

## DIY camera adapter for Lomo and DSLR + bonus

There are good pages:

<http://www.microscopy-uk.org.uk/mag/artsep13/dw-afocal.html>

<https://www.microbehunter.com/connecting-a-camera-to-a-microscope/>



... but the DIY part of DSLR is missing. I made two Nikon DSLR adapters for (from 1979 onwards USSR domestic "proletar" version of) Lomo Erudit microscope. I have used a lathe as the main tool, but some parts will be done by a 3D printer.

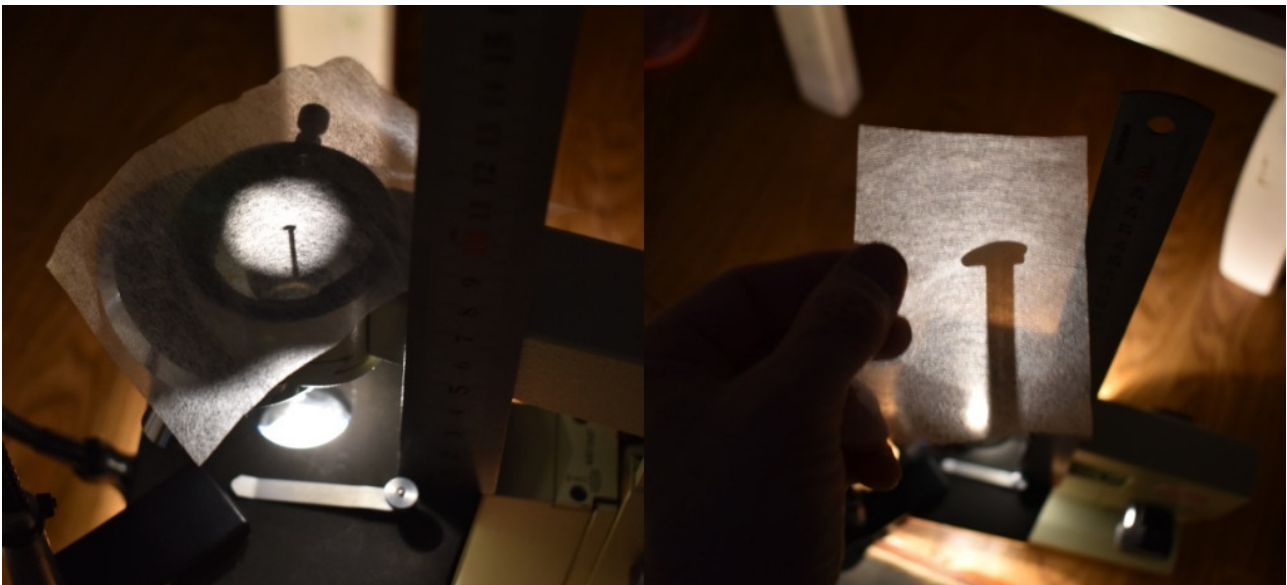
The idea is to replace the prism, tube and ocular with adapter tube and DSLR. If your camera has an app for remote control, with a tablet you will have an easy focusing method. We shall not stick to 160 Or 170 mm tube length: there is no need for identical focus distance with removed eyepiece.

In theory scope / camera magnification is:  $\text{object mag} * \text{adapter mag} * \text{digital mag}$ .

Digital magnification can be defined: display diagonal / sensor diagonal. With this formula you get a different mag for the picture depending on display size (phone vs tv). For me field of view and resolution are more relevant parameters. I test different tube lengths comparing the eyepiece view diameter to the longer side of the picture.

With a microscope objective only you can get a real image at different distances, the image is a mirror image at all relevant distances. Example tube length 160 mm and 45 mm parfocal focal distance are compatible / standard combinations, not the only option (when we have enough focusing range). In the picture there is a shadow of a needle at a lens cleaning paper at two distances: longer distance produces bigger images.

For infinite objectives you need some lens into the adapter, but finite objects work well without (at least when there isn't an eyepiece to set specific focusing distance and requires a too big magnification for camera).



Minimum reasonable distance is based on full use of a camera sensor. My Nikon D5600 has the APS sensor and numbers ahead are based on this size. Longer distance produces more magnification, but the amount of light decreases. The longest 230 mm adapter make almost the same view as 10X eyepiece, but I prefer 150 mm adapter with 50% view compared to eyepiece, exact number depends parfocal distances too (old Erudit has one 45 mm and two 36 mm parfocal objects!).

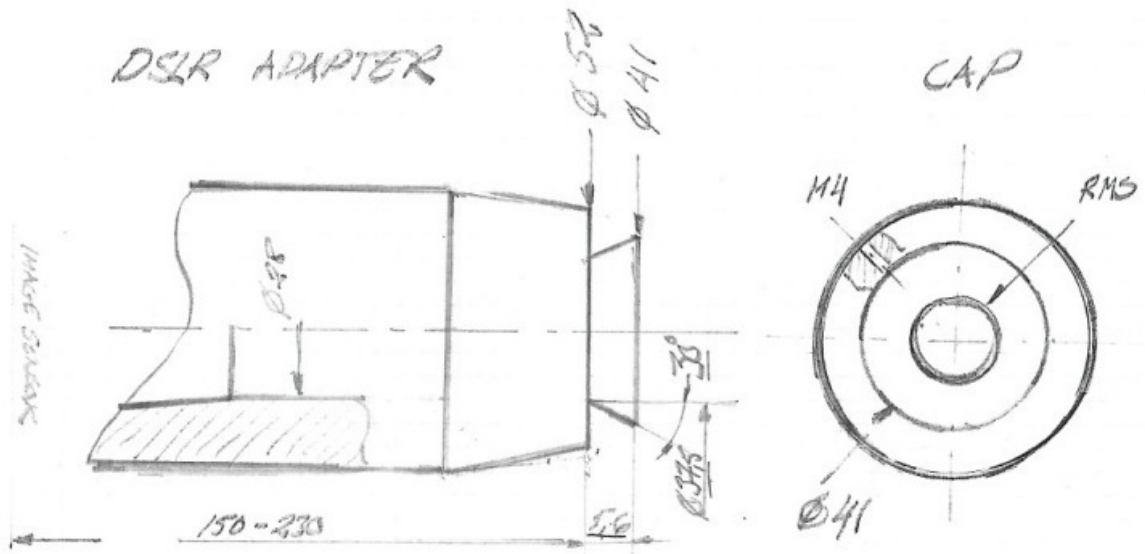
Distances are to image sensor level.

Optimum distance may depend on the sensor's pixel size and amount, quality of microscope object, lighting etc.

The camera side of the adapter is easiest to do with old pieces of optics (at least in Nikon case). I have a set of old extension tubes for macro photography, but broken dismantled objective may be OK. For LOMO microscope side are easy to do.

On the site <https://blog.lidskiaif.net/2020/08/22/nikon-dslr-to-lomo-biolam-microscope-adapter/> there is link into Nikon\_Lomo\_Adapter\_v2.stl (3D model without the camera side).

For lathe polyacetate plastic (pom) is a good choice for base material. Joint with the old extension tube is based on a collar and tape (spring tensioned locking stud must be removed or stuck into the inside position from the adapter side of extension tube (or make a hole)). Diameters equal to the old extension lead to a little heavy adapter with 28mm hole, outer diameter of 51 mm is minimum (based on Lomo outside diameter).



Bonus: if you make a top cap with 0.8"-36 tpi Whitworth thread (into 19,45mm hole with 55° blade) in the adapter, with LOMO 3.7-0.11 objective you can have a good macro lens for camera (view and sharpness are very limited with 8x). Fitting of the cap are done with three M4 internal hexagonal socket head



One way to support Ukraine is to buy pre-owned USSR optics from there, please do not knock down prices.



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