BFB from box. Align the base of the bulb with the holes in the socket and press it straight in. Reattach the base plate and rubber feet.

### Transmitted Halogen Base (upper)

If the transmitted light illuminator will not function at any dimmer setting but the incident illuminator functions as normal, the lower illuminator bulb is probably blown. Replace it as follows:

Remove the microscope head from the focusing mount and turn the microscope base upside down to reveal the base plate. Remove the four screws from the rubber feet and remove the base plate. Grip the old bulb firmly and extract it by pulling it straight out

Using gloves or a piece of paper, remove the new bulb #6099B from its protective envelope. **Avoid touching the bulb with bare hands**, doing so can shorten its life, align the two pins of the bulb with the holes in the socket and press it straight in. Reattach the base plate and rubber feet.

## 5.g Fuse Replacement

The fuse holder is located at the back of the electrical base. If the fuse is blown, the electrical system of the microscope will appear totally dead. No light or transformer noise will be detectable at any setting.

**WARNING: ELECTRICAL HAZARD! Unplug the power cord prior to replacing the fuse.**

Located on the back of the electrical base, is a screw cap labeled "fuse". Unscrew the cap and remove the old fuse. Do not attempt to ascertain the condition of the old fuse by visual inspection. The wire inside is very fine and hard to see. If available, use an ohmmeter to see if the circuit in the fuse is open or closed. If infinite resistance is detected, replace the fuse. Place a new 0.5 amp fuse (FS-05) in the fuse holder and screw the cap in place.

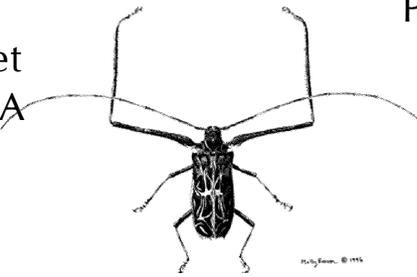
If the electrical system still does not work, check the bulbs and dimmers. Make sure the electrical outlet is working and provides good contact to the power cord. If the unit continues to blow fuses, It may be a sign of a more serious problem. Do not attempt to resolve it by putting higher amperage fuses in place. Have the electrical system inspected.

## 5.h Mechanical Service

Periodic service by qualified technicians is recommended to keep the microscope in prime mechanical and optical condition. The focusing and zoom mechanism requires cleaning and re-lubrication to remain smooth and responsive. How frequently service is needed depends on the use the instrument receives. For heavy use, annual service is recommended. Signs the microscope requires service are mechanisms becoming excessively stiff or gritty in feel, unresponsive or loose.

Sometimes the lubricant will stiffen if the unit has been stored for a long period of time or in a very cold environment. If this is the case, function may be restored by working the mechanism back and forth several times to overcome the viscosity barrier. If any grittiness or strong resistance is detected, the microscope will require service. Make sure the focus tension control is not set too tight.

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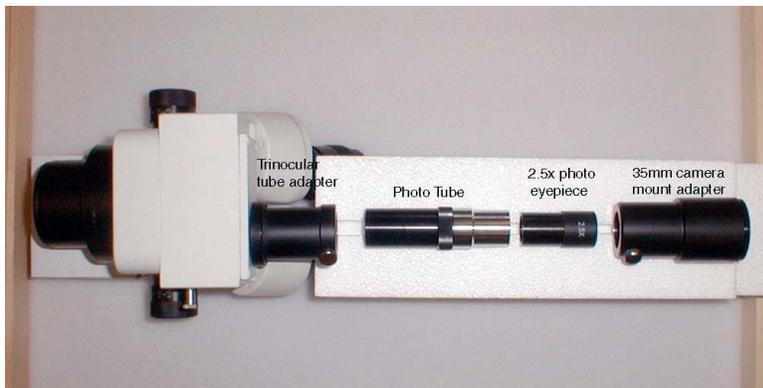
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The following pictures provide visual assembly instructions for the “in-line” and/or “right angle viewer” camera adapters available for the #6603, #6604, or #6605 Trinocular Stereo Microscope available from BioQuip.

In addition to the adapters, the customer will need to provide a 35mm or digital camera and “T” mount and to complete the picture taking process. BioQuip carries the following “T” mount adapters, p/n #6606X [C-Cannon, CE-Cannon EOS, N-Nikon, P-Pentax, M-Minolta, Y-Olympus]. We also carry adapters for selected Sony Mavica (#6606SDIG) 27mm, selected Nikon (#6606NDIG) 28mm Cool Pix digital cameras and any digital or camera that takes 52mm threads. Adapters for over the eyepiece and ‘C’ mounts for video units are also available. Inquire

Extra lighting is highly recommended with “Fiber Optics”, such as the BioQuip #6101B or #6102B being the lighting of choice. Cool and bright. You can use flash units with extension cords or desk lamps, preferably halogen type lighting, if you desire.

Most beginning microscope photographers will need to take some test pictures to determine proper exposure settings. Good Luck and enjoy.



In-Line camera adapter.

Camera  
T-mount

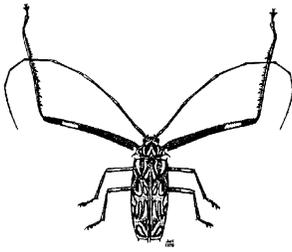
Camera



Right-angle focusing camera adapter.

Camera  
T-mount  
adapter

Camera



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## Instructions for using: Digital Camera Adapter with Microscopes

### **Standard Microscopes:** Over the eyepiece type

1. Screw the Camera Adapter onto the camera, using the threads provided in **front** of the camera lens for installing filters or accessory lens. Tighten the adapter until it is snug (usually about 1-1/2 turns.)
2. Remove the eye guard from the eyepiece that has the focus adjustment on your microscope.
3. Slide the camera adapter over the eyepiece until it is snug on the shoulder of the eyepiece.
4. Tighten the thumb screws on the camera adapter while holding the camera adapter snug and flat on the shoulder of the eyepiece.
5. Shine a bright halogen light onto the specimen that you wish to photograph. (We offer a 20 & a 180 Watt Halogen Fiberoptic light source that works well. #6101B/ #6102B)
6. Focus your photograph by adjusting the microscope focus up and down.
7. If you see a black "halo" around the edge of the picture - use the zoom control on your camera to zoom in until the "halo" is gone.

### **Trinocular Microscopes:**

1. Screw the Camera Lens Adapter onto the camera, using the filter threads provided in **front** of the camera lens for installing filters or accessory lens. Tighten the adapter until it is snug (usually about 1-1/2 turns.)
2. Slip the assembled setup onto the photo adapter tube with the 10X eyepiece and insert into top ocular receptacle on microscope head.. Refer to the included instructions for a picture of same if needed.

Over the eyepiece adapters as well as digital camera adapters and a special trinocular eyepiece mount are available also. In most cases your digital camera may need a special **lens adapter**, made by you camera manufacturer, to interface with the Microscope

Please remember that the digital area is still evolving and the industry has yet to establish any standards. We are trying to keep abreast with current changes and advancements to better serve your needs. We are currently carrying adapters that will fit Nikon 28mm filter threads, Sony 37mm filter threads and a generic 52mm thread.

Thank you for using BioQuip and good luck with your new adventures.

BioQuip Products, Inc.

Visit us on the web at <http://WWW.bioquip.com> or drop us a note at [info@bioquip.com](mailto:info@bioquip.com)



Lens adapter for moveable lens digital cameras specific to camera from mfg. Usually mounts on threads in camera body and allows the use of filters, etc.



Lens Adapter normally from Camera MFG. Made for your particular camera if it will accept lens filters there should be threads in the camera body.

The "Lens Adapter" is made by your camera manufacturer and is sometimes included in your camera package, if not it will have to be ordered from the camera company. Your camera must be able to accept external filters for it to, i.e. there must be threads at the front of the lens area.



The long tube is the **digital camera lens adapter**. In this case the Sony, 37mm fits nicely with the Kodak 'lens adapter'.



The 10X eyepiece and the eyepiece tube make up the "Digital Camera Adapter" for the Trinocular

Microscope. The Digital Camera Lens Adapter will fill over most Microscope eyepieces for added value and functionality.

