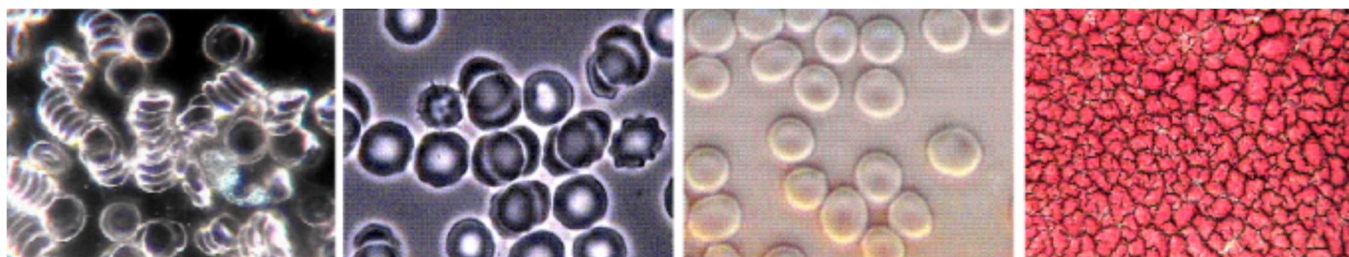




Quick Set-up Guide for the Biomedx Configured Olympus CX43



Please refer to the **Olympus CX43 Manual** link below for more complete user operation. This guide is meant to give you a quick overview of the system setup and the camera operation with pertinent specimen viewing tips.

>>> STEPS FOR MICROSCOPE ASSEMBLY <<<

When you get your microscope you will find that the various parts are packed in different boxes. You will find it advantageous to take everything out of the boxes and lay them on a clean work surface so you can then begin the identification process and assembly.

Depending on your chosen configuration, you may have parts and pieces that differ somewhat from what is shown here. You may have some components and not others though in all respects the basic nature of the assembly of parts does not differ.

ON-LINE REVIEW FILES & VIDEOS

Quick video review of this microscope's operation.

<https://media.biomedx.com/sitevids/using-microscope.mp4>

Review pages on getting a sample slide specimen and viewing with the scope.

<https://media.biomedx.com/sitedocs/microscope-specimen-observation.pdf>

Other Files (Olympus user manual) & Videos found at:

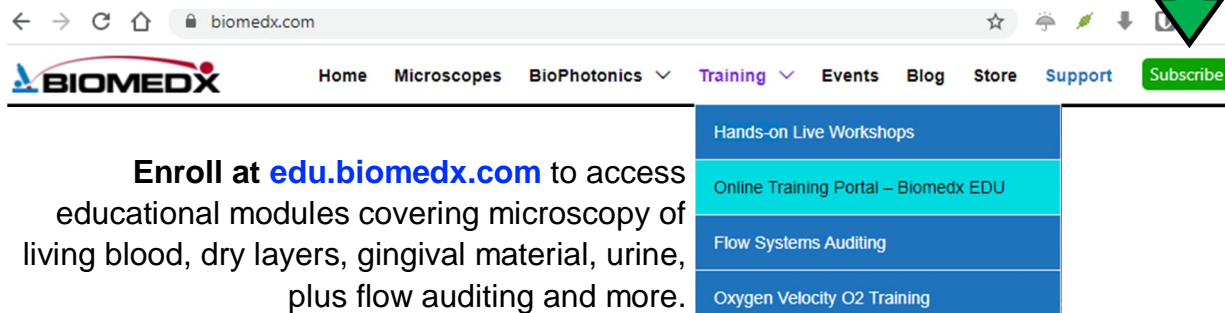
<https://biomedx.com/support>

<https://youtube.com/biomedx>

Direct link for the Olympus CX43 user manual

<https://media.biomedx.com/sitedocs/olympus-cx43-manual.pdf>

Sign up to the Biomedx Newsletter to keep informed on events, classes, online programs, new hardware, scope scoops, etc. at biomedx.com



The screenshot shows the Biomedx website interface. At the top, there is a navigation bar with links: Home, Microscopes, BioPhotonics, Training, Events, Blog, Store, Support, and a green Subscribe button. Below the navigation bar, there is a section for signing up to the Biomedx Newsletter. A large green arrow points down to the newsletter sign-up section. Below the newsletter sign-up section, there is a dropdown menu for Training resources, which includes: Hands-on Live Workshops, Online Training Portal – Biomedx EDU, Flow Systems Auditing, and Oxygen Velocity O2 Training.

Enroll at edu.biomedx.com to access educational modules covering microscopy of living blood, dry layers, gingival material, urine, plus flow auditing and more.

Assembly Steps

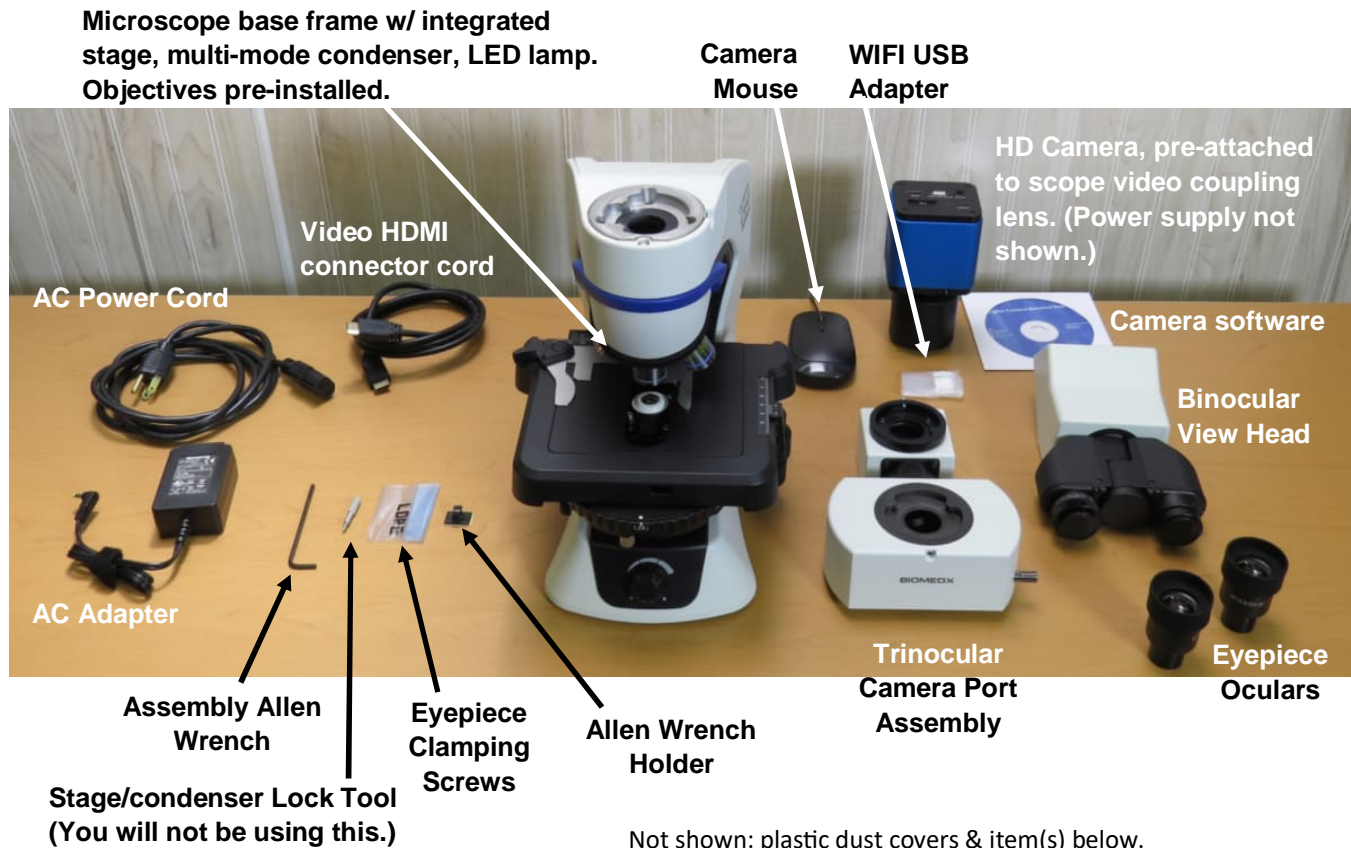
Setting up Your System	4
Mounting the Trinocular Port	5
Putting on the Camera Assembly	6
Parfocal Monitor/Eyepiece Adjustment	6
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Plugging in the Camera	8
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Video Only Setup	10

Operation Notes

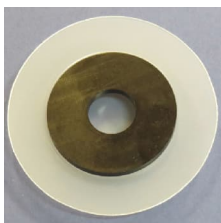
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Setting up Your System - Begin by laying everything out on your workspace.

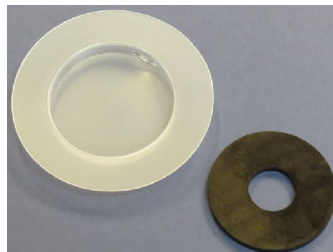
When you do, you will see something like the picture below differing only in the items that were selected in your particular configuration. Biomedx pre-assembles, pre-checks and pre-adjusts everything prior to shipping so the objectives will already be mounted in place.



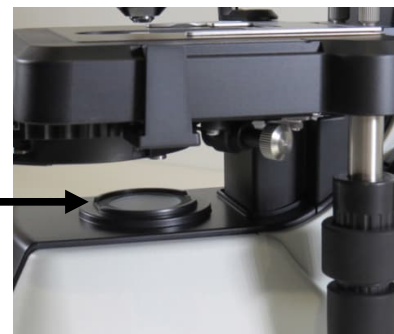
When your scope shipped there was a top cover over the objective tube opening on the very top of the microscope. It is not shown on the scope in the above picture but shown below. Fitted inside the plastic cover is a black plastic donut (there may be two of these). This is a darkfield enhancer. When the microscope is being used in darkfield mode, this donut can be slipped above the light lens at the base of the scope. This will enhance darkfield imaging by taking out some of the scattered light which tends to lighten a darkfield background. You can leave it there for phase contrast & 3D views as it will not affect the image, but it must be removed for brightfield. Whether the donut with the smaller or larger hole is used depends on the specimen and the objective. You can experiment.



Scope top-hole cover with dark-field donut/disc.



Disc removed from cover. Place onto filter space shown to enhance darkfield view in turret DF mode.





Use the Allen wrench to loosen the set screw a bit then mount the assembly and tighten.

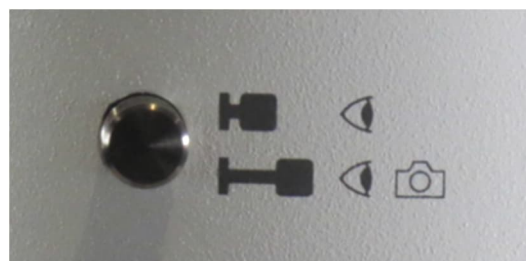


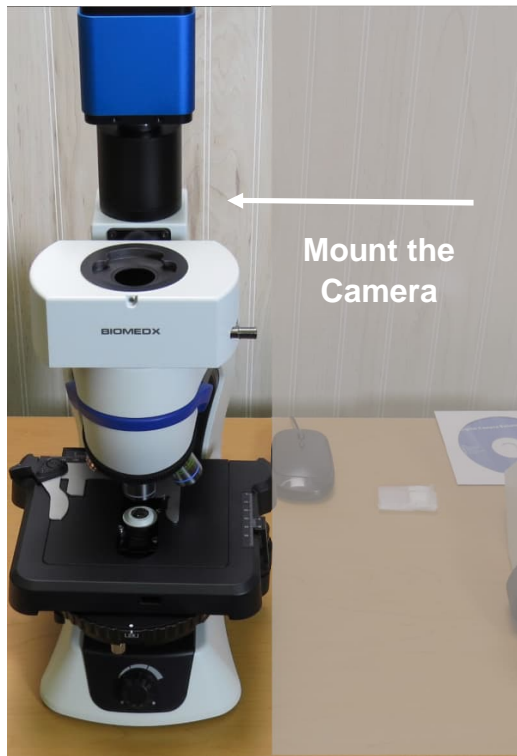
Note: There is a slider bar on this assembly. This slider moves an internal prism back and forth. When the slider is pushed in, 100% of the light is directed to the eyepieces. When pulled out, 20% of the light remains in the eyepieces and 80% is directed to the video camera.



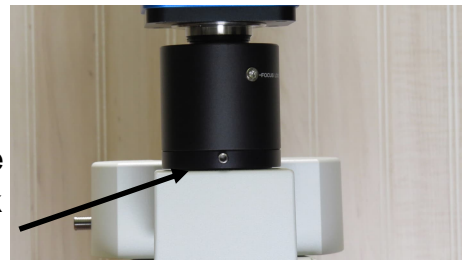
To see an image on your camera's TV, the slider must be pulled OUT.

If the bar is only pulled half way out, you will only see half an image on your monitor.





The set screw to hold the camera assembly in place points to the back on the port itself.



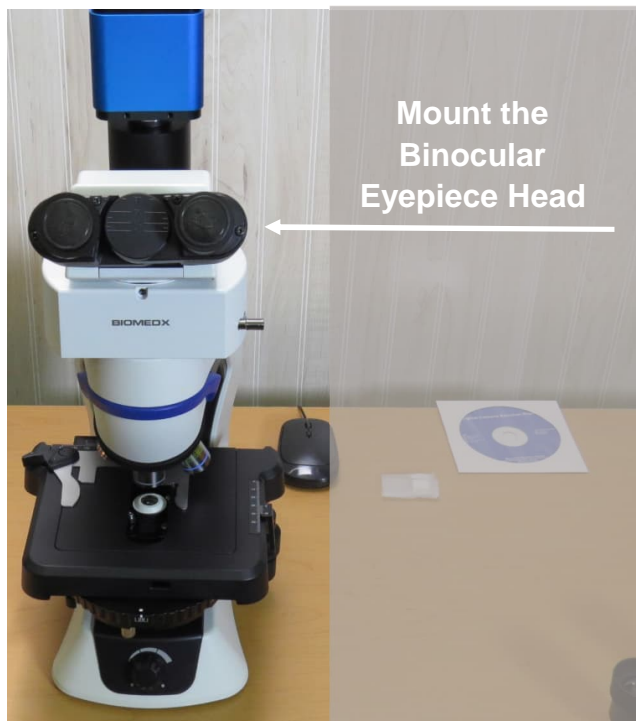
The video camera is pre-mounted on a microscope optical coupling lens.

You will note two set screws, marked FOCUS and LOCK.

This is for **parfocal adjustment**. These are preset before shipping.

Parfocal means when you have a focus on your microscope (as viewed through the right eyepiece ocular) your video image will also be focused.

If your monitor is not in focus with your right eyepiece scope view, you can correct the video focus by loosening the lock screw, adjusting the focus screw which will focus the video on the monitor, and then re-tightening the lock screw to hold it in place.



(See page 10 for video only setup using no binocular view head or eyepieces.)

The set screw to hold the head in place is directly in front and below the head.



Note that the oculars just slide right down into the hole.

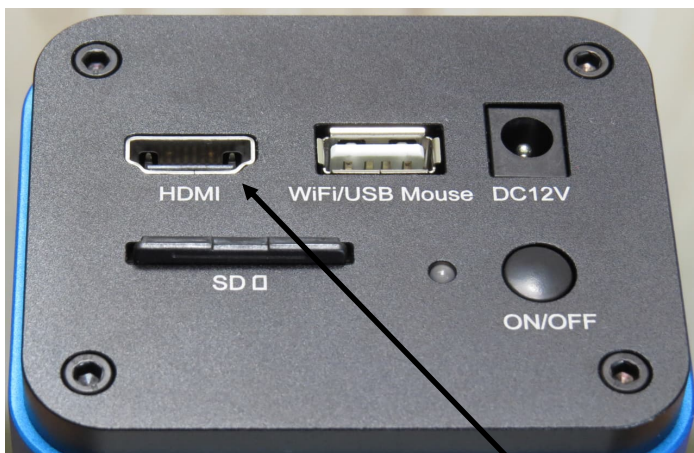
If desired you can screw the supplied clamping screws into the tiny screw holes on the ocular barrel to hold them in place.

The rubber eyecups can be unfolded for normal viewing as shown here on the left eyepiece or folded down as shown on the right eyepiece when wearing glasses.

The eyepiece tube assembly can be pulled apart as well as tilted to adjust for your own eyes.



The left eyepiece tube has a diopter adjustment. In use, you would focus the microscope viewing the right eye first, then adjust the diopter to focus the left.



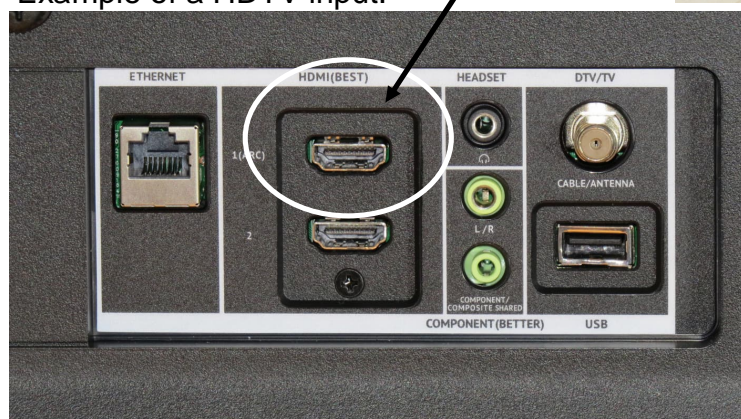
Plug in the AC adapter for the camera to DC12V.

Plug the mouse into the USB port.

Plug one end of the HDMI cable into the camera slot marked HDMI and the other end into your HDTV HDMI input.



Example of a HDTV input.



The HDMI cable will have ends as shown here.

NOTE: Computer HDMI slots are OUTPUT slots for monitors and NOT input slots for cameras. **DO NOT plug your camera HDMI cable into a computer HDMI slot.**

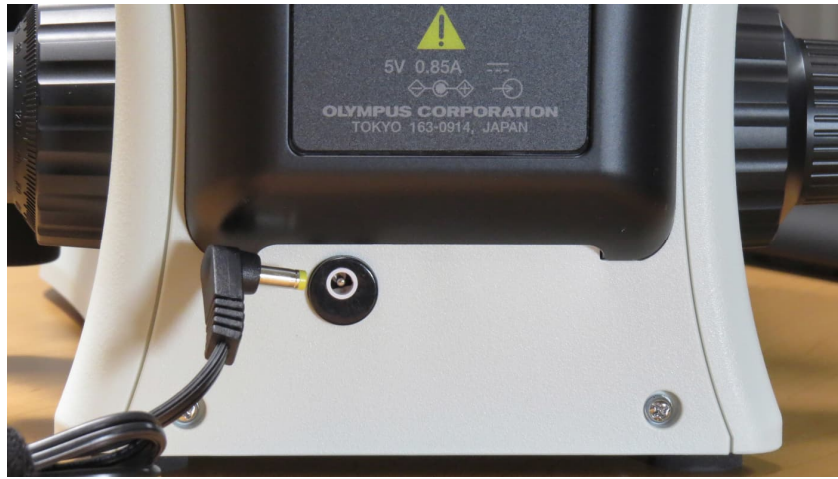
The best imaging will be on a HDTV with 1920 x 1080 resolution.



Here is a 24" HDTV on a desk stand to raise it off the desk. Up to 32" size can be mounted in this fashion.



Using WiFi for image capture: Plug the WiFi chip into the camera's WiFi/USB Mouse socket. Turn on the camera and go to your computer's WiFi settings to view available networks. Find BIOMEDXCAM and connect using password 12345678. The camera will now be able to be found via the camera's software (which must also be installed on the computer/laptop.) See pages 17 & 18 for more info and WiFi-less ideas.



As a last step to set up,
plug the AC power
adapter into the back of
your microscope.



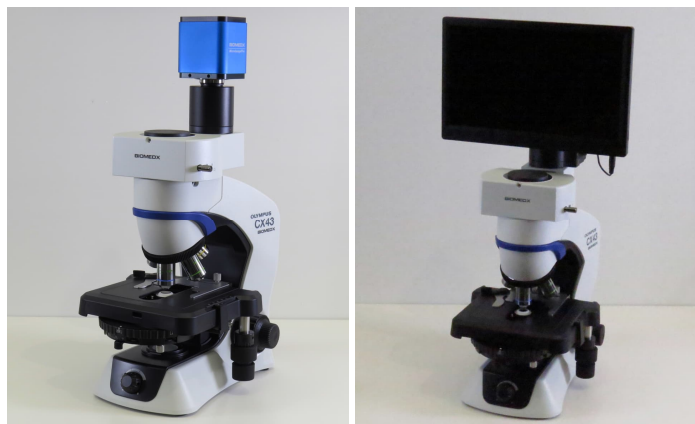
You will note a Velcro strap on the power
cord, you can use this and other Velcro
straps to tidy up the cords behind the
microscope and from the camera.

It's always a good idea to plug your system into a surge protected AC power
strip. When you are not using your system you can simply switch off the power
strip. In addition, when not using your microscope, you can put a cover on it to
keep the dust off. When using a plastic cover, just pop it over the whole scope
leaving some room for air to get in the bottom so you don't lock in any moisture.



Assembled system.

Video only system & with a view screen.



NOTE FOR VIDEO ONLY SCOPE

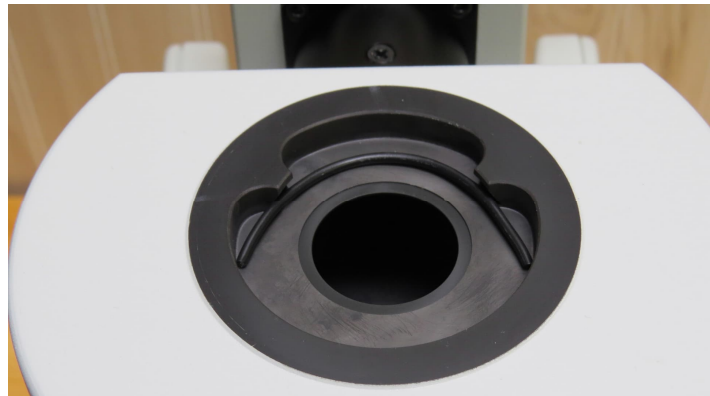
If you purchased a “Video Only” microscope, this page should be reviewed in lieu of page 7 of this quick set-up guide which shows you the trinocular video port set up for a video only scope. The steps shown here may have already been done prior to the scopes shipment to you. If it has not been done, do the setup procedure below.

(If you have a binocular port with eyepieces and desire to temporarily ‘travel light’ without that assembly, you can obtain a short 14-16 gauge wire as shown and you can swap the binocular head with the camera port cover cap through this procedure.)

Packaged with your trinocular port is a short wire.



Place this wire into the binocular head receptacle slot as shown here.

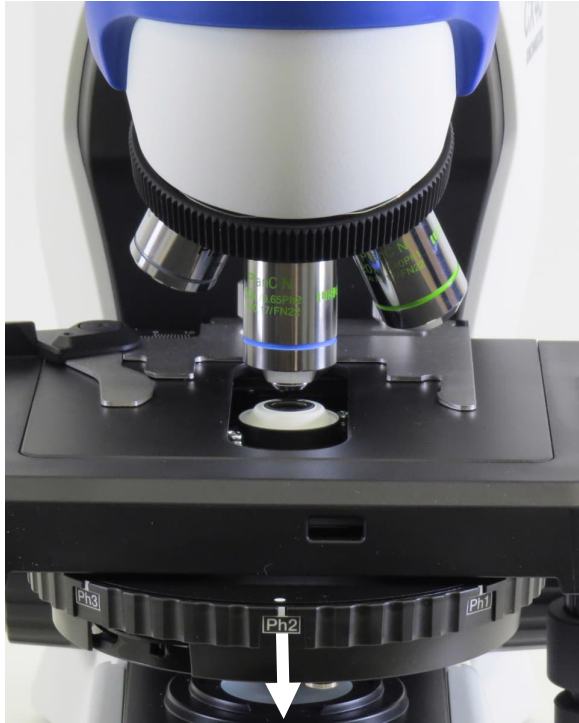


Move the camera port cover cap from the back to the front and lightly tighten the set screw in front to center the cap and keep it in place.



Should you get a binocular view head with eyepieces in the future, you would simply remove this cap and wire and mount the head as shown on page 6 of this set-up guide.

OPERATION NOTES

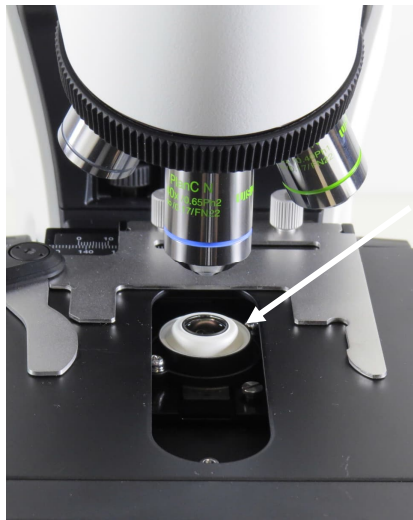


Your microscope has a factory built-in multi-mode universal turret condenser. By simply rotating the condenser turret left or right, you can change the condenser mode from brightfield to darkfield to phase contrast and even to a 3D image perspective.

Condenser Modes

- DF— Darkfield
- PH3— Phase Contrast using 60x and 100x oil phase objectives.
- PH2— Phase Contrast using a 40x phase objective
- PH1— Phase Contrast using a 10x or 20x phase objective
- BF— Brightfield (note that this setting has an associated condenser iris adjuster and set-screw to set image contrast/depth of field). Generally for live blood viewing you would close the iris quite a bit to give you more contrast and depth of field, and open it up for a dry blood view to give you less contrast and depth of field
- 2X— This is when using the 2X plan objective so you can see a wider field of view when looking into the eyepieces.
- FL — This is for reflected light fluorescence viewing (Scope as shipped is not equipped for fluorescence.)

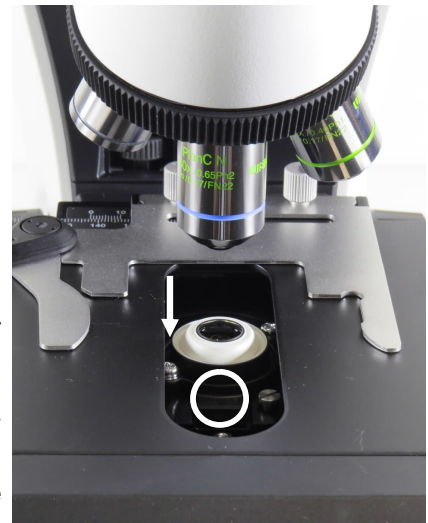
The most popular Biomedx configuration is set up for non-oil microscopy using all condenser modes and will have 2x, 4x, 10x, 20x, 40x objectives. The 2, 4 & 10x optics are typically used for brightfield viewing (the 10x will give a very wide field darkfield view) The 20x is a phase objective and you will find PH1 indicated on the lens barrel telling you to use the PH1 setting on the turret. You can also use DF. The 40x is a phase contrast objective and an everyday working optic for live cell work. It uses the PH2 turret setting for phase contrast, DF will provide darkfield, and if you slightly shift the turret out of the DF indent position, you will have a 3D view of your sample.



The top condenser lens can be oiled IF you were using an oil objective.

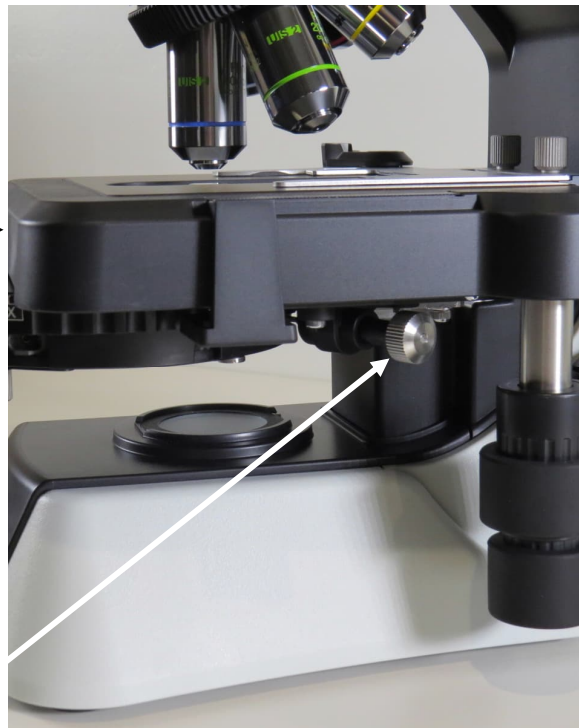
The lens can be pulled forward an inch to drop on the oil and for cleaning.

NOTE: During travel or shipping this lens can move forward, make sure when operating the lens is pushed back into place.



Microscope Stage

Phase Contrast adjusting knobs are found on both sides of the scope.***



X-Y slide control

***** IMPORTANT NOTE** These knobs are essentially screw drivers on a spring. If you were in the PH1, PH2, or PH3 mode on the condenser and pressed in on these knobs and then rotated them, you would move the pre-adjusted phase annulus of the condenser and push it out of adjustment. **DO NOT** do that unless you know what you are doing and have a phase centering telescope and can put the annulus back where it belongs. See the manual and review videos on-line for reference.

The phase contrast adjustments were pre-set for the phase objectives on your microscope prior to shipping and once set about the only way they can be un-set is to inadvertently or directly push in and rotate these knobs. Ergo, **DO NOT** push in and rotate or fiddle with these knobs because you could put your phase imaging and clarity out of whack.



Focus knob: Raises and lowers the stage. Large outer knob is course focus, inner smaller knob is fine focus.

On/Off Switch



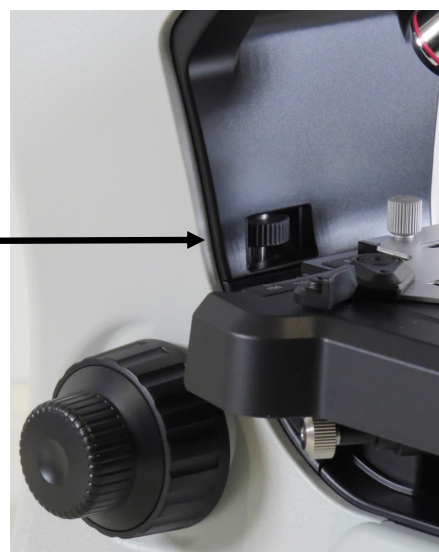
Light intensity dial: Typically turned down for brightfield lighting, about 12 o'clock to 3 o'clock range for phase, 1 o'clock to all the way up for darkfield. The settings are specimen and objective dependent, for video viewing the camera default mode is to auto-adjust for any lighting situation.



Focus knob and stage tension: The inner ring on the right focus knob is a stage tension adjustment. With your fingertips you can rotate it counter-clockwise to loosen the stage tension and focus knob. If too loose, the stage can vertically drift down by itself and that can be corrected by tightening the tension ring.

Setting a stop point for the stage:
This is the pre-focus/stage stop adjustment wheel.

See page 15 of the Olympus instruction manual for more details on both of these last items. Please read this manual for much more technical data and detailed operation information for this microscope.



VIDEO CAMERA



The Biomedx MicroImagePro is a select high definition video camera with internal operating software. The camera engineers specifically adjusted the software to the Biomedx specifications required for our live cell imaging market. Inside there is a Sony high pixel size chipset with very high dark signal sensitivity. Coupled to the Olympus optics, the result is superior live video imaging at up to 60 frames per second.

The on-board software is accessed via the mouse that is plugged into the camera's USB port. An arrow will appear on your TV monitor when plugged in.

Moving the arrow to the bottom edge, top edge or left edge of the screen will bring up different menus.

Below is the monitor left edge menu.

Mouse clicks on Snap or Record will take a picture or begin recording a video to the SD memory card.



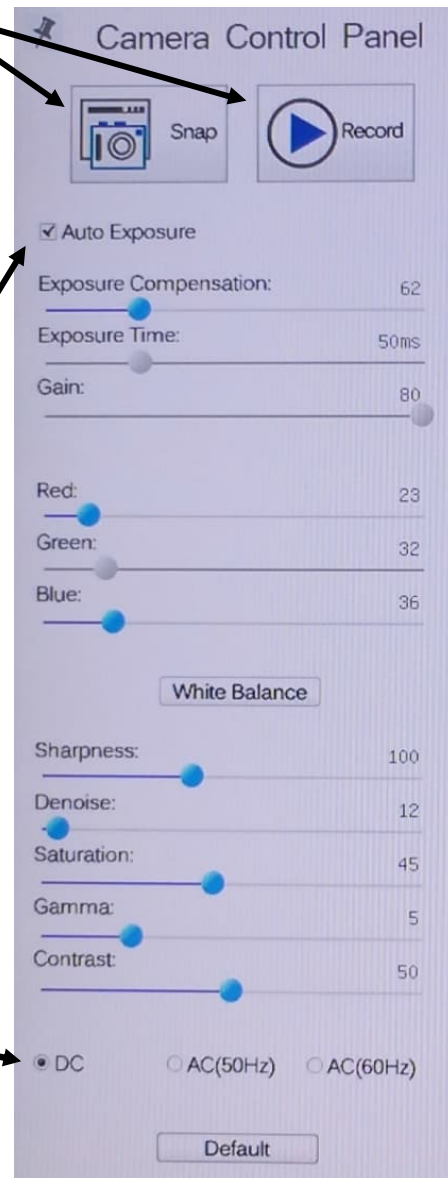
For everyday scope viewing in all modes, the Auto Exposure (AE) mode should be selected and checked.

With AE set the camera will handle the exposure details for varying light levels.

The values shown on the panel for the blue highlighted sliders are those you can adjust manually. Shown here are what we set them at for testing the scope prior to shipping and they work well for all around viewing in all modes of the microscope but may need to be tweaked along with your HDTV settings. They are shown here in the event you should move the values and forget what those starting values were.

Because the scope runs on DC powered LED lighting the DC button is selected.

The Default button will return the camera to the internal software's default settings.



Your selected HDTV will have its own menu system to adjust color, brightness, contrast, backlight, gamma, etc.

The default settings of the camera itself (values which may differ a bit from those shown here) are a good place to leave the camera settings and from there you can tweak your TV settings.

Because specimens can have very bright elements (like eosinophils in blood) as well as less bright elements in the blood plasma (like fibrin), this huge variation in light intensity is a lot for the pixels in a camera chip to handle on equal footing. While phase contrast handles it all very well, darkfield mode does not.

When you are in darkfield mode, you should be using the darkfield enhancing donut to darken the background field. Decreasing the light of the microscope may help refine the image of red blood cells, while increasing the light may enhance elements seen in the plasma. Increasing the Exposure Compensation on the menu may highlight plasma elements even more and with auto exposure turned off you can vary the overall Gain and Exposure Compensation as well but you would need to go back to Auto Exposure when exiting darkfield mode as there would then be too much light and the camera would wash out.

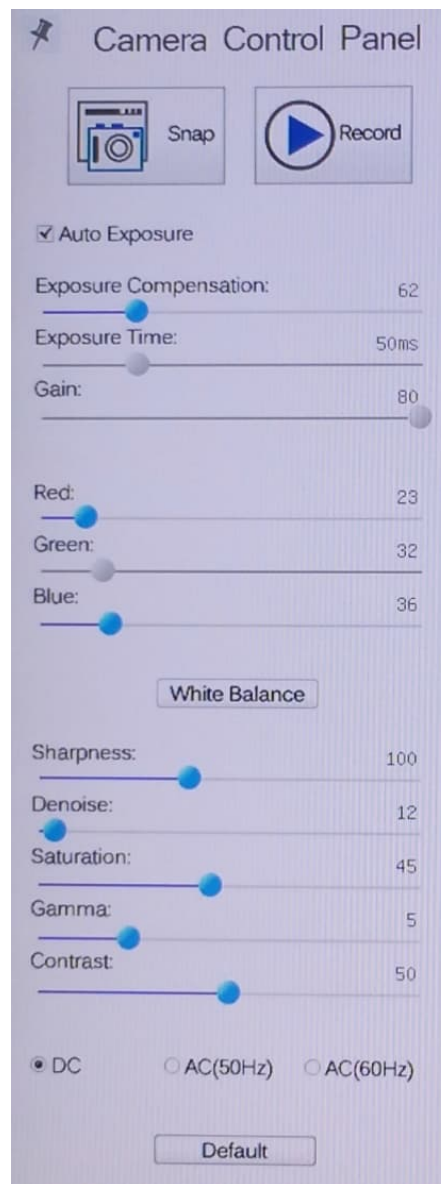
White Balance When you press the White Balance button on the menu, the camera will adjust the red and green values for 'white' depending on what the camera is looking at. Where the values move will vary depending on the scene. Generally White Balance would be set while looking at a field of light in brightfield mode. If you were in phase contrast mode, the values would be different.

The Red and Green values of Red 23 and Blue 36 are very good for phase contrast using the LED light of the CX43. Just a single point up or down can change the image color slightly. Whether it needs to be tweaked may depend on your monitor. Moving the red or blue value a single point up or down with the mouse can be difficult. The mouse scroll wheel moves the values at 3 point increments. To arrive at the value you want, scrolling up from 0 or down from 200 will often land you on the value you want.

Sharpness setting from 20-150 can all look very good and sharpen the image to your preference but where it should be somewhat depends on your HDTV sharpness setting. With some TVs the camera can be at 0 and the TV sharpness set higher, it might be just the opposite for other TVs. Setting sharpness higher can make the image appear very sharp and nice, but when digitally zooming in, fractal patterns become evident and decreasing sharpness will lessen that fractal effect.

The **Denoise** filter on the camera should not go above 9 to 12 for live cell imaging. Set at 12 it gives a slight refinement to the picture, above this and it starts affecting the real time movement of blood particles too much. As the software massages the image to refine it, the process slows down the real time movement that is actually occurring. If that is not a concern, than a higher value here will refine the image.


Saturation is related to how deep color renders. 45 here is about right, your HDTV will have a level for this level as well.



Gamma adjusts the output to the screen of the shading from white to black. For all around scope use using all modes of the condenser, 5 is typically a good place for it to be. If your TV has a dark gamma to begin with (some computer screens have a dark gamma and can't be changed), bumping this down will lighten the screen image, with some monitors or HDTVs you will have to increase it to 6.

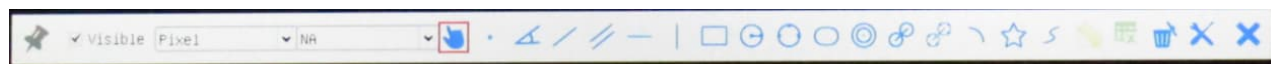
Contrast at 50 is often good and you can tweak your HDTV contrast setting as desired or vice versa. Some HDTV/computer monitors will not provide great contrast and moving this camera contrast setting much higher will be required, possibly more so for darkfield.

Moving the mouse arrow to the bottom edge of the video screen brings up this menu:



<p>Mouse clicks here gives you a digital zoom and unzoom feature. You can get a good image with 1 to 4 clicks of the + box, beyond that you will get digital roughness. In some cases, zooming in a lot will still provide some additional image info. How good may depend on condenser lighting mode, denoise filter and sharpness setting.</p>	<p>Mouse clicks on the left box will flip the video image on the horizontal, the right box flips it on the vertical.*</p> <p>*When you look into the eyepieces and move the specimen left to right and up and down, the video should match this movement. If not, clicking each box here once will flip the image to match what you see on the monitor to what you see in the eyepieces.</p>	<p>Puts grid lines on screen.</p> <p>Freezes frame on screen.</p>	<p>WDR (Wide Dynamic Range) not used.</p> <p>Compares images.</p>	<p>Access SD memory card to see image and video files you have captured or recorded. Note that while the camera can record the video, you need to pull the memory card out and put it into a computer to play them.</p>	<p>Internal software version info.</p> <p>TOOLS: Menu/graph/WIFI channel setup items, video/image capture settings, ruler display on/off, time on/off, misc. settings. Each tool screen is self-explanatory.</p> <p>Note on time function: If you want to set the date of the camera to time stamp your image captures, you need to select the time function (under miscellaneous), click on apply, then exit and turn off the camera. When the camera is turned back on it will ask you to set the date and time. There is no internal camera battery so when the power is disconnected the date and time will need to be reset.</p>
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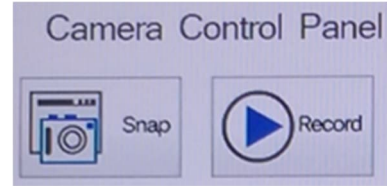
Moving the mouse arrow to the top edge of the video screen brings up this menu:



This menu is primarily for drawing on the screen and for use with a calibration slide so you could calibrate your on-screen images to obtain accurate micro measurements.

Notes on Image Capture

The camera has built in software. When you insert the SD memory card into its slot and move the cursor of the mouse to the left side of the screen, you will see the boxes to snap a picture or record a video.



Reviewing Images You can review the images snapped by moving your cursor to the bottom of the screen and selecting the folder icon to view your snaps. You can also see any filenames for videos made, however there is no playback facility in the camera itself so you would have to remove the SD card and insert it into a computer to play back the videos.

.asf to .mp4 Extension Note that the videos you see will have the .asf extension. Even if you have set the video capture to mpeg in the tools selection from the bottom screen menu, these still will state .asf. You can change this extension to .mp4 when the file is in your computer and it will play as such.

Using a computer/laptop for image viewing save/capture/record

There are two methods to accomplish image viewing, capture, and recording direct to a computer.

Method #1 - Using camera transmission via WiFi to computer software

Plug the WiFi chip into the camera's WiFi/USB socket. Turn on the camera and go to your computer's WiFi settings to view available networks. Find BIOMEDXCAM and connect using password 12345678. The camera will now be able to be found via the camera's software (which must also be installed on the computer/laptop.) If you do not have a disc reader on your computer, go to biomedx.com/support to download the file to install.

NOTE on Mouse Control: When you use the WiFi chip in the camera the mouse is no longer plugged into the camera, hence, all camera control will be shifted to your computer via the software.

NOTE on Image Snap/Record: The images captured or recorded from the camera itself will be from the image directly hitting the camera optical chip and before any image processing by the camera occurs. Hence, if you zoomed in on the image or created lines on the screen, these will **not** be captured when you snap or record the image.

NOTE on view delay: When WiFi is used, there is a slight time delay of when movement on the microscope shows up on the computer screen. Because of this, using a computer (with the software) is best used for camera control and image capture only, not as a main view screen.

To use your laptop as a main or secondary screen to capture/record images to include your zoom level, mouse movements, lines on screen, etc., use the next method.

METHOD #2 - Use HDMI to USB adapter.

On shopping sites, these will be described similar to this:

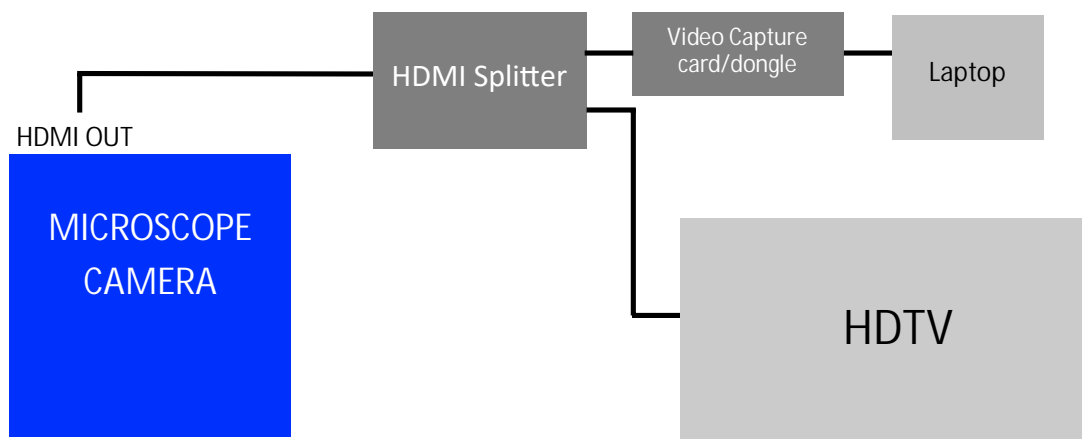
Capture Card, 4K HDMI to USB 3.0 HD Game Capture Card, 1080P Video Capture Card for Streaming.... Depending on model, expect a cost of \$17-30.



The HDMI cord from your camera would plug directly into this little dongle, the other side would plug into your USB port on your computer. Your microscope camera will then be seen as a USB camera on your computer. Open your computer's camera app and select the USB camera and you will be viewing the microscope's camera just as you would see it on your HDTV.

Anything seen on the camera app's screen, such as a zoomed in image, mouse cursor movement, lines on the screen, etc., can now be captured/recorded via the computer's resident camera app.

Dual View: If you want to view the image big screen on your HDTV and on your laptop/computer at the same time, get an HDMI splitter to view the image in both places. On shopping sites these would be described as 'HDMI Splitter 1 in 2 out'. Cost \$10-20. Examples:



USB NOTE: The USB port on the camera is ONLY for the mouse or the WiFi dongle. It is not a USB video output. Do not connect it directly to a computer expecting to see video. Use the other methods described.

Remember that all HDTVs have their own menu settings. It is impossible to go through all the possibilities. Below are reasonable settings for a Vizio 24" 1080p HDTV as shown here:



This model, the Vizio D24F-F1 used on some of the scopes in our classroom works great. The new Vizio model that replaced it is D24F-G1. Models change all the time. DO NOT GET A COMPUTER MONITOR TO USE AS A VIEW SCREEN. For best imaging from our video camera and optimum control of the image, you need a HDTV, not a computer monitor.

KEY TO SELECTING A HDTV: When selecting a model at the store, observe the picture from the sides and look at the screen from slightly above and below the TV. Compare it with others that are on the same shelf. Walk down the line observing the pictures. Pick a screen that maintains the best contrast, brightness, and definition from various angles. A few months ago I was at Best Buy and I noticed the brand Insignia with a 39" screen and 1080P resolution to be better than all the others on that particular shelf. That was surprising as it was also only \$170. More recently I saw a Samsung 32" 1080P N5300 series to be the best on the shelf for \$250. Basically you don't know how any TV will perform until using it, but in general, stick to the one with the best screen angles and it should work okay.

Example TV settings:

Auto Brightness Control = Off
Backlight = 100
Contrast = 60
Color = 50
Tint = 0
Sharpness = 70
Color Temperature = Normal
Black Detail = Off
Backlight Control = Off
Reduce Noise Selection
 Reduce Signal Noise = Medium
 Reduce Block Noise = Low
Game Low Latency = On
Gamma = 2.2

The above is what works well for our microscope work station's 24" Vizio model. For a different HDTV like the Samsung 32" N5300 model, you can try similar TV settings as shown here but tweak as needed, and you may need to tweak the camera a bit as well, typically the gamma setting may move up or down by 1 point, possibly the color might need a point movement up or down, maybe the contrast also. You will have to play with it viewing the different modes of the scope you are using while making your fine adjustments to get it exactly as you like it.

HDTVs generally have their own built in stands. If it is not of a size you will be mounting on a wall, then sometimes it is nice to add a bit of height to the TV when it is on a desktop.

This can be done with a monitor arm.

What we use on many of the lab stations in the Biotorium classroom is a VIVO stand.

It is shown here at Amazon for screens up to 27", Vivo also has the same for larger monitors:



VIVO Single LCD Monitor Desk Mount Stand Fully Adjustable/Tilt /Articulating for 1 Screen up to 27" (STAND-V001)

by VIVO

★★★★☆ 1,366 customer reviews

| 395 answered questions

Amazon's Choice for "vivo monitor st..."

Price: \$25.99 ✓prime

It also comes as a free-standing unit:



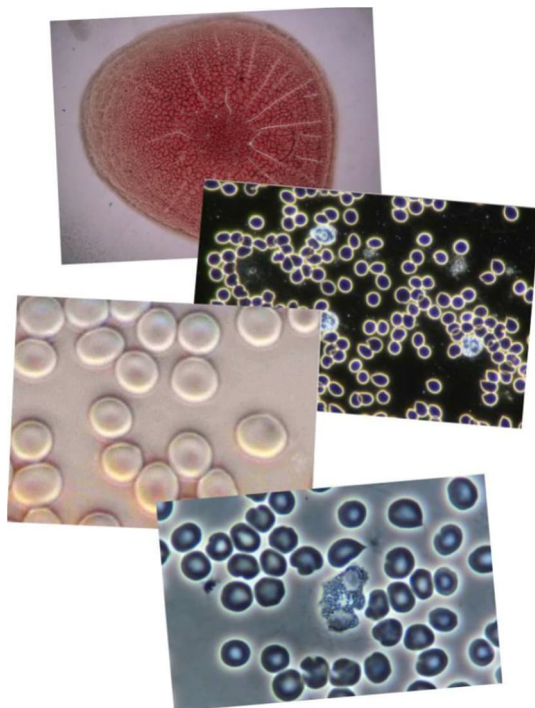
VIVO Single LCD Computer Monitor Free-Standing Desk Stand Riser with Adjustable Tilt, Swivel, Rotation | Holds One (1) Screen 13" to 32" (STAND-V001H)

by VIVO

★★★★☆ 363 customer reviews
| 121 answered questions

Price: \$29.99 ✓prime

Condenser Mode Viewing Tips



The variable mode condenser provides a lot of versatility, particularly when using non-oil optics.

BRIGHTFIELD (BF) condenser mode:

This will be used for all brightfield applications, such as when viewing dried blood clot retraction patterns as shown in the top image here on the left. In BF mode when viewing on a monitor through a camera, the field of view using a 2x optic will be on full display (you must remove the darkfield donut or variable aperture if this was in place.) However, when you look through the eyepiece with the 2x, you will see an even wider field of view and to see the whole field, you must rotate the condenser to 2X. The 2X condenser mode has a set iris so your depth of field will be slightly increased. If you want a less depth of field view on the view monitor, move the condenser to BF mode and open the condenser iris all the way. To zoom in on a clot retraction puddle area, move to the 4x and 10x or even 20x.

PHASE CONTRAST (PH2) condenser mode using a 40x objective (PH1 for 20x) - bottom image above:

40x is the everyday non-oil working optic for live blood viewing on this microscope. In phase contrast mode it has stellar image quality to provide you 99% of everything you may want to view in blood on your video monitor providing a level of morphological contrast that darkfield does not offer. It is imperative that phase contrast is aligned properly. No worries here as this is done before the scope was shipped to you. However, if you or someone else fiddled with the phase centering adjustment (explained on page 11) this may need to be reset. Your image should look as it does above and if it does you are all set.

DARKFIELD (DF) condenser mode using a 20x or 40x objective - 2nd image above.

While darkfield is older technology from phase contrast, some individuals studied with others that have used this as a primary method, often using dedicated oil condensers and oil objectives. With a non-oil setup as we have here, some adjustment is in order to get to a better darkfield view. 2 things are required; 1) when using a 40x objective you should use the darkfield donut, and 2) you may need to turn off the Auto Exposure mode of the camera and lower the Exposure Compensation setting. This was referenced at the top of page 14, pay attention to the notes listed there if you are using darkfield mode a lot.

When people have adapted to the morphological richness phase contrast offers over darkfield, darkfield is not used much, mostly to better discern nuclei in white blood cells, for doing white blood cell 100 counts, or for observing extracellular vesicle (EV) activity, often while zoomed in. While zooming in affects resolution, the gray of EVs in darkfield can allow a bit more discernment of the EVs intracellular activity.

MODULATION CONTRAST (3D) - 3rd image above.

This is not a defined mode of the condenser. It is arrived at by shifting the condenser to be slightly off the indent position of DF. When we do this we shift the light to move over our specimen more from one side of the condenser than the other therein modulating the contrast of the image. This provides a 3D perspective where we can see the concave or convex nature of red blood cells, target cells stand out, EVs are highlighted, and the morphology of plaque patterns related to bong hand vessels is more easily discerned.

GINGIVAL AND URINE SAMPLE TIPS

Mostly 20x and 40x phase, see the online PDF link shown on page 2 for specimen observation procedure.

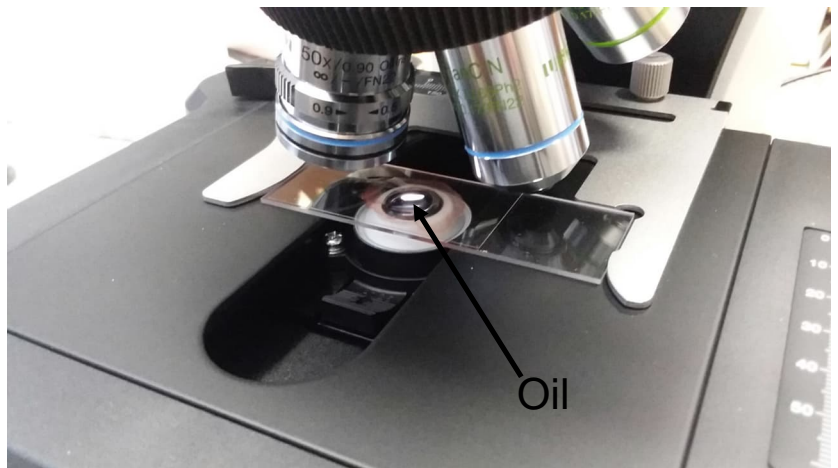
USING OIL OBJECTIVES

Having to use oil objectives is not necessary for most specimen viewing applications for day to day clinic and education use. However, if you are capturing photos or video for publication purposes and require a refinement in resolution that oil can offer, than using oil objectives may be something you might be doing. Below are tips for using oil

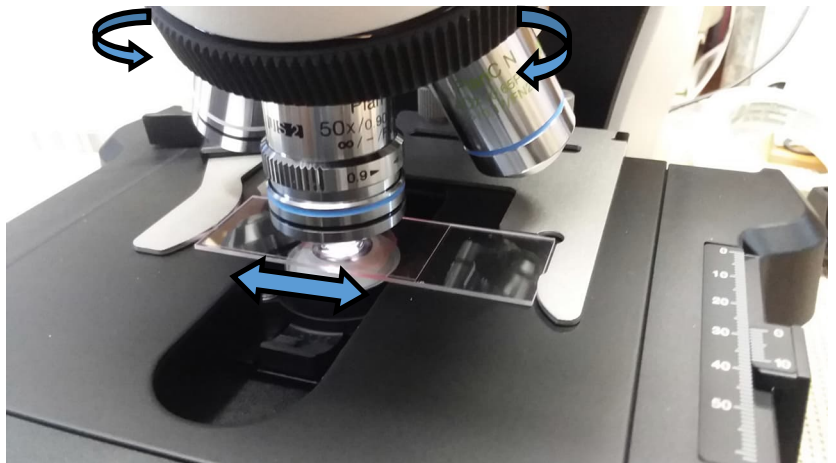
We will assume for purposes of this instruction that you have a live blood slide specimen on your microscope stage and you have been viewing this with the 40x non-oil objective in phase contrast (PH2) or darkfield (DF) mode.

Using 50x oil darkfield objective.

To go to the 50x oil darkfield objective, move the 40x objective out of the way so you are looking at your sample as shown in the picture. You will place a drop or two of the microscope objective immersion oil directly onto the top cover slip where the 50x oil darkfield (or 100x oil phase) objective will be rotated into place.

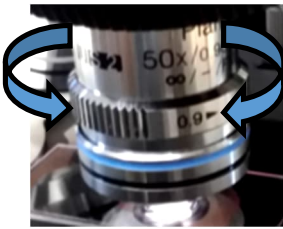
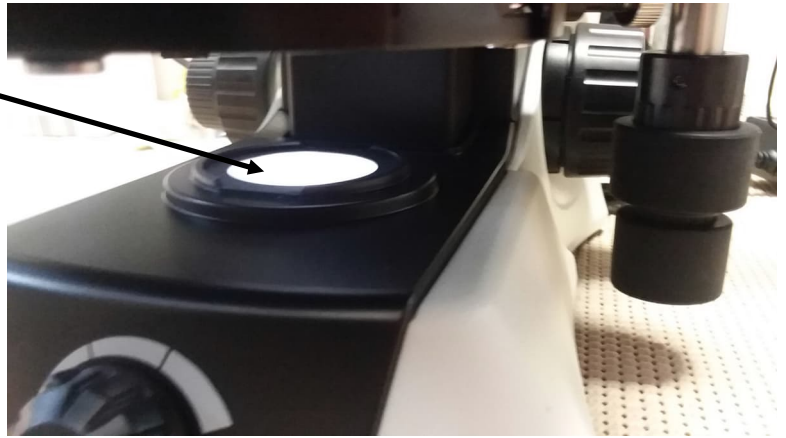


After dropping on the oil, you will rotate your oil objective into place and move it back and forth in the oil a few times (a millimeter either way) to well seat the oil around the objective lens. Your turret condenser should be moved to DF mode if not already there.



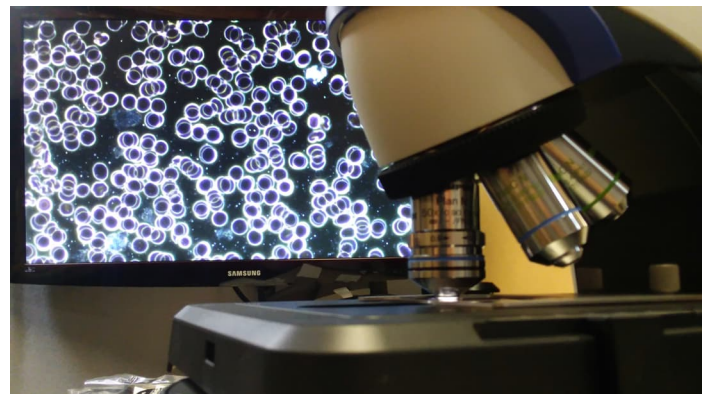


Place a donut in place over the light port shown here. This will intensify the dark background in the field being viewed. You can experiment with the two different donut sizes as there will be differences depending on the specimen being viewed as well as the objective being used.



Note that the 50x oil objective has an iris built into it which rotates in either direction.

When your 50x oil objective is in place over your sample and your condenser is properly set to DF mode with the light intensity turned UP, you will need to adjust this objective iris to obtain the image you desire. Note that different things in the sample can be highlighted more or less dependent on where the iris is set. To refine the image a bit more, you might find that turning the camera Auto Exposure off and manually adjusting the Exposure Compensation, Time and Gain will do this.



If you have a secondary market variable iris as shown here, remove the donut and place the iris over the light port instead. The iris assembly is held in place by the raised ridge that surrounds the light port. When you put it in place there will be a little bit of play in any direction but it will be roughly centered.

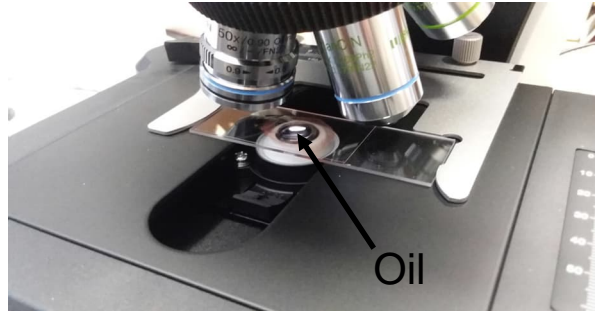
To move the iris assembly itself, hold the outer portion of the assembly with one hand, and adjust the iris lever with the other. An iris will give a little more variability to the light as opposed to the fixed aperture of the donut.

Using 100x oil phase objective after using the 50x oil darkfield.

Here you would simply rotate the 50x out of position and rotate the 100x oil phase objective into place (moving it back and forth about a millimeter either way to well set the lens into the oil.) It is conceivable that you might need another drop of oil on your slide cover depending on how much you may have moved the slide around using the 50x. If that is the case, just rotate the 100x out of place and put another drop of oil down. Set the condenser to PH3 and you will have a 100x phase contrast view that is much magnified.

Using 100x oil phase objective after using the 40x oil non-oil objective.

This process is similar as to using the 50x oil objective. We will assume that you have a live blood slide specimen on your microscope stage and you have been viewing this with the 40x non-oil objective in phase contrast (PH2) or darkfield (DF) mode. Rotate the 40x objective out of the way so you are looking at your sample as shown in the picture. You will place a drop or two of the microscope objective immersion oil directly onto the top cover slip where the 100x oil phase objective will be rotated into place. After dropping on the oil, you will rotate your oil objective into place and move it back and forth in the oil a few times (a millimeter either way) to well seat the oil around the objective lens. Your turret condenser should be if PH3 mode.



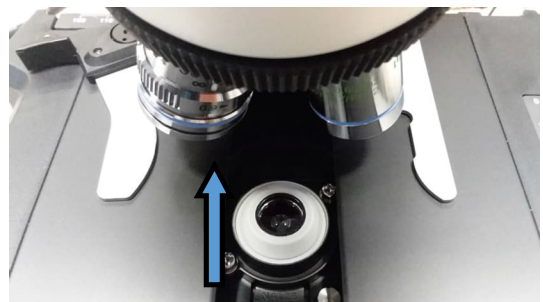
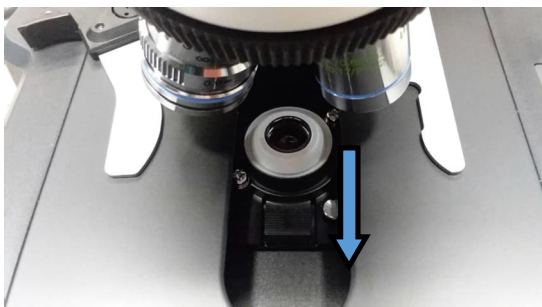
Never go back to the 40x non-oil objective after using an oil objective as it is not designed for oil and if oil seeps into the lens chamber it can be ruined.

Oiling the Condenser

The microscope's universal turret condenser has a numerical aperture of 1.25NA so it can be oiled. Numerical aperture provides resolving power when magnifying a specimen. With objectives up to .9 NA you do not need oil on the condenser. When using objectives that go beyond .9NA, oiling the condenser might bring a bit more resolution. Many people that use oil on the top of the slide for the objective, often do not use oil on the condenser. More or less this is due to the hassle factor. When moving back and forth between slides, especially when going from live blood imaging to dry layer and back to live blood, having to clean the condenser each time the slides change is a big hindrance. You might find yourself that you choose not to oil the condenser when using oil objectives.

For reference, the 50x oil objective has a numerical aperture of .9NA, the 100x phase is 1.25NA.

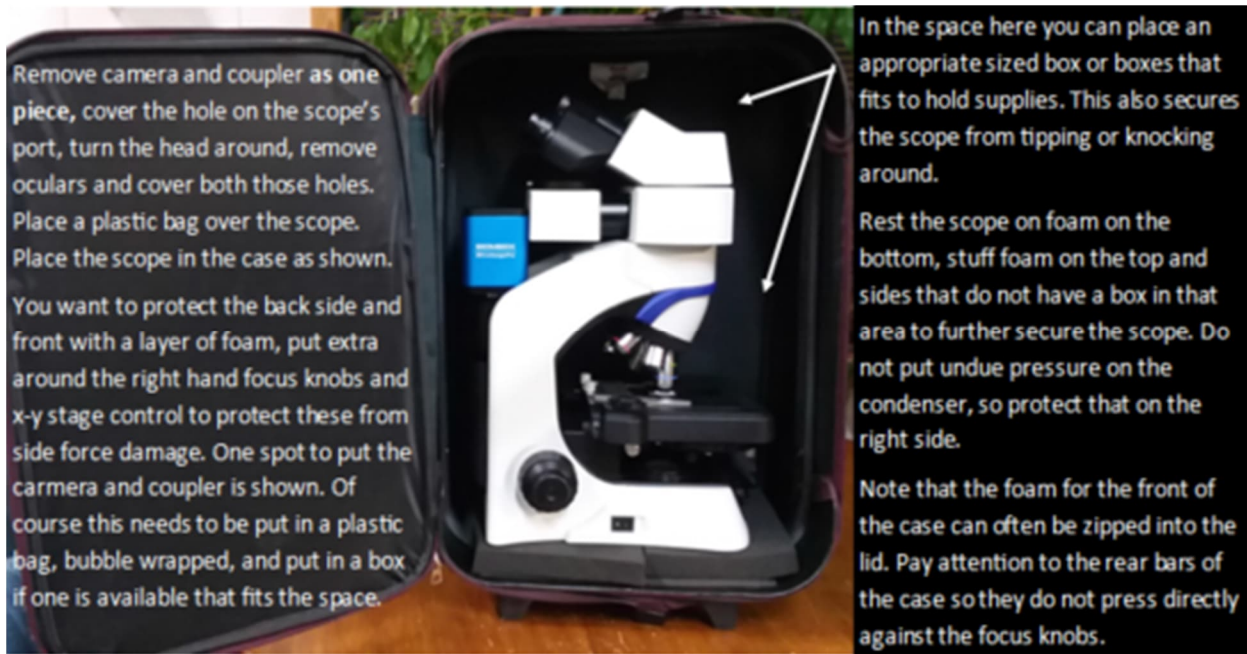
If you want to oil the condenser, you need to have your specimen off the stage and out of the way of the top lens of the condenser so you can add your oil, then place the slide on top of the oil centering your sample over the oil. **Note that for clean up**, the condenser lens can be pulled forward making clean up easier. When using oil, you must ALWAYS clean your objectives and condenser at the end of the day, sometimes the condenser during the day so as not to let the oil build up and spill over the retaining edge that surrounds the condenser top lens. **See the Olympus manual for more details on use of immersion oil and clean up.**



Traveling with the Microscope

A custom cut travel case for this scope has not been made. If you are interested in this, check out custom case manufacturers in your area to have them make one specific for your needs. A company that makes cases for the music and rock and roll industry is good for this task. Bring the the scope and whatever else you want to fit into the case and they will build it.

For local travel or when travelling by air in a big jet where you can do a carry-on, the image below shows how the scope can fit into a standard carry-on along with some pertinent packing notes.



Local travel tip: In a pinch, you can also place the entire scope in a 14x14x14 box (rotate the eyepiece assembly to the right and lock it back down), place foam or bubble wrap around the sides, put another 14x14x14 box flipped upside down and over the first box, and now you can easily take that box with scope and strap it into the backseat of your car. When arriving at the destination, just take the whole scope right out of the box, adjust the head, and it is ready to go.

Troubleshooting a Few Common Problems

Image seen in the microscope, but not on screen.



Make sure prism slider is pulled out on camera port assembly.

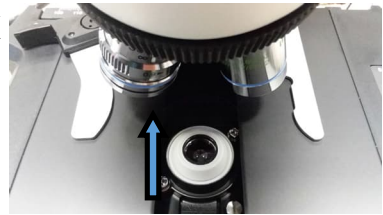
Make sure camera has power (blue light on).

Make sure HDTV is turned on and correct input on TV is selected.

Partial image seen in eyepiece and on screen or it is weird looking, or no image seen in eyepiece or on screen.

Make sure slider arm (seen above) is pulled ALL the way out.

Make sure the top condenser lens is pushed to the BACK as far as it will go >



Difficulty focusing live blood image.

Make sure two cover slips are not stuck together over your specimen, this will make the image look odd or a bit out of focus. Also make sure the slide is upright and not upside down where slide specimen is facing the condenser lens instead of the objective lens.

The camera's mouse curser is not responding or has frozen on the screen.

Occasionally the internal software will hang from a power glitch or whatever and the software needs a full reboot. Unplug the power cord at the top of the camera for 15 seconds or so and then plug it back in and press the power button to turn it back on.

Light intensity seems to shift dull to bright on its own.

There is a spot when the light intensity knob is turned down to the point of it being off but not quite off, that the power might fluctuate a bit so just turn the knob a bit more clockwise to get past that point.

Blue power light does not stay on.

We have seen power glitches and a case of a flood wherein the camera transformer was compromised and full voltage/average was not being sent to the camera. Any

12VDC 1A or better AC/DC power supply with the right power jack will work to power the camera.

Camera red light appears when turned off, but blue light does not turn on when power button is pressed:

We have seen power glitches take out the blue light or blue light circuit. When the camera is off (red light shows), and the power button is pushed, the blue light does not blink. It appears the camera will not turn on. Even though the blue light does not blink or turn on, the camera might still be loading its internal software and might still be working. Wait 30 seconds after pressing the power on button, and then check the output of the camera to the TV screen. If the camera content appears on the screen, the camera is still operating but just not the blue light.

Phase contrast image does not look like it should, is tan, or appears 3 dimensional:

Someone may have altered the phase alignment by engaging the phase alignment screws by pushing in and rotating when in PH1, 2 or 3 on the condenser. (Note on page 12.) The phase annulus in the condenser on the misaligned setting for PH1, 2, or 3, needs to be realigned with the PH1, 2, or 3 objective. This requires you obtain the phase centering telescope and do the alignment. Video showing this process is posted at <https://biomedx.com/support>

Image appears red, or has a red cast to it all over or in one place and just does not look right:

It is possible the the tip of the objective touched down in blood without a cover slip on the slide, and this has contaminated the lens. In many cases, that blood may have dried on the lens. The lens should be removed and inspected. Hold the lens up and look through the open end against a white wall or paper. If you see red at the other end, this likely occurred. You can use a magnifying lens or jewelers loop to look at the lens on the end and you will likely see the dried blood. Lens needs to be cleaned. This can be done with Windex or Sparkle glass gleaner or other lens cleaning/wetting agent. Get a portion of a kimwipe wet, lightly put it onto the lens for a bit to melt the blood, and wipe off. Dry with the kimwipe, reinspect to make sure you got it all off.











Lamp/Bulb Replacement

The bulb is an LED lamp with rated lifetime of 60,000 hours. With 8 hours a day usage 5 days a week, it should be good for 28 years - give or take. The lamp is not user replaceable.

Warranty

View the warranty information online at <https://biomedx.com/microscopes>
Scroll to the bottom of the page under FAQs and click the warranty tab below that.

Get supplies and re-supply at — <https://store.biomedx.com>

 <p>MICROSCOPE SLIDES</p> <p>\$9.80</p> <p>ADD TO CART</p>	 <p>MICROSCOPE SLIDE COVERS 24X30</p> <p>\$7.00</p> <p>ADD TO CART</p>	 <p>MICROSCOPE SLIDE COVERS SMALL 22X22</p> <p>\$9.90</p> <p>ADD TO CART</p>	 <p>KIMWIPE LOW LINT TISSUES</p> <p>\$4.00</p> <p>ADD TO CART</p>	 <p>UNISTIK NORMAL</p> <p>\$22.00</p> <p>ADD TO CART</p>
 <p>UNISTIK EXTRA</p> <p>\$22.00</p> <p>ADD TO CART</p>	 <p>UNISTIK3 GENTLE</p> <p>\$22.00</p> <p>ADD TO CART</p>	 <p>BLOOD TYPE TEST KITS</p> <p>As low as \$0.40</p> <p>ADD TO CART</p>	 <p>IMMERSION OIL 10Z</p> <p>\$10.00</p> <p>ADD TO CART</p>	 <p>SPECIMEN CUPS</p> <p>\$0.25</p> <p>ADD TO CART</p>

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June 22-25, 2023

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35 contact hours over 3 1/2 days.

[Register](#)

For more detailed class info see the training page or download the class agency PDF:

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