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HOW TO INSTALL A DIGITAL CAMERA ADAPTER ON AN EM STEREO

A very popular practice is to take digital still pictures of specimens or processes with a microscope and digital camera. This basic primer may help those new to integrating cameras microscopes or help others who may just need quick instructions and information about how to install the camera adapter and what kind of results to expect. For those using 35mm f digital SLR's, you can find your information [HERE](#).

First, we need to say that your digital camera will need to be able to physically **attach from the lens aperture with threads** to be able to use it in photo-microscopy. **If your camera accept filters screwed onto the lens, this is what microscope adapters need to have as well.**

For this primer, we are going to use our EMZ-8TRU microscope head mounted on a PBH stand, the camera adapter part number MA151/30/50 and a Nikon Coolpix E995 camera. The following information may or may not apply specifically for your specific model of camera or microscope however the basic steps for the most part are the same.

The EMZ-13, EMZ-13TR, EMZ-8TR and EMZ-8TRU are unique within the EM Series microscope line as they feature a constantly active trinocular tube. Other models have a lever that moves the image from one of the eyetubes to the trinocular tube rendering that one eyetube without an image.

The Nikon CoolPix E995 camera we used worked great with the trinocular tube that comes standard with the EMZ-8TR. Some cameras may need some help with gathering an image removing the standard trinocular tube by installing a MA151-8TR. The MA151-8TR is typically used to mount "C" type video cameras. It has a 0.6X reduction lens mounted inside at a shorter body. But when installed in place of the standard tube, you may find this modification to work in your case with your camera.

Let's start with mounting the camera onto the scope.

First, we are going to **remove the dust cap** from the trinocular tube on the microscope.

Your trinocular tube may instead stick out directly from the top of the microscope head and a lever will need to be engaged to direct the signal from one of the eyetubes to the trinocular or phototube.



Now we will **place the camera** setup onto the trinocular tube.

The black part of the adapter slips inside of the chrome tube.

The chrome set screw will be used to keep the camera in place on the tube.



Your camera will need to be parfocalled with the microscope which is accomplished by **adjusting the height** of the camera on the tube. To do that, we are going to first check or parfocal the microscope by placing a specimen on the stage.

Once your scope is parfocalled, and you have an image sharp on your microscope, slide the camera up and down to find the spot where the camera image is as sharp as possible.

Sometimes with cameras that have auto-focus, you can try just placing the camera in the middle of the adjustment range then evaluating how well the camera is doing by just taking some shots of something very familiar like a coin. You may still need to adjust the height as needed to get images focused correctly.



Once the camera is parfocal to the microscope, it should not have to be re-adjusted.

Our completed setup looks like this:

We have our Nikon camera mounted onto the camera adapter, with the adapter adjusted at the correct height on the trinocular tube and the microscope **parfocalled** and ready to go with a sample specimen on the stage.



What one sees when looking in the eyetubes will look similar to the picture on the left. When adjusted and parfocalled correctly, one will see a perfectly round field of view.

The field of view or FOV, is the round area where the coin lays which is the area inside and separate from the black area.

Digital cameras derive their image from a flat rectangular integrated circuit array or "chip". The physical size of this chip and its position do not always gather the "virtual image" inside of the trinocular tube correctly. This is why height adjustments or tube replacements are made. We are adjusting the way the chip gathers the virtual image inside the trinocular tube.



Now let's take a picture !

As you can see, the image is somewhat different than what was seen through the microscope eyetubes. There is some magnification even though we had the camera zoom at zero. Notice that the coin takes up more of the FOV as indicated by the area shown between the red lines and arrows.

The image is also flipped upside-down. Some microscopes and camera setups will flip the image around. You can use Photoshop or other image software to re-orient the picture.



Another phenomenon that can occur is called "vignetting".

This is where the field-of-view is so small or restricted that it limits what can actually be seen of the whole specimen as you can see in this photo on the left.

This condition occurs because the image inside the tube is just not hitting the cameras "chip" correctly. Typically, the tube will need to be adjusted in some way in order to correct this issue. If your camera has a zoom function, one can "zoom past" the vignette and get a more usable image.



Sometimes vignetting cannot be eliminated completely because the difference in size between the camera aperture and the phototube is just too large to accommodate or other factors.

It is reasonable to assume that a camera attached to a microscope will reproduce what is seen when looking into the eyetubes of the microscope. But indeed, this is not the case. The reason is that the microscopes FOV is round and the output of cameras are square or rectangle. The result is either a circle inside the square or the square inside the circle. The majority of microscope users prefer the square inside the circle. You will not be able to see the outer pieces of the image outside of the rectangle but the majority of the image will be seen how cropped within the cameras rectangular field of view.

This primer covers only the bare essentials when it comes to photo-microscopy. Like any art or skill, it takes in-depth understanding, trial and error and experience. Generally speaking pertaining to Meiji Microscopes in particular, if you are using one of the cameras we list in our "Digital Camera Adapters" page and you have the proper adapter and phototube installed can expect the kind of results you see above.

New digital cameras are coming into the market each month. As a microscope manufacturer, it is a never ending job to keep up with the new and discontinued models of digital cameras. Techno is committed to support digital camera adapters for the most viable makes and models.



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