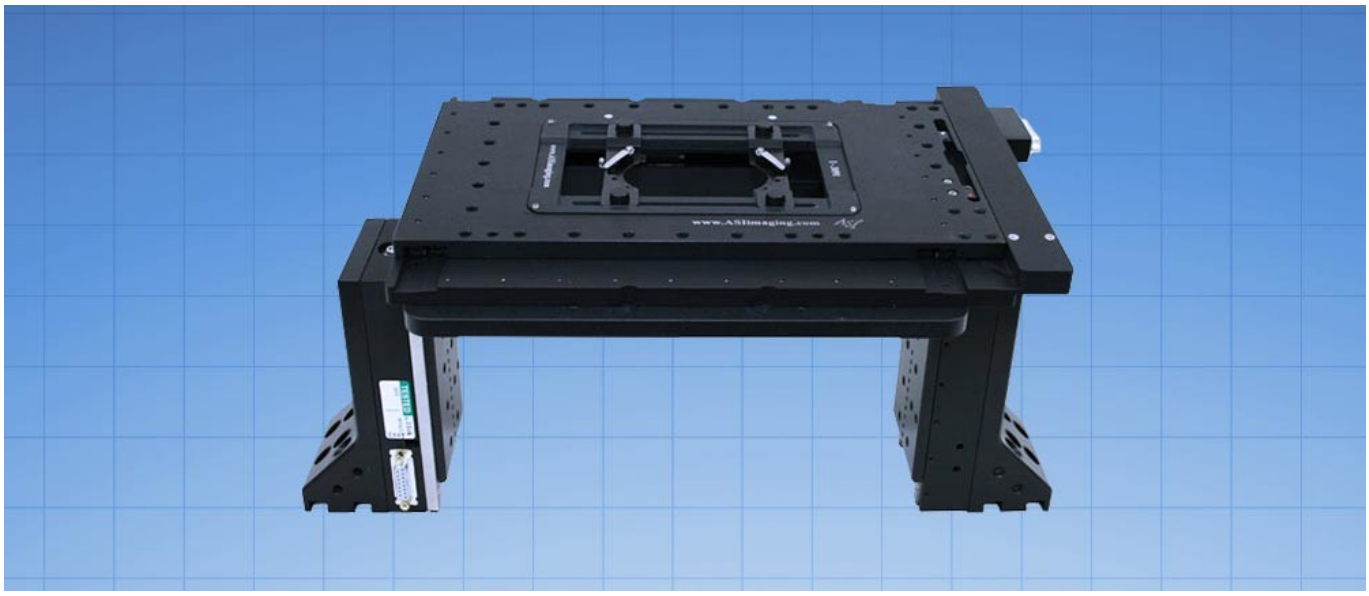
FTP-2000 Setup & Alignment

ftp, manual



See the FTP Firmware Manual after you setup the stage.

Parts List

1 - Tiger controller and FTP firmware
1 - XY stage
2 - Stilts (single-axis stages with mounting brackets; one master, one slave) [1)]
1 - Optical breadboard ≥ 600 mm wide
1 - Ruler or measuring tape
1 - 5 mm hex driver
4 - M6 washers
4 - M6 x 25 mm socket head screws (stilts to metric breadboard)
1 - 4 mm hex driver
2 - M6 x 16 mm flat head screws (stage to left stilt)
2 - M6 x 14 mm flat head screws (stage to right stilt)

Mount the Stilts

1. Plug the XY stage into the Tiger controller.

2. Measure the distance between the X- and X+ mounting holes in the XY stage's bottom plate, as in Figure 1. (Use the joystick or a serial command to move the X-axis to either side to reveal the mounting holes.)

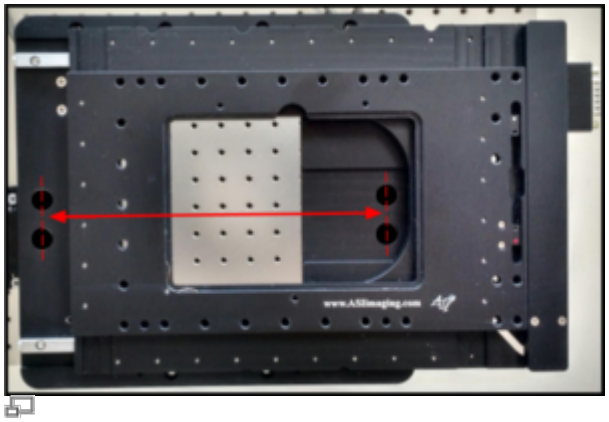


Figure 1: the distance between mounting holes

3. Space the stilts on the breadboard so that the stage will mount

- Either directly into the stilts' flange[2)] as in Figure 2a,
- Or into T-nuts for manual Y adjustment, as in Figure 2b.

Figure 2a: fixed mount

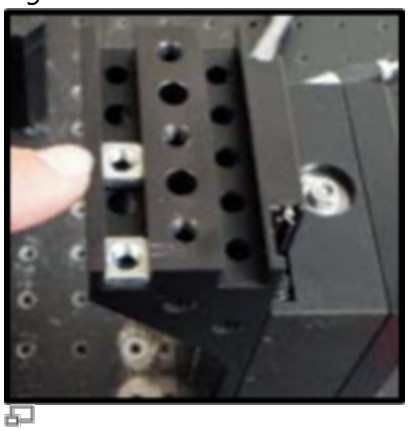


Figure 2b: manual Y adjustment mount

4. Loosely mount the stilts using the M6 washers and 25 mm socket head screws, 2 per side, to:

- Either a metric breadboard, as in Figure 3,
- Or in the case of an imperial breadboard, to the adapter.
    - Use 4 additional screws - ¼”-20, two per side - to mount the adapters to the imperial breadboard.

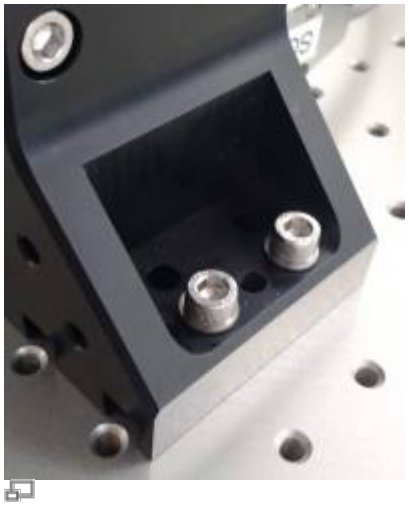


Figure 3: Stilts loosely mounted to the breadboard

5. Plug the stilts into the ASI controller.

Alignment of the stilts

Measure the position of the slides of the stilts relative to their bodies and/or how level the XY stage is relative to the table. If there is a significant discrepancy do the following to level the stilts:

1. Make sure the XY stage is only loosely attached to the stilts, if it is mounted at all. Loosening the XY stage's mounting screws is usually sufficient if the deviation is small. The screws attaching the stilts to the breadboard should also be loosened because the XY stage to stilt attachment should take place before the stilt to breadboard attachment.
2. Move the slave axis[3)] to match the master axis, e.g. if your slave is the F-axis, use serial command `R F=-5000` to move -0.5 mm. Alternatively you can temporarily assign an input device to the slave axis letter and move it that way, just be sure to un-assign the input device afterwards.
3. Assign the same position value to slave and master axes, e.g. if the axes are F and Z, use serial command `H Z` (or `H Z=0`) to set both F and Z positions equal to zero.

NOTICE: Commanding the slave axis by itself after the XY stage has been mounted can result in permanent damage to equipment. Leveling the two stilts is the only reason to command the slave axis itself, otherwise command both axes together by using the master axis. Input devices like the wheel should only be used with the master axis, except temporarily with the slave axis to align the stages.

Mount XY Stage

1. Mount the bottom plate of the stage to the stilts, as in Figure 4. Work in a criss-cross pattern, gently tightening the screw farthest from the one you just tightened. Do the sequence once gently,

and then again to properly seat all the screws. This ensures the stress is applied evenly.

- 2 - M6 x 16 mm flat head screws on the flat side
- 2 - M6 x 14 mm flat head screws on the recessed side

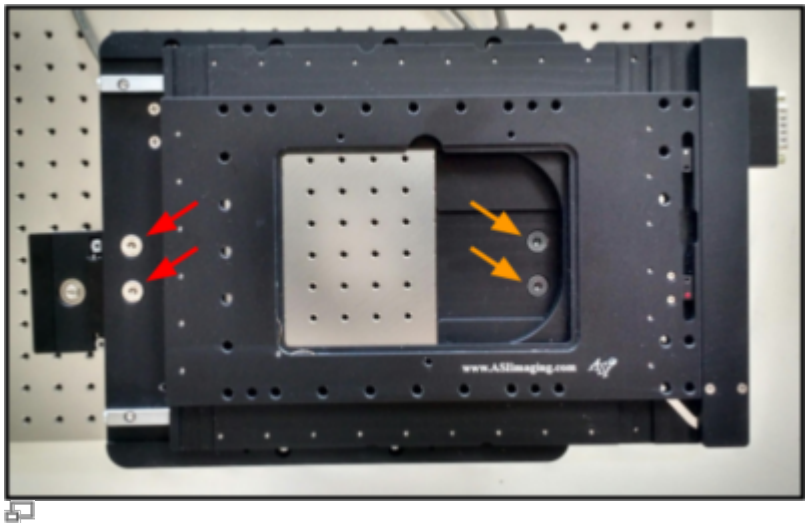


Figure 4: stage mounted using criss-cross pattern (red arrows indicate 16 mm screws, orange arrows indicate 14 mm screws)

NOTICE: Firmly mount the XY stage to the stilts before tightening the stilts to the breadboard, else permanent damage to equipment may occur.

2. Tighten the screws fastening the stilts to the breadboard after the stage is firmly mounted.[4] Again, work in a criss-cross pattern, gently at first, to ensure all screws are properly seated.

3. After the screws are tightened, it is important to:

1. Check that the screw tops are flush with or slightly below the surface of the stage bottom plate. If any protrude (i.e. are “sitting proud”) then the screw head is larger than it should be and moving the stage may scratch the middle plate. Please contact ASI for new screws.
2. Check that the stage is level with the table; remove or loosen the screws if realignment is necessary.
3. Verify both stilts are plugged in.
4. Verify the slave and master-axes have the same value for their position.[5]
5. Send commands to the master-axis ONLY, not the slave-axis.

NOTICE: To control the vertical movement of the stage, send commands to the master-axis ONLY, else the stilts lose alignment and permanent damage to equipment may occur.

For MIM: When using an FTP with an inverted microscope

that has an objective **below** the stage, then the FTP card must be setup with the following commands to reverse it's direction of travel such that increasing values move away from the objective and decreasing values move towards the objective. ***2 CCA Z=6 2 CCA Z=8 2 SS Z*** Note: “2” Represents the card address in these commands. If your Z/F FTP cards address is not the standard 2, then use the correct address, visible on the front panel of the card.

Operation

Send commands only to the master axis. The firmware feature for keeping the linear stages synchronized is documented here.

If the two linear stages become unsynchronized somehow (e.g. a cable comes off) then go back to the section Alignment of the Stilts.

1)
Usually it is master-Z-axis and slave-F-axis, but it can vary depending on the system.
2)
There are two mounting positions available: forward or back.
3)
This is the only reason to command the slavea xis directly
4)
Small jiggles throughout this step can help reduce mechanical stress.
5)
e.g. If your master is the Z-axis, enter H Z to set both positions equal to zero