**Microscope Camera
DFK MKU130-10x22**

THE IMAGINGSOURCE
TECHNOLOGY BASED ON STANDARDS

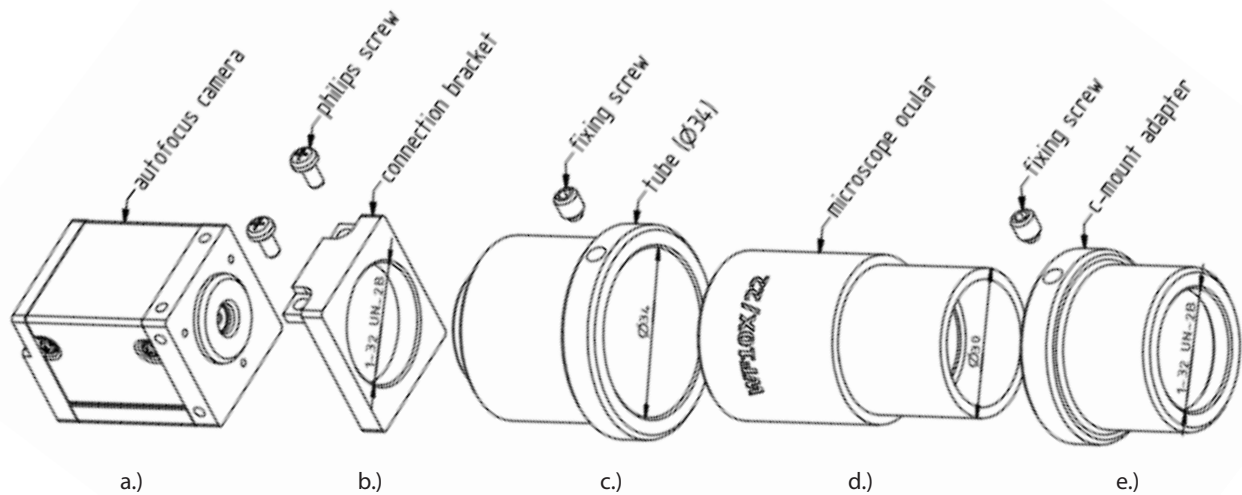# Content

Microscope Camera
DFK MKU130

Fig. 1 Camera Components

The microscope camera, DFK MKU130-10x22, can be used with a wide range of standard microscopes having an ocular diameter of 30mm. It can also be placed on a trinocular photo tube with a C-mount adapter. If there is a relay lens on the C-mount adapter, it must first be removed. If the tube (c) is removed from the camera, it can also be used as a video camera for documentation and filming purposes.

Components

a) autofocus camera, b) C-mount connection bracket, c) tube for adjustment of the eyepoint,
d) 10x ocular, e) C-mount adapter

Initial Start-up

1. Start by loading the latest USB camera driver and the end user software, IC Capture and IC Measure, from our website: www.theimagingsource.com/support

2. Next, connect the camera to the USB 3.0 interface of your computer. The camera is not compatible with a USB 2.0 interface.

3. Now install the USB camera driver and IC Capture software. Start IC Capture and select the camera.

4. Remove an ocular from the microscope and insert the camera ocular into the ocular holder. At this point, the first images should become visible. Improvements in image quality can be achieved by adjusting the camera to the correct eyepoint.

5. The eyepoint is the optimal distance between the eye and the ocular which every human observer must find to achieve the best possible image quality. Similarly, the camera must be adjusted to its "eyepoint" to ensure an optimal image field without vignetting. To this end, loosen the fixing screw on the C-mount (c) so that the ocular slides along the length of the tube. Slide the ocular slowly along the tube until optimal image quality is achieved. Accordingly, a camera mounted to the C-mount should be adjusted in a similar fashion. Please ensure that there is no relay lens on the microscope. If a relay lens is being used, it will need to be removed.

Trinocular photo tube

Fig. 2 Three possible assembly scenarios

IC Capture Software

IC Capture software allows for the adjustment of all camera properties. Single images and videos can also be acquired and saved. With this software, images can be adjusted in a number of ways including contrast, brightness, color saturation, gamma, and sharpness.
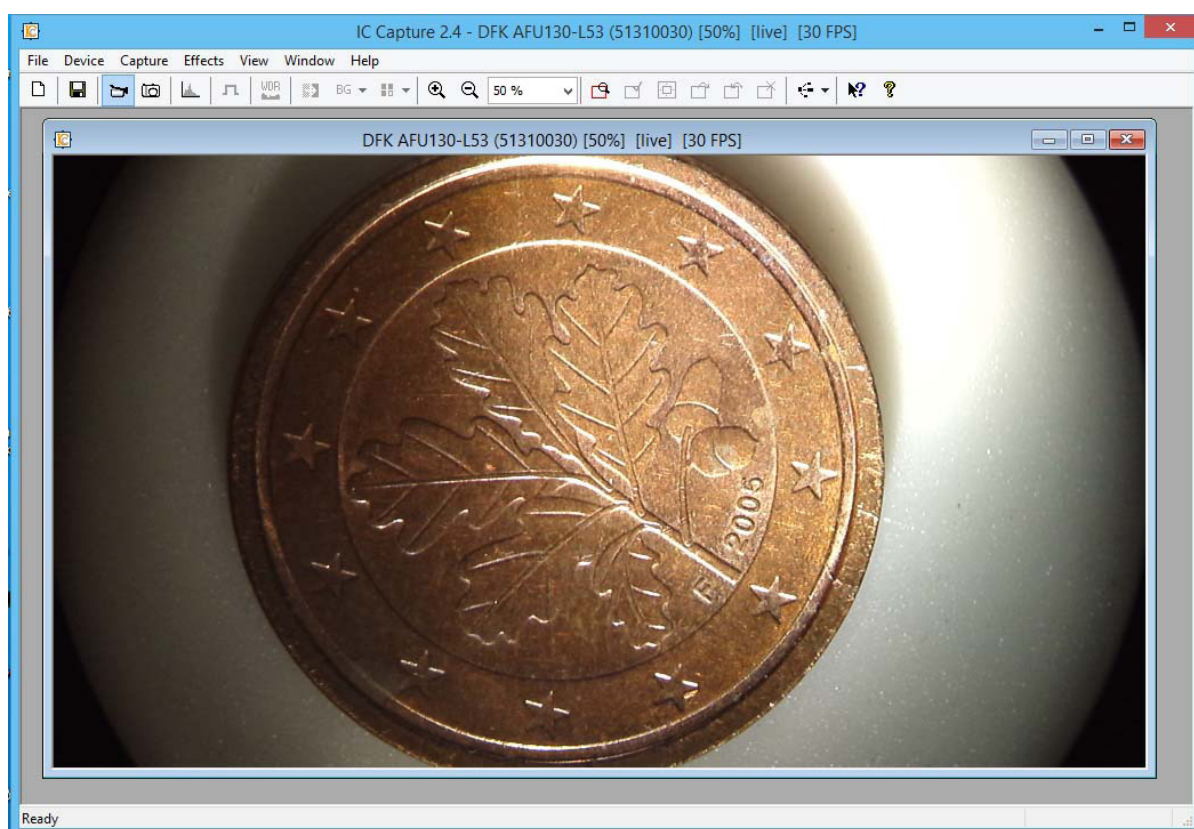

Fig. 3 Microscope's Field of View

The bright, round area shows the microscope's complete field of view (FOV) at low magnification. One can clearly see the cropped field of view at the top and bottom of the image. The visual representation of a round field of view on a rectangular sensor always means a compromise in some way.

Adjusting Camera Function

There are several ways to select camera functions. Under View (at the top of the menu bar) click on **Toolbars** and select **Toolbar Manager**. Activate your chosen function(s) by clicking on the desired boxes for the following functions: **Device Bar, Exposure Bar, Gamma & Sharpness Bar, White Balance Bar and Color & Backlight Bar as well as Zoom & Focus Bar**.
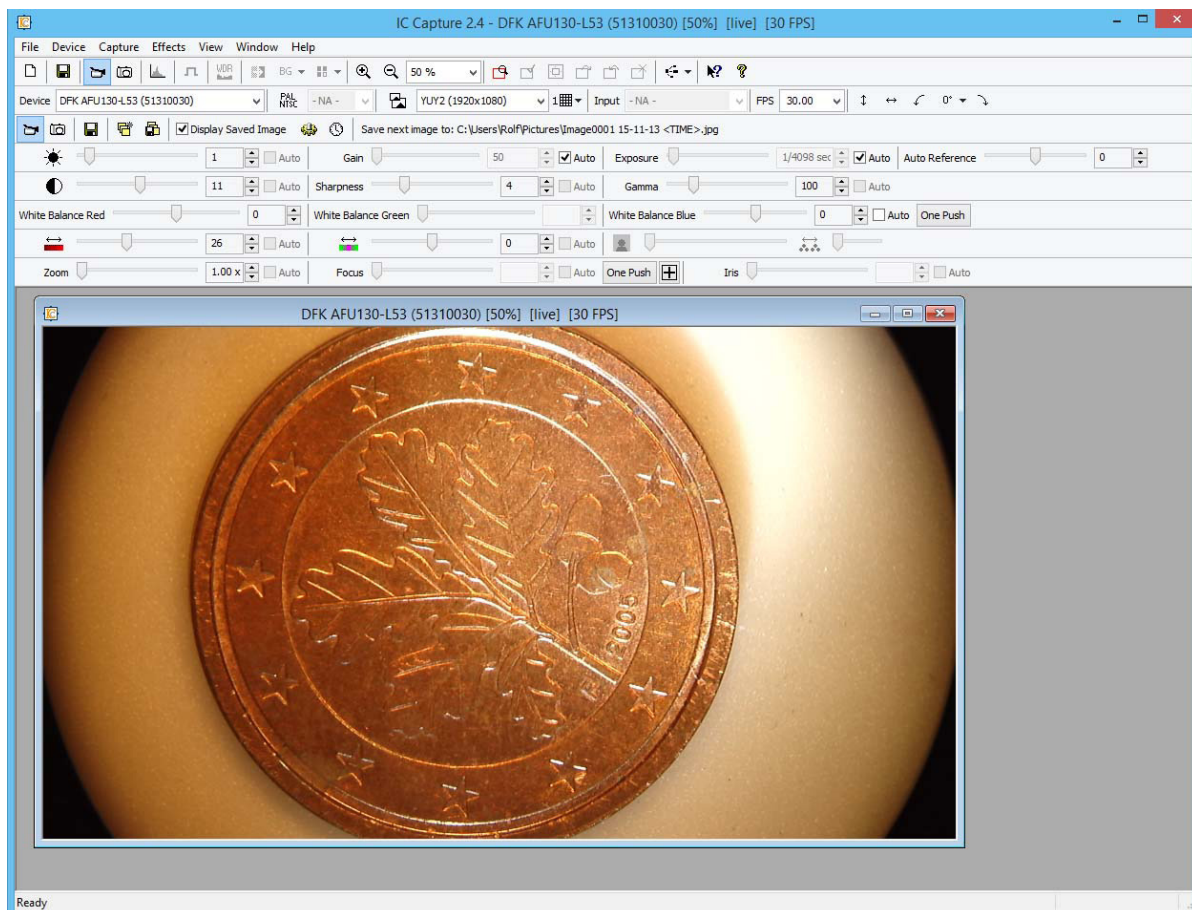

Fig. 4 This image displays some of the settings mentioned above and shows the result of a faulty, automatic white balance correction.

As a rule, good results are the norm when automatic settings are selected. In microscopy, however, it is quite often the case that there are no white or gray areas in the image for the software to use as a calibration point. In this case, the **white balance** can be adjusted manually.

Setting White Balance Manually

Simply place a sheet of white paper under the microscope's lens and click the Auto White Balance off and then click the **One Push button**. After this is done, the Auto White Balance must remain off. Now the system should be able to accurately render the colors on the slide.

Focus

Automatic refocusing is especially helpful in microscopy as frequently the depth of field is only a few micrometers. Consequently, some areas of the image appear sharp while others remain out of focus. To enable automatic refocusing, click on the cross to the right of the **One Push button** and pull it over to the area of interest in the image. When One Push has been selected, the camera focuses on the center of the image area.

Sharpness

Even the best lenses cannot deliver absolute sharpness. Because of this, there are ways of improving the subjective sharpness through the imaging software. To that effect, the setting is optimized for subjective sharpness and adjusted so that there are no image artifacts visible.

Gamma Correction

Gamma correction serves to optimize images by taking advantage of the non-linear manner in which humans perceive light and color. The linear images captured by the camera must be adjusted (i.e. gamma encoded) so that the captured images can be displayed on devices like monitors, printers and data projectors. Many times, the perceived image quality can be improved by increasing the gamma value. Adjust it to find the level that works best for the captured image.

Color Saturation

The Color Saturation control has an automatic default set at 32. Color intensity can be controlled by adjusting the color saturation control. Because color spaces vary from display device to display device, color rendition and intensities will often require some adjustments.

Gain and Lighting

These controls are set with an automatic default. In some lighting situations, however, it is beneficial to make manual adjustments such as with highly reflective surfaces or when images of different specimens need to be captured using the same exposure time.

IC Measure

In addition to IC Capture, IC Measure offers additional important measurement and documentation features that are especially relevant to many microscopy tasks. The program has a *Help* page that explains all functions in detail.

Fig. 5 Measurement of camera front plate using IC Measure.

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