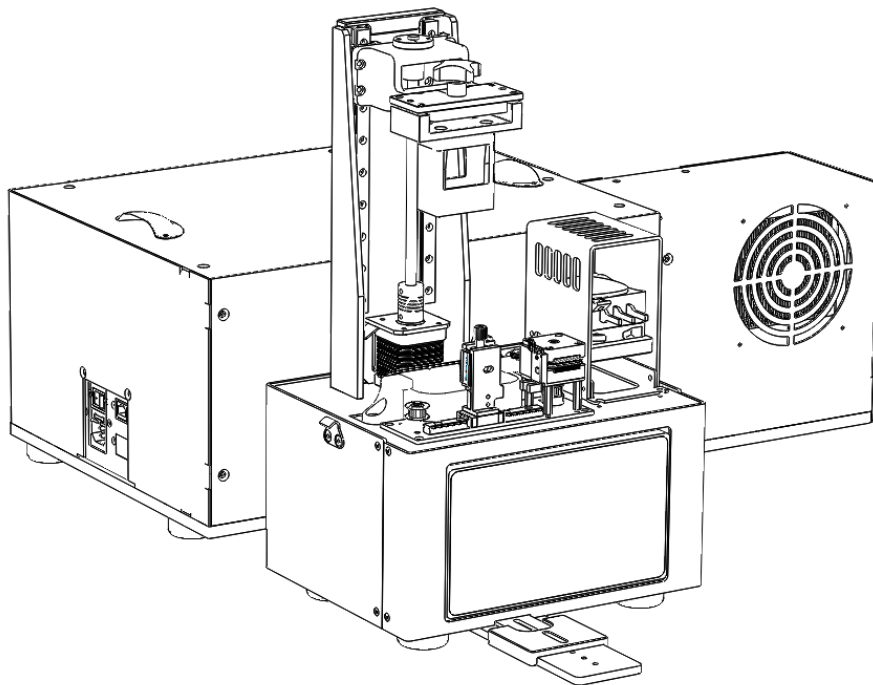


MonoPrinter.com

# MONO3Z2 (2CH) Initial Assembly & Alignment

Rev. 1.2



## Revision History

Rev. 1.0	11-18-2020	Initial draft
Rev. 1.1	08-04-2022	Update based on Mono3Z-V2 design
Rev. 1.2	08-19-2022	Update about the projection focus adjustment

Please read thoroughly and contact us if you have any further questions or suggestions at [info@monoprinter.com](mailto:info@monoprinter.com)

## 1. Preview of the final setup after assembly and alignment

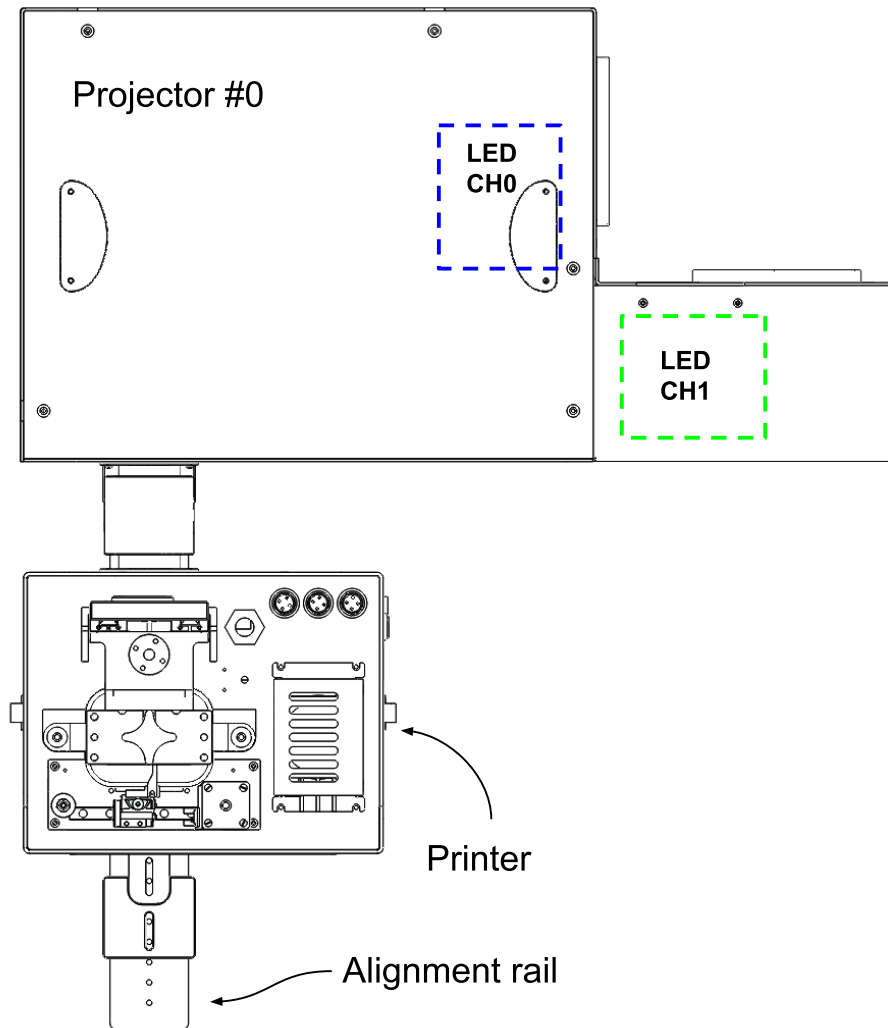


Fig. 1. Diagram of fully assembled 2CH printer

- After the system is fully assembled and aligned, the system should look like Fig. 1. All details will be followed.

## 2. Identify each sub-assembly part

- The 2CH printer consists of 3 sub-assembly parts: Projector #0, Printer, and Alignment rail.
- Identify each sub-assembly and check everything is in good condition.

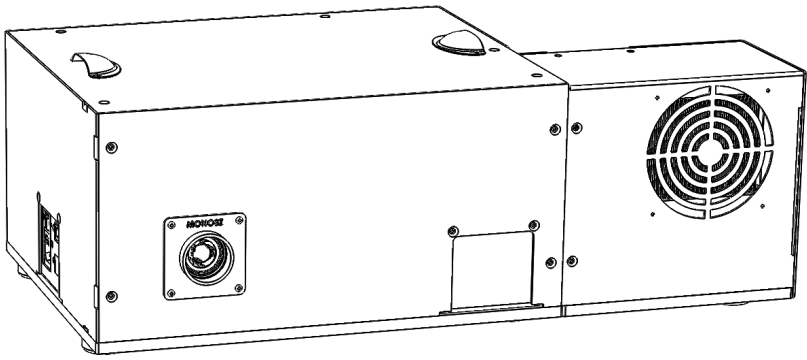


Fig. 2. Projector #0



Fig. 3. Alignment rail

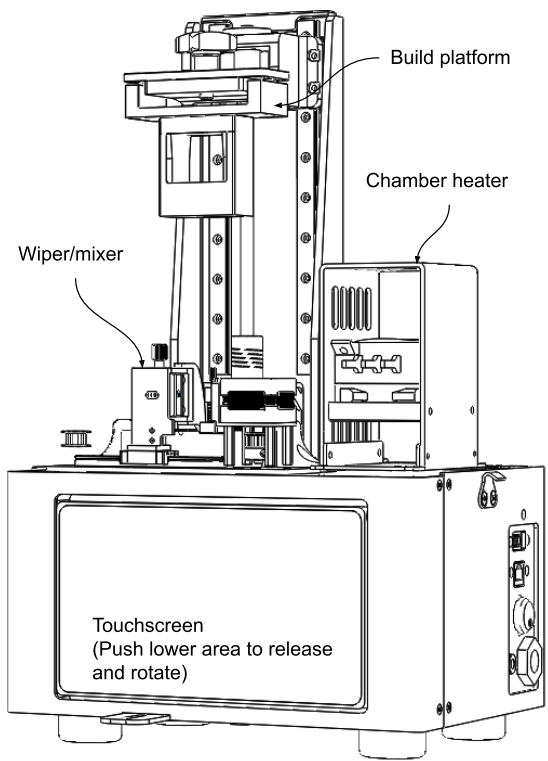


Fig. 4. Printer with heater and mixer assembled

### 3. Assembly of the alignment rail to Projector #0

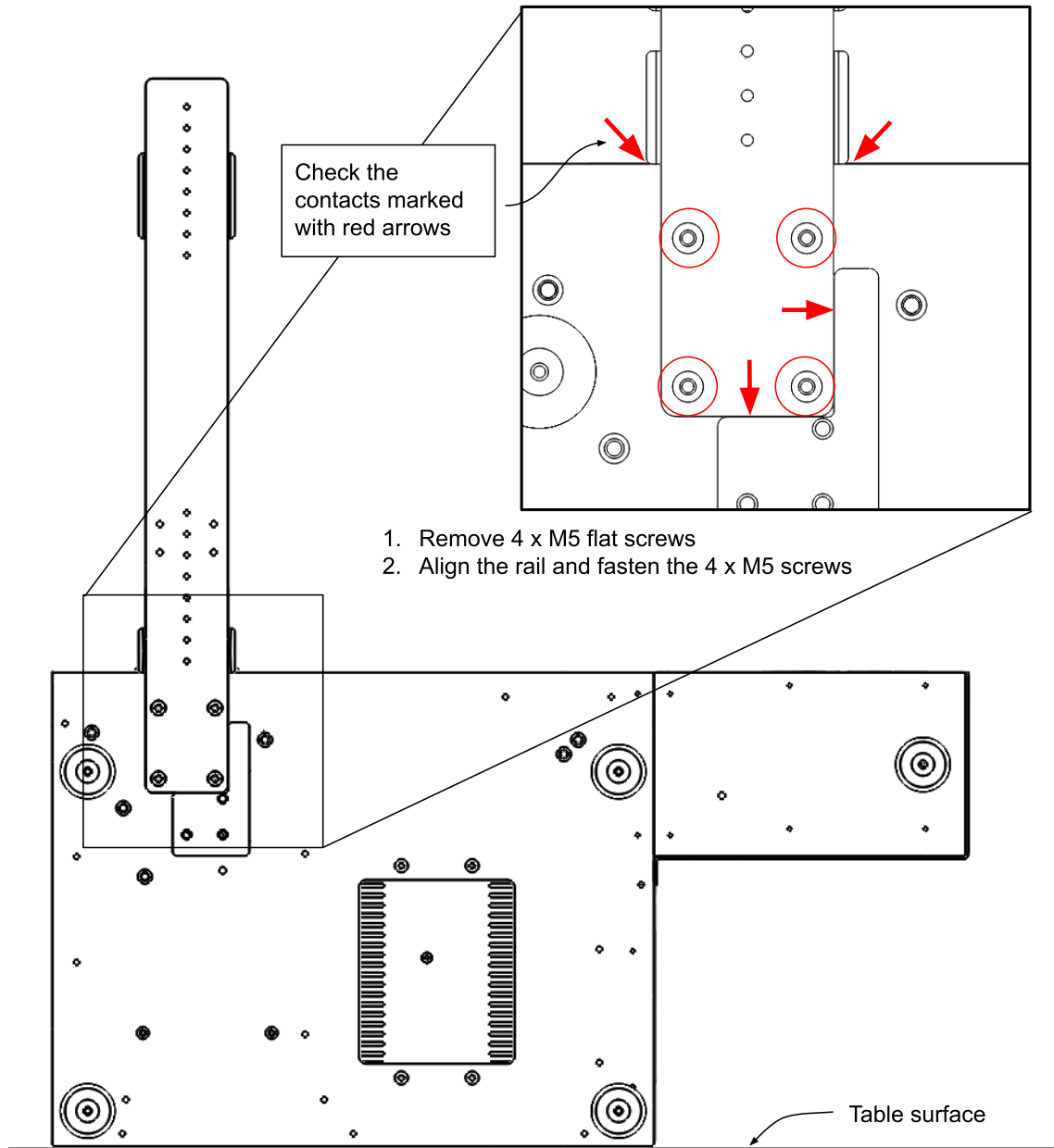


Fig. 5. Assembly of the alignment rail

- 4 x M5 flat screws are installed at the bottom of Projector #1. Remove them first.
- Place the alignment rail while checking the contacts of alignment structures (red arrows)
- Tighten the M5 screws.
- The alignment rail should be as vertical as possible. If it's not installed correctly, the dichroic assembly won't fit properly.

#### 4. Assembly of the printer

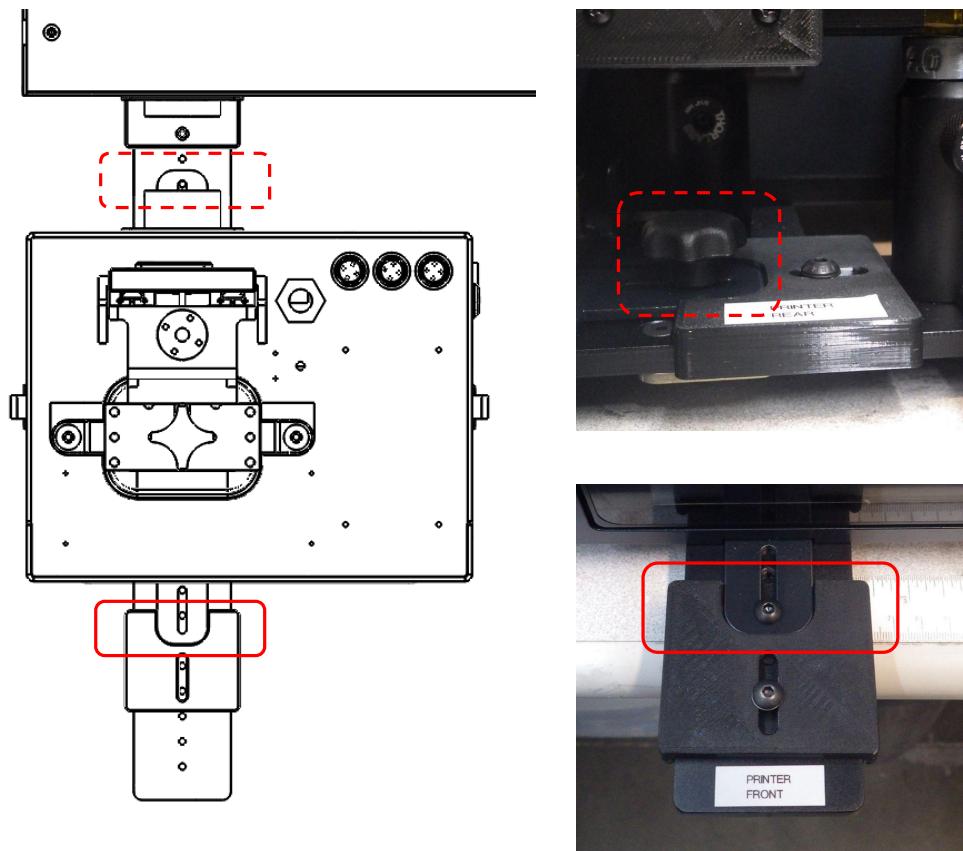


Fig. 6. Attach the printer to the system

- Before attaching the printer, the alignment rail should have two screws (1 x M5 screw, 1 x hand screw). Remove them. They will be used to fix the printer position.
- Place the printer and align its front and rear flaps to the alignment guides.
- Push the flaps and make sure they are fully inserted.
- Tighten two screws on the front and rear flaps to fix the position.

#### 5. Cable connections (Power and network)

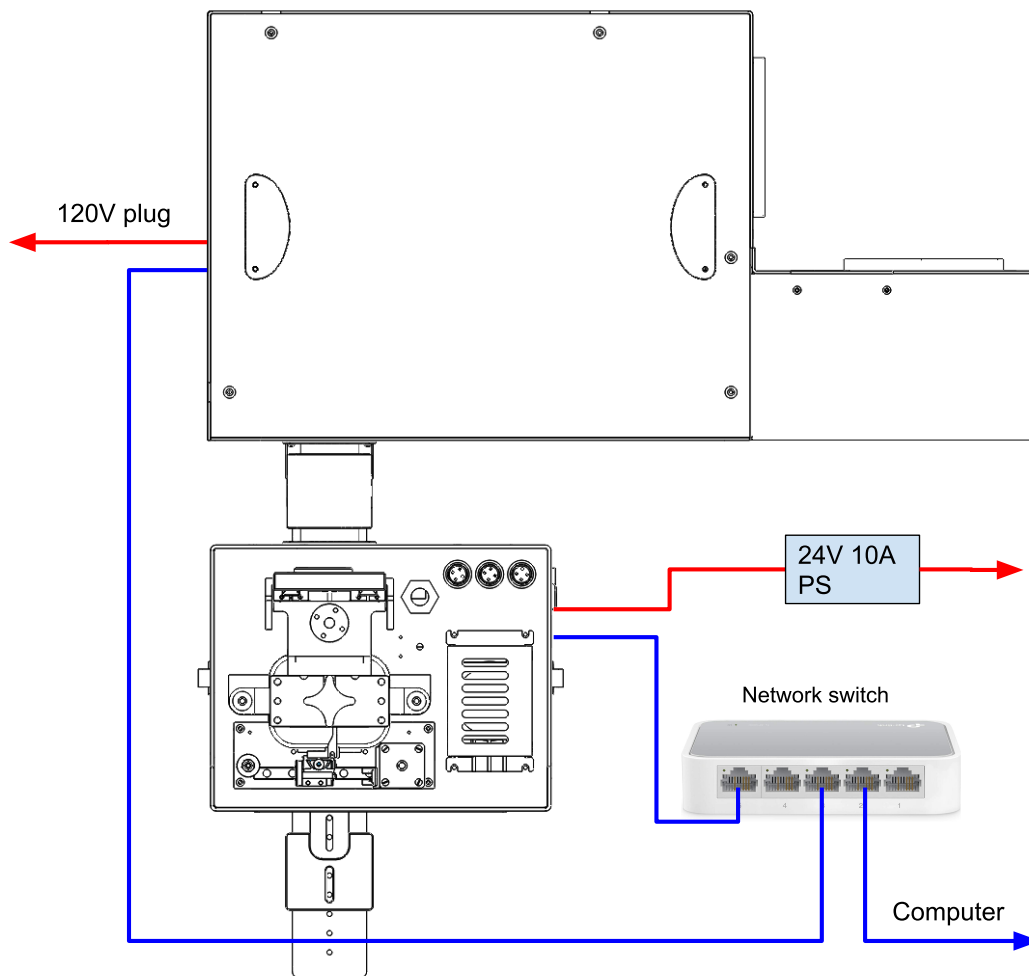


Fig. 7. Cable connections

- Find a network switch (with 5V power supply), 24V 12A power supply (for printer), a regular power cord, 3 x ethernet cables.
- Connect both network and power cables as shown in Fig. 7.
- There is no specific position for ethernet cables on the network switch.
- (Optional) connect between the network switch and a computer using an ethernet cable. This will be needed when our technical staff remotely connects to the printer and projector through your computer. **RealVNC** and **AnyDesk** should be installed on the computer.

RealVNC viewer: <https://www.realvnc.com/en/connect/download/viewer/windows/>  
 AnyDesk: <https://anydesk.com/en/downloads/windows>

Please let us know your **AnyDesk address** (9 digits) when you need remote support.

- 6. Turn on projectors first, then turn on the printer.
  - This turning-on sequence will help detect two projectors from the printer.
- 7. Go to control page and perform homing first

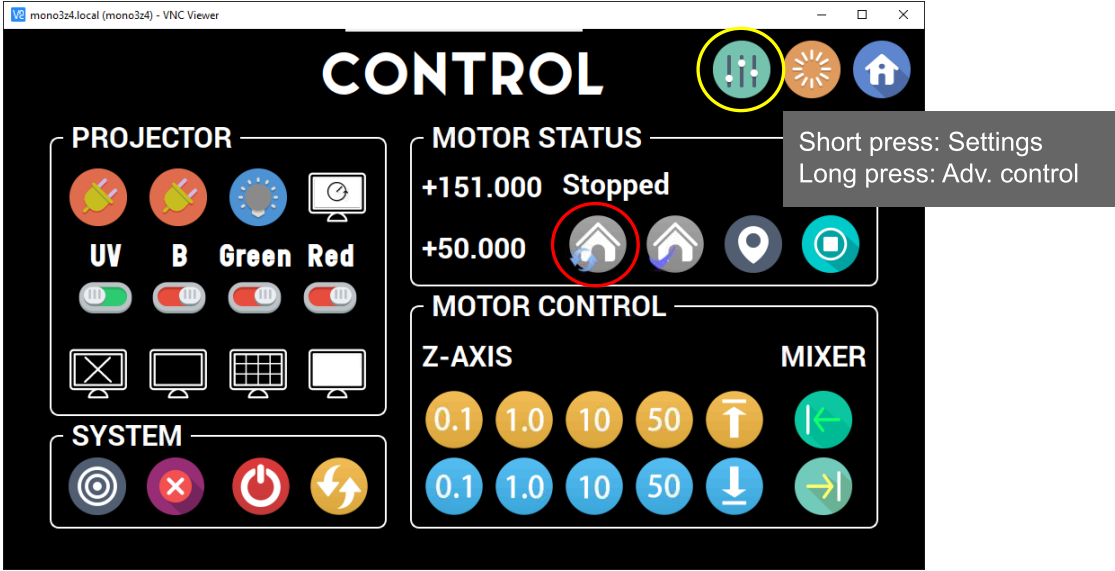


Fig. 8. Control page

- After about 1 minute, the system will be booted up. Then press CONTROL to move to the control page as shown above.
- Perform homing (red circle). Then the current platform position will be 151.000 (mm) and the mixer position will be 50.000 (mm)
- Then press and hold (~3 sec) the setting button (yellow circle) to move to the advanced control page

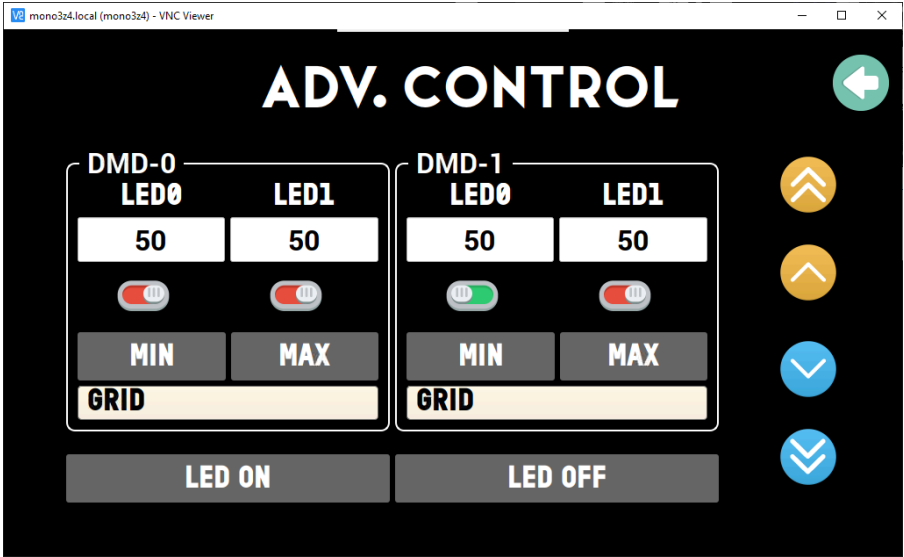


Fig. 9. Advanced control page



## 8. Mount USB camera into the z-axis

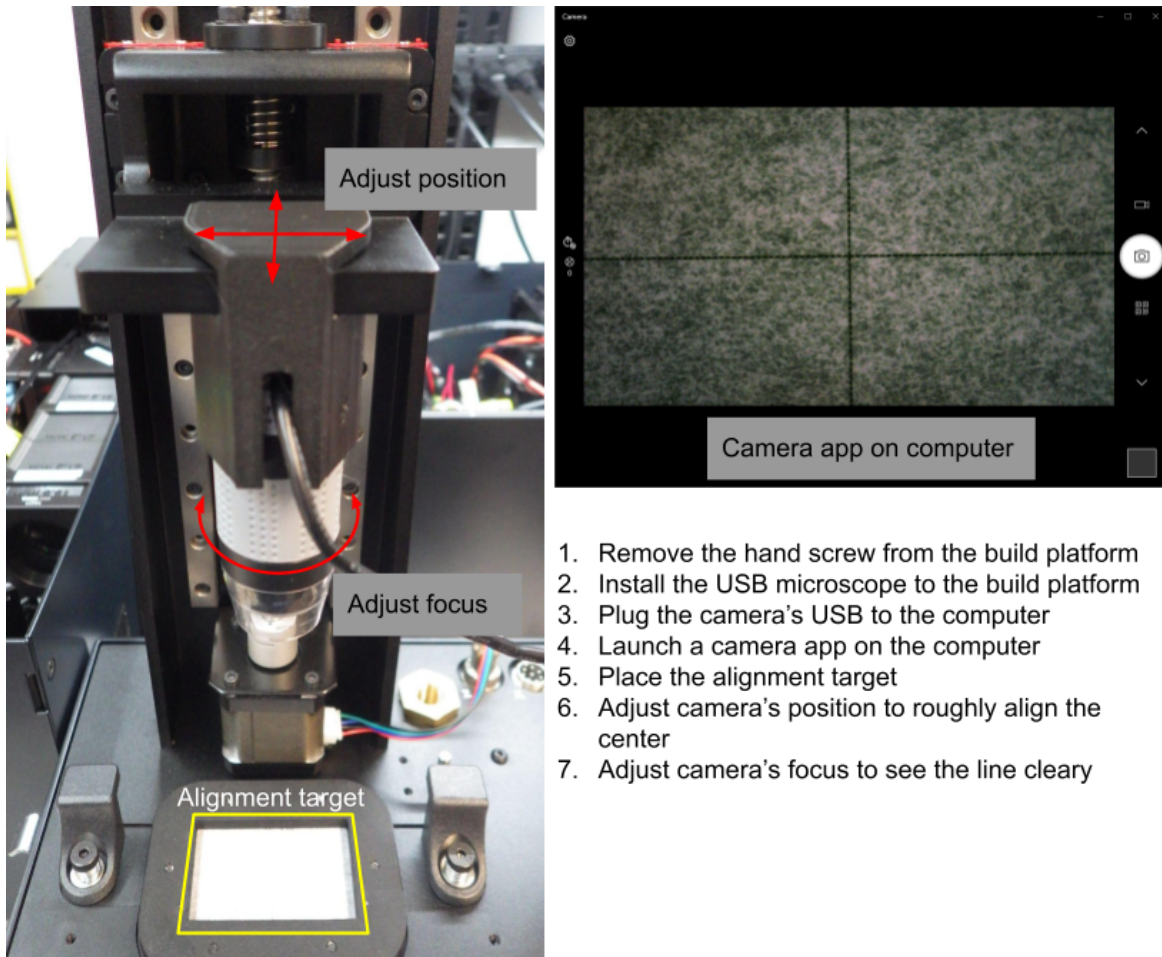


Fig. 10. Mount of USB camera and alignment target

1. Remove the hand screw from the build platform
2. Install the USB microscope to the build platform
3. Plug the camera's USB to the computer
4. Launch a camera app on the computer
5. Place the alignment target
6. Adjust camera's position to roughly align the center
7. Adjust camera's focus to see the line clearly

- The z-axis position is not critical, but the maximum height (151 mm) will give the largest field of view.
- Run camera App and set the resolution to the maximum (2 MP with included USB camera)

## 9. Overview of the alignment process

- Alignment will be done with the Advanced Control menu and an USB camera.
- Adjust the LED intensity using DAC (intensity) values. For alignment, the intensity value of 0-100 will be reasonable (Max: 2200). Since UV is dim, 100-300 will be needed.
- Turn on the Green grid pattern and align it to the alignment target first.
- At this moment, the Green and the alignment target are aligned with each other.
- Turn on the Blue grid pattern and check if it is well aligned to the alignment target.
- The Blue grid pattern should be aligned to the target without any adjustment.
- Only one LED can be turned on, so the alignment test between two LEDs should be checked by comparing its position to the alignment target.

10. Turn on the Green grid pattern and align it to the paper grid

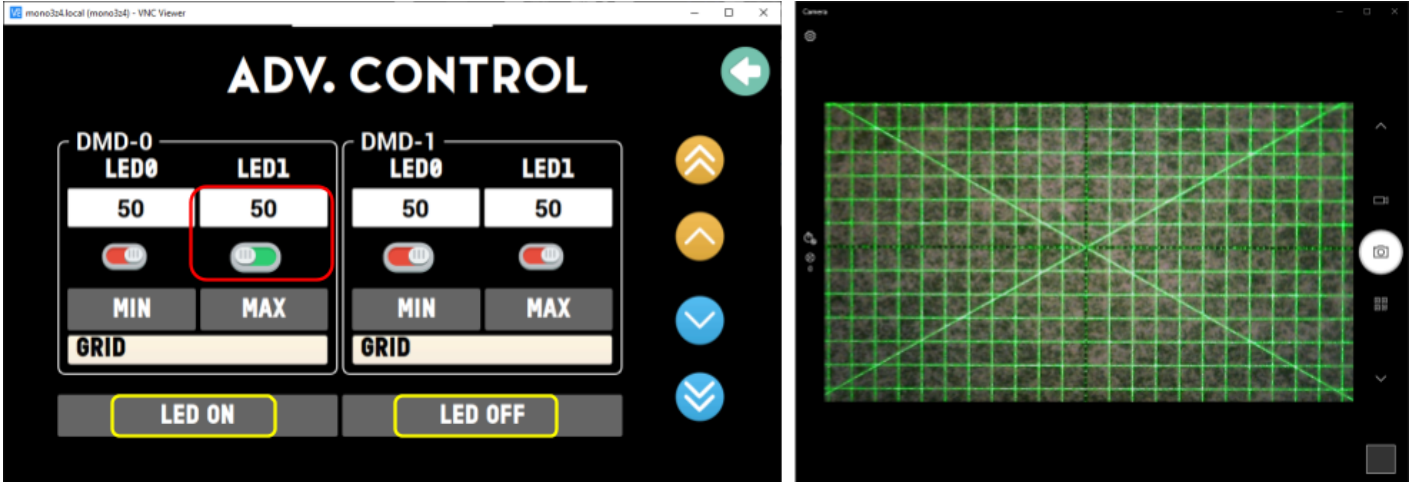


Fig. 11. Green grid pattern projection

- On the adv. control page, set the intensity to 50 and select DMD-0 >> LED1. Note that LED0 (or CH0) is the shorter wavelength and LED1(or CH1) is the longer one.
- *You should turn off the LED (LED OFF button) manually in the Advanced Control.*
- Press the LED ON button and you will see a grid pattern on the camera app.
- Try to move the alignment target to match central cross lines between the target and green grid projection.

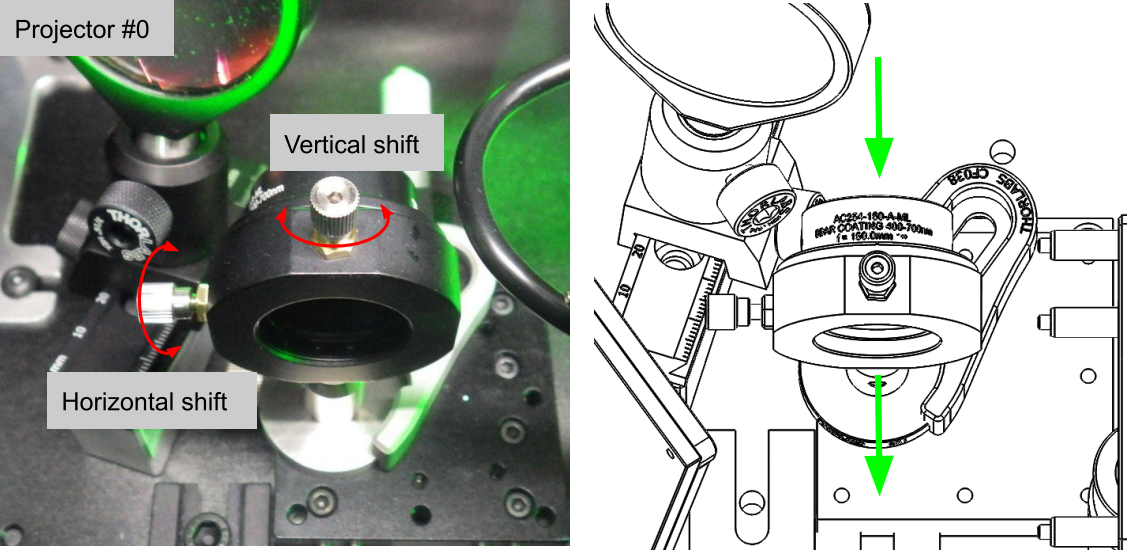


Fig. 12. Projector 1 adjuster and PC screen of USB camera

- If the LED1 (Green color in this manual) grid is too far off from the target, you will need to move the Green grid by adjusting lens position as shown in Fig. 12.
- Use this adjustment only if the error is so big that you can't match the LED1 grid vs. target by adjusting the target position.

- If you satisfy the alignment between the LED1 grid and the alignment target, turn it off and turn on LED0. Then you will see the LED0 grid is well aligned as well.

## 11. Focus adjustment

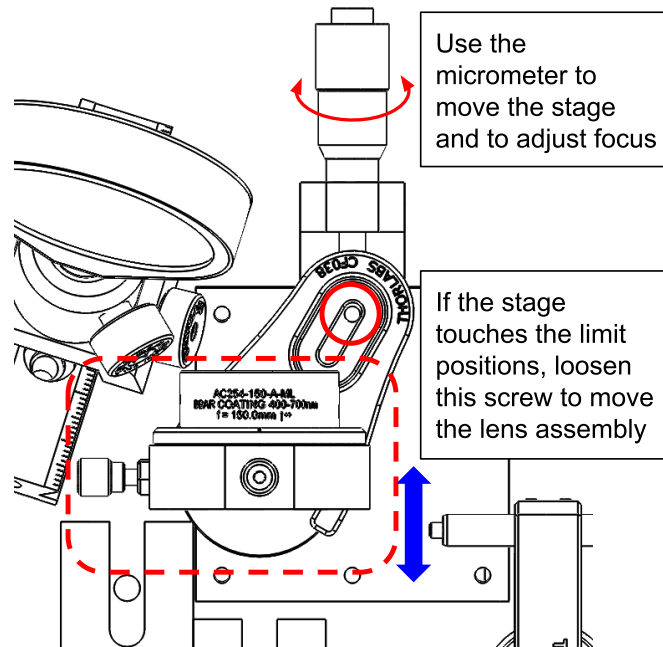


Fig. 13. Focus adjustment with a micrometer or by moving lens assembly

- The focus of the projection is adjusted during a manufacturing process, but it might be moved during shipping.
- If the focus of the projection (ex. grid patterns) is not properly set, the image will be blurred. In this case, use the micrometer to move the stage back and forth.
- If the stage hits one of its end positions, slightly loosen the screws (red circle in Fig. 13) and reposition the lens assembly. Once the focus is restored, tighten the screw again.

## 12. Place the top covers of both projectors

- To avoid dust collection inside the projectors, place the top covers back.
- There is a chance that the covers interfere with the alignment. If you experience this issue, check the alignment before tightening cover screws.

## 13. Closing remarks.

- If you have any issues during installation, please contact us at [info@monoprinter.com](mailto:info@monoprinter.com)