

FIRST TIME USE

1

The CentriTower is equipped with a USB 3 camera, an infrared light panel, and a special telecentric lens that allows you to film without parallax errors or lens distortion making this system ideal for viewing objects in PCR plates, deep well plates, petri dishes, etc (1).

Mounting the lens. Mounting the lens must be performed by two people.

IMPORTANT: The lens is heavy! Be careful not to drop it or to scratch its surfaces, especially of the optics.

2

Tilt the black tower on its side, remove the bottom plate, and insert the lens into the opening at the top (2). The four threaded holes on the bottom side of the lens (2, **arrow**) must align with the non-threaded holes in the top plate of the tower (2, **arrow**), so that the camera mount of the lens faces in the direction of the Loligo® logo on the tower. Now screw the four included umbraco screws with washers into each of the four holes from inside the top plate (2.1) and tighten each screw. Be careful not to overtighten.

Place the tower in an upright position again on a flat and sturdy table.

3

Mounting the IR light panel. Place the bottom plate back into the tower with the recessed area pointing upwards, and push the plate down, so that it lies flat on the table. Place the infrared light panel into the recess, and run the power cable through the opening on the back of the tower (3). If using a custom light panel, the bottom plate can be removed entirely.

Remove any tape holding components in place.

4

Adjusting the lens and camera. To find the optimal focus distance, the back focal length of the lens must be set correctly.

The lens comes with several spacer rings (4a, **arrow**) to allow for fine-tuning the back focal length. The flange (4a, **arrow**) on the camera mount of the lens can be unscrewed to gain access to the spacer rings. For the included camera in this system, the optimal spacer ring thickness is 0.8 mm (which equals the 0.05 mm + 0.05 mm + 0.10 mm + 0.10 mm + 0.5 mm spacer rings). Attach the correct spacer rings, and screw the flange onto the camera mount. Do not overtighten.

Now attach the camera to the mount and screw it in place (do not overtighten). The camera should face upside down once it has been screwed in place. Then connect the included USB cable to the camera and screw in the locking screws on the cable (4b).

5

Software for video recording. Download and install the latest version of our free **Video Recorder**:

loligosystems.com/resources/software-downloads/behavior/

6

The video tracking tower is now ready to use.

FOR EACH TRIAL

7

Setting up hardware. Connect the power adapter to the adapter cable, and connect the adapter cable to the IR light panel. Connect the power adapter to a grounded outlet.

IMPORTANT: Only power on the IR light panel when it is inside the tower. Avoid looking into the light panel when it is powered on.

Connect the USB cable from the camera to a USB >3 port on your PC. Let the camera initialize on the computer, and make sure that the LED on the back of the camera is lighting green.

8

Handling the sample. Open the front drawer and place the PCR plate (or alike) onto the center of transparent holder (8). To optimize the placement of the PCR plate, it may be necessary to attach/glue one or more of the included guides onto the holder, so that the PCR plate will be in the same location each time (8.1a). Use the included translucent holders instead of the transparent holder to adjust the light intensity (8.1b). Close the front drawer. The tower is now ready for video recording.

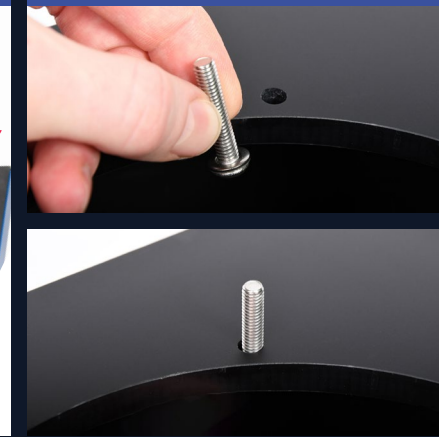
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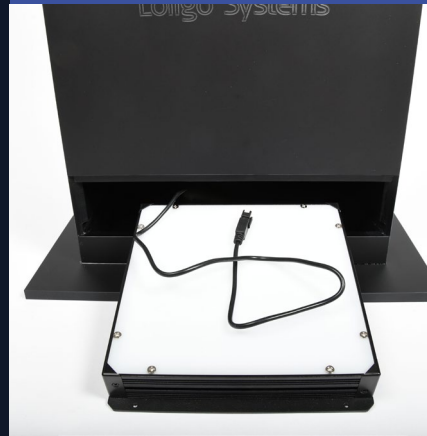
2



2.1



3



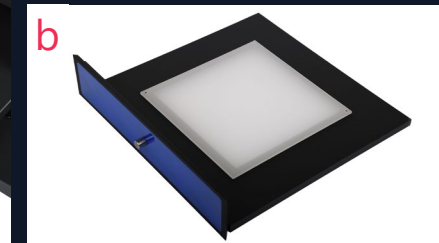
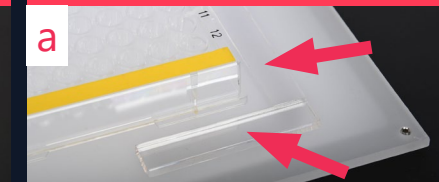
4



8



8.1



RECORDING VIDEOS

Open **Video Recorder** > Experiment. The live view is shown in the *video preview area* (9, **arrow**), and you can adjust the camera settings in the *settings panel* (9, **arrow**).

In the settings panel:

- **Camera:** Shows the name of the camera. Other connected cameras can be selected from this list.
- **Frame rate [fps]:** Shows the frame rate you want to record at. Note that the actual frame rate (*Current frame rate*) may differ from this value.
- **Horizontal AOI:** Adjust the horizontal area of interest (AOI). Click and drag each slider handle to reduce the area, and click and drag on the slider line to move the area.
- **Vertical AOI:** Adjust the vertical area of interest. Click and drag each slider handle to reduce the area, and click and drag on the slider line to move the area.
- **Current resolution:** Shows the resolution of the video. These values will change when the AOI sliders are adjusted.
- **Sync with:** Select another connected camera from this list to start simultaneous recordings from both cameras.

The *video file data* are shown below the video preview area (9, **arrow**):

- **Recorded time [hh:mm:ss.ms]:** Shows the recorded time of the current video.
- **Current frame rate [fps]:** Shows the frame rate the video is being recorded at. Note that the current frame rate may differ from the set *Frame rate* (see below).
- **Captured frames:** Shows the amount of captured frames in the video.
- **Missed frames:** Shows the amount of missed frames in the video.

Adjusting frame rate. Start by adjusting the frame rate to match your application. A higher frame rate requires more processing power, which can lead to missed frames. A higher frame rate also requires more light on the filmed object, so increasing the frame rate will decrease the video exposure.

Adjusting AOI. Now adjust the horizontal and/or vertical AOI sliders to crop the video image to match your application. A more narrow AOI will increase recording performance, so preferably the AOI should be as close as possible to the area in which the object can move around (9, *Cropped AOI*). Click and drag on the *slider handles* to reduce the AOI, and click and drag on the *slider line* to move the AOI. The video preview may freeze shortly between each AOI adjustment.

Start recording. Click the *Start recording button* **REC** to select where to save the .avi video file. The video file should be saved to a local drive on your computer as saving to a synchronized drive (like OneDrive) can cause problems.

Recorded videos can be analyzed in our video tracking and behavior software, [LoliTrack v5](#).

Missed frames or low current frame rate? If you get missed frames in your recordings, or if your *Current frame rate* does not meet the set *Frame rate* in the settings panel, it means that your computer is not able to process the frame rate at the given resolution. In this case, please consider:

- That the camera is connected to a USB >3 port.
- That you are not running other software or services on your computer that limits its performance.
- To lower the frame rate in the settings panel.
- To reduce the resolution using the AOI sliders in the settings panel.

Editing videos. Main menu > **Edit video**. Load a video file and follow the instructions in the lower part of the *settings panel* to edit the video before exporting. Change the exported frame rate, if necessary, and then click *Export video* to export the video as an .avi file.

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The screenshot shows the 'Video Recorder' application window. The main area is a live video feed of a 96-well plate with a grid overlay. A yellow arrow points to the center of the plate. To the right is a settings panel for camera 'U3-31FxCP-M'. It includes sliders for 'Horizontal AOI' (set to 12 - 2460) and 'Vertical AOI' (set to 8 - 2056), and a 'Current resolution' of 2448 x 2048. Below the video preview is a status bar with a red 'REC' button and a table of recording statistics:

Recorded time [hh:mm:ss.ms]	Current frame rate [fps]	Captured frames	Missed frames
00:00:00.000	54.0	0	0

Cropped AOI

