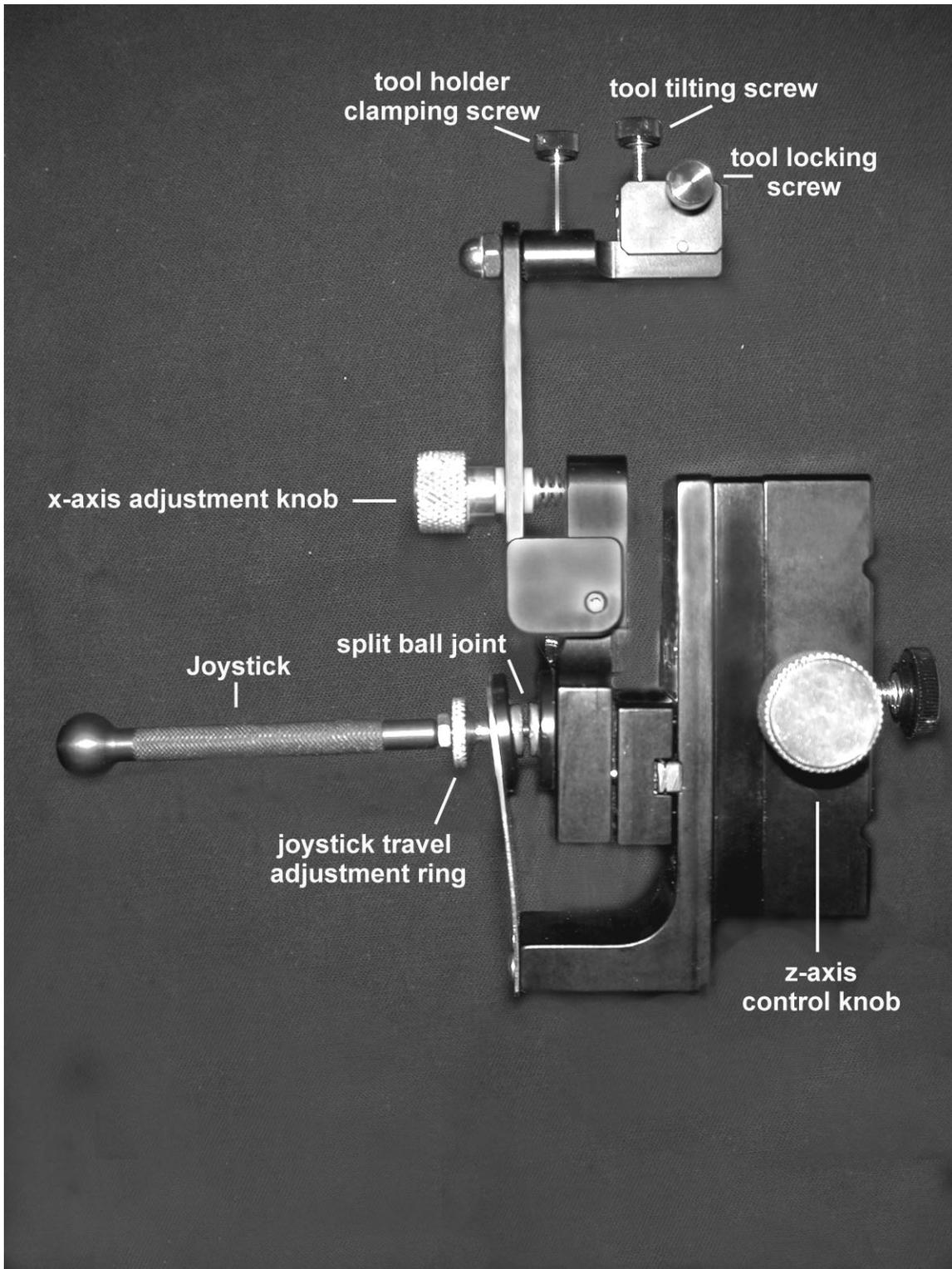


**Tetrad Dissection
Accessories
For Nikon Ci Microscope**

INSTRUCTION MANUAL
(2-12)

MICROMANIPULATOR NOMENCLATURE



MOUNTING THE CONDENSER EXTENSION RING



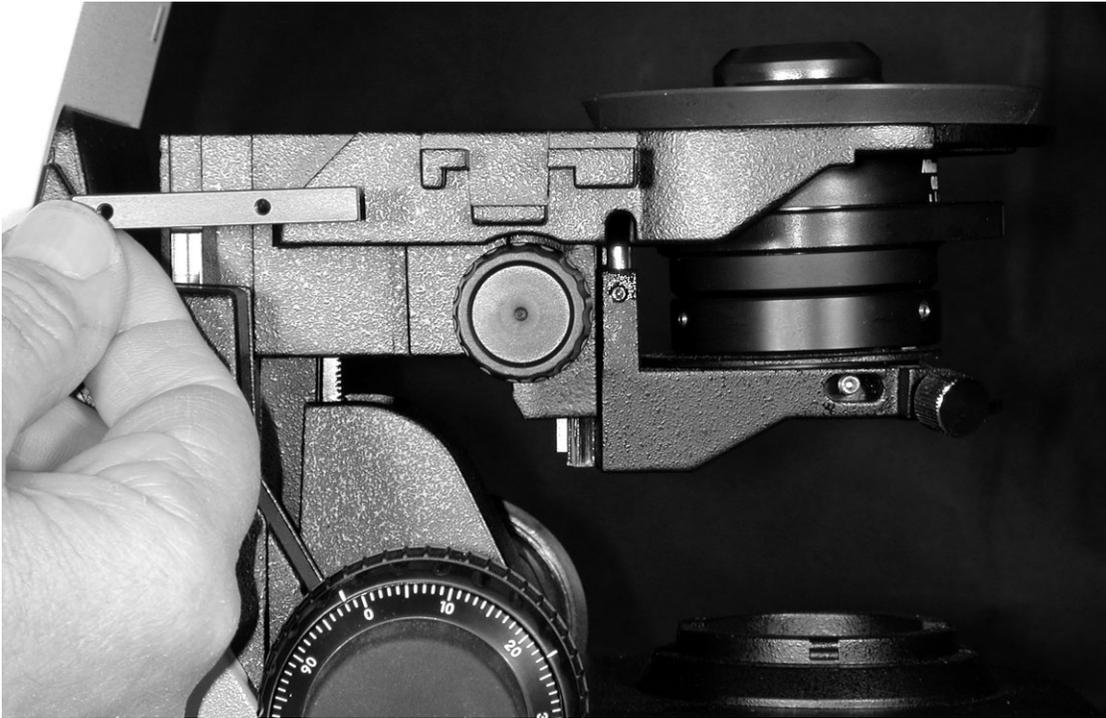
The modified Nikon Abbe condenser must be extended with the condenser extension ring. It may have been installed before shipment.

INSTALLING THE CONDENSER ON THE NIKON Ci

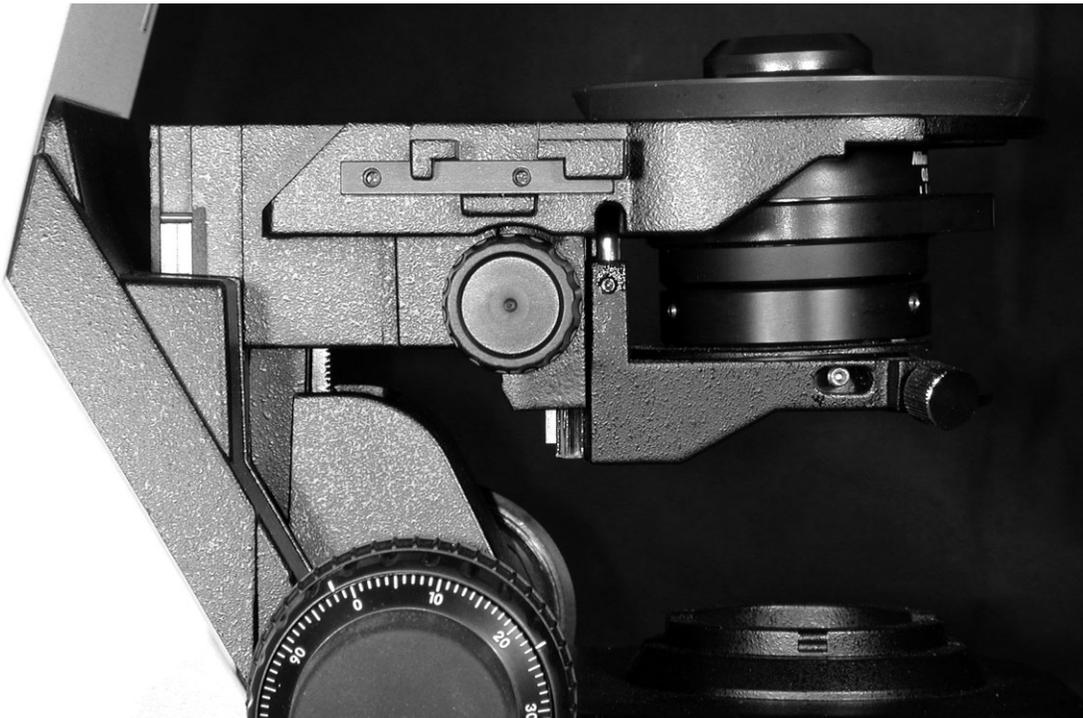


Raise the Ci stage carrier using the coarse focus knob on the microscope. Lower the condenser carrier. Insert the condenser into the carrier as shown above. Lock in place with Allen wrench.

MOUNTING THE MICROMANIPULATOR BRACKET



Be sure that microscope focus is at the top of its travel. Insert bracket rail into slot on left side of Nikon Ci stage carrier as shown in figure above and below.

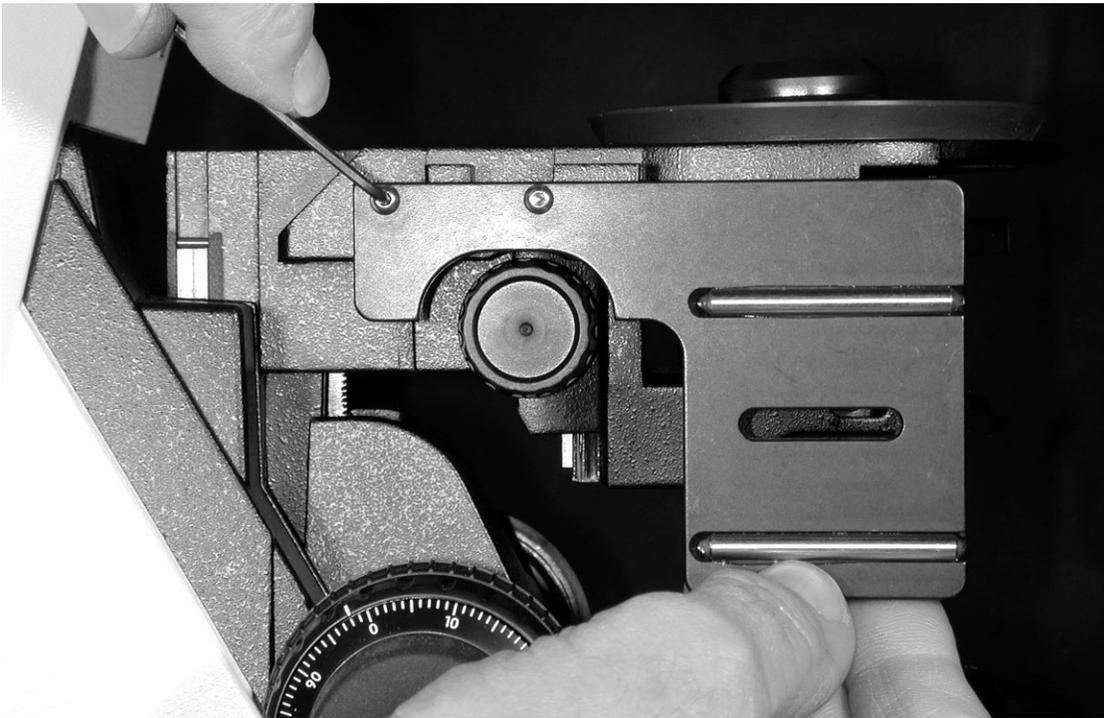




Mount bracket to bracket rail using two M3 x 25mm button-head screws. Do not tighten completely.

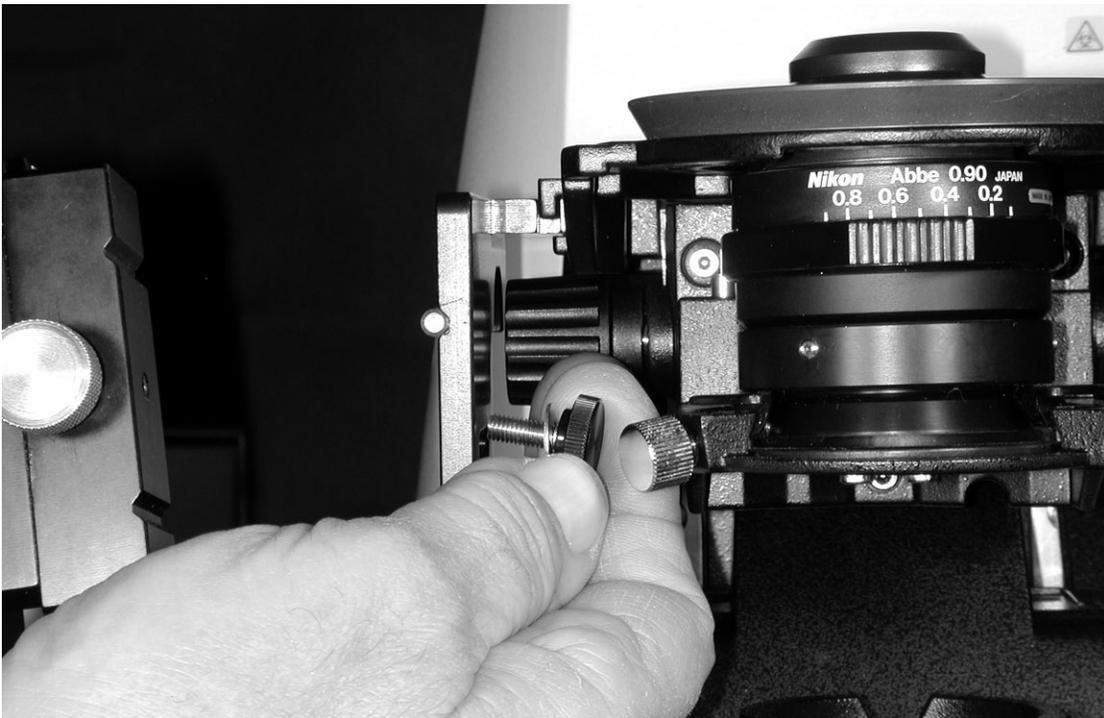


Tighten set screw to lock bracket rail to stand. **DO NOT OVERTIGHTEN!** This could damage microscope casting.

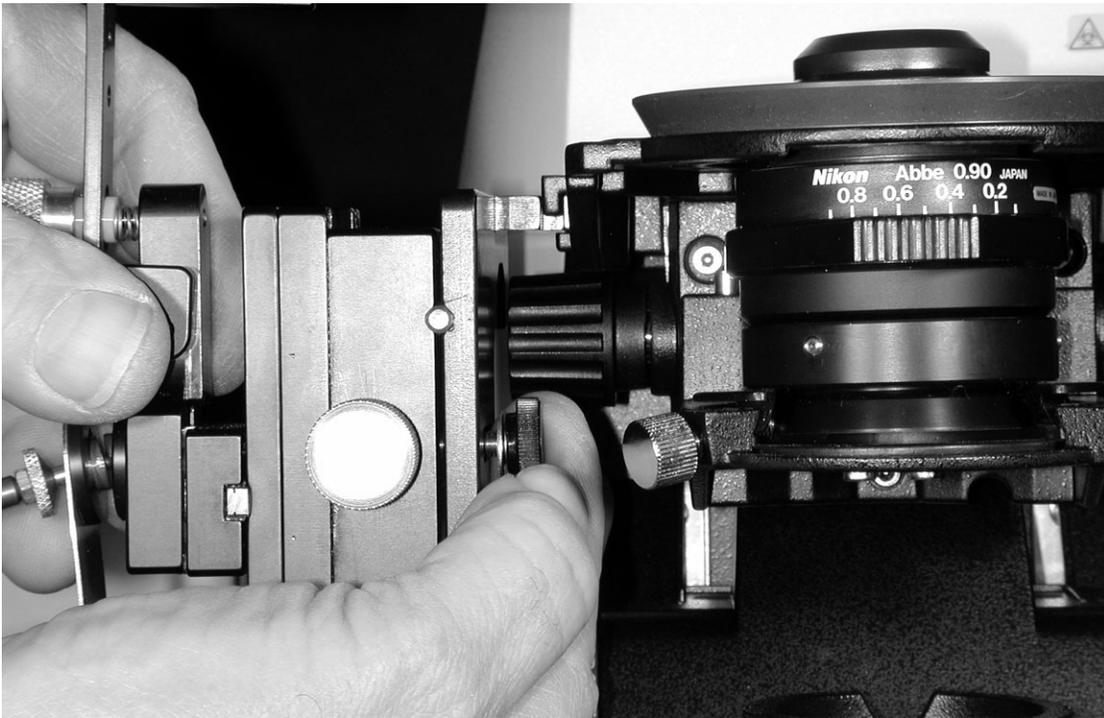


Tighten two M3 x 25mm screws on bracket.

MOUNTING THE JOYSTICK MICROMANIPULATOR



Insert micromanipulator mounting screw through bracket slot.



Mount micromanipulator to bracket using mounting screw.



Micromanipulator installed on Nikon Ci microscope.

ATTACHING THE Y-AXIS DETENT



Remove single stage screw and washer as shown above and below.





Insert the y-axis rack as shown above.



Slide y-axis rack under stage vernier bracket until the screw hole in the rack is aligned to the empty screw hole.



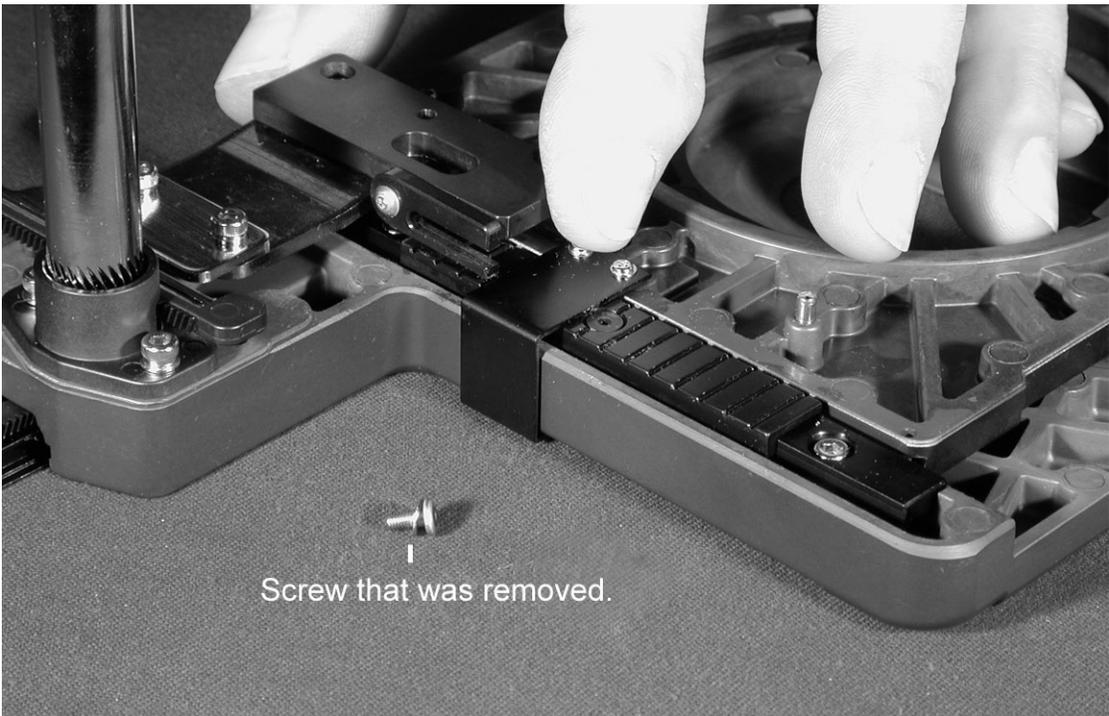
Insert flathead screw.



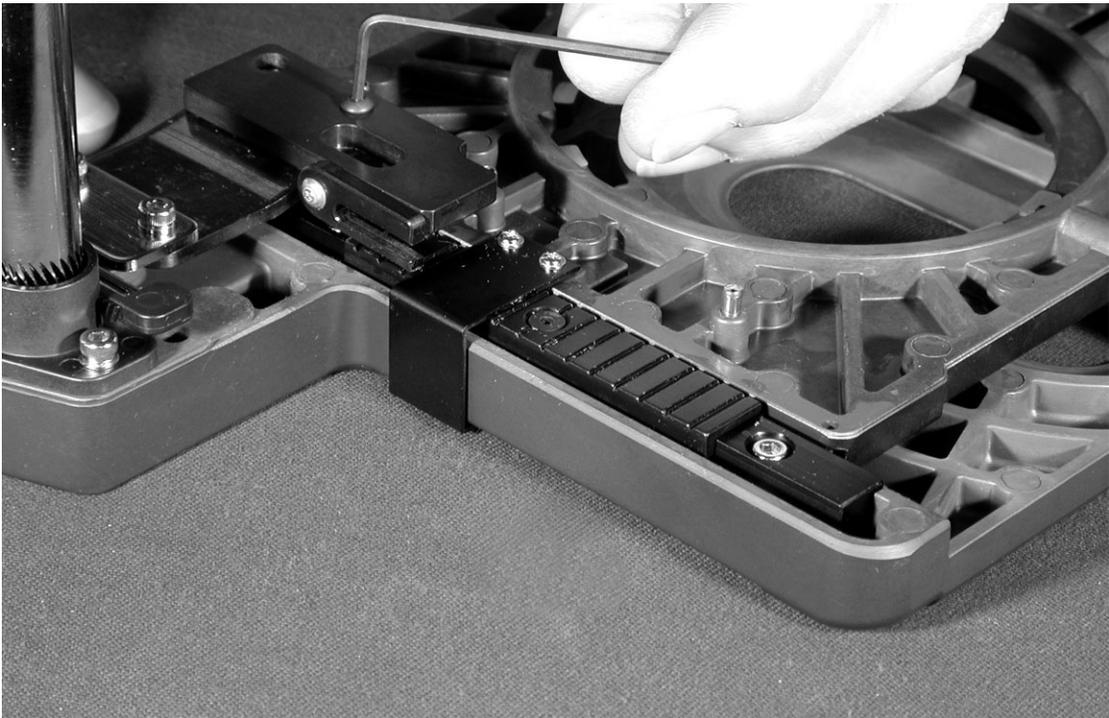
Tighten flathead screw.



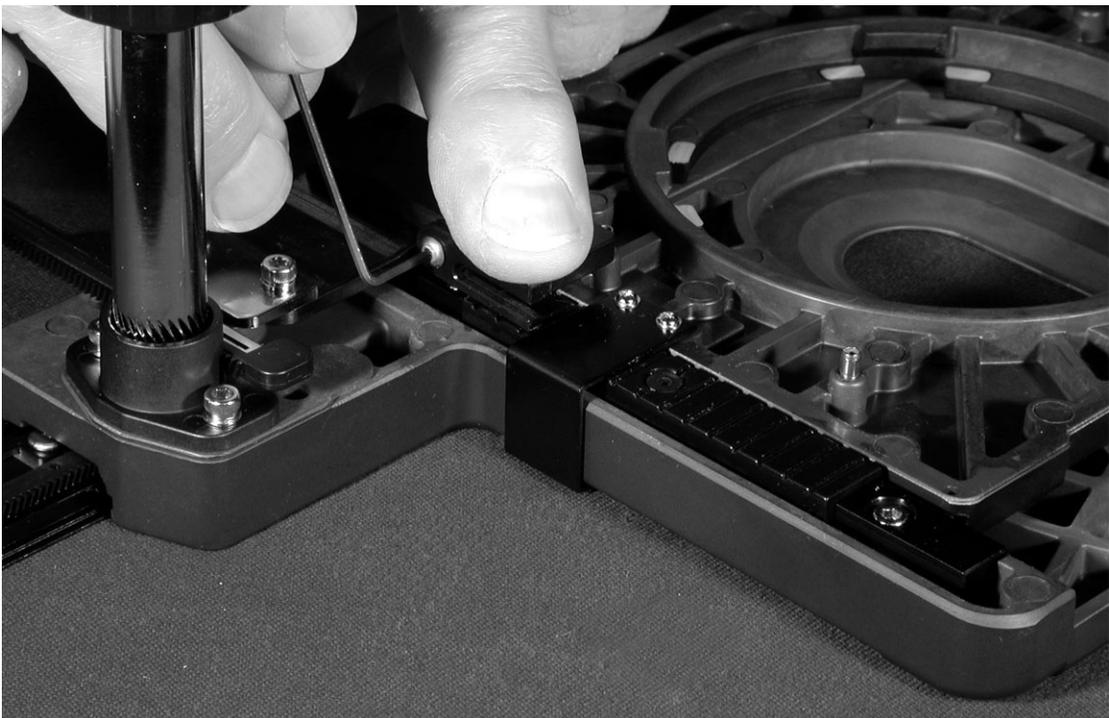
Remove the stage screw (only one) as shown.



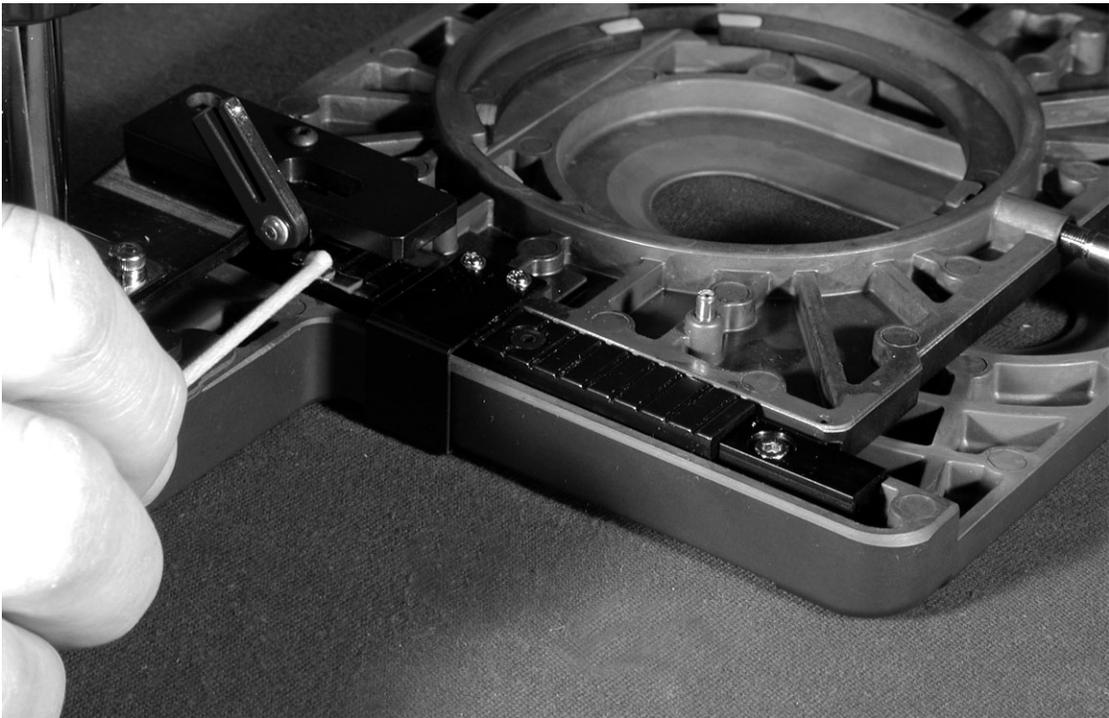
Place the y-axis detent on stage so that the screw hole aligns with the empty screw hole.



Insert and tighten an M3 x 10mm buttonhead screw.



Loosen the screw on the y-axis detent arm.



Pivot the y-axis detent arm upwards so that light grease can be applied to the y-axis rack as shown above and below.

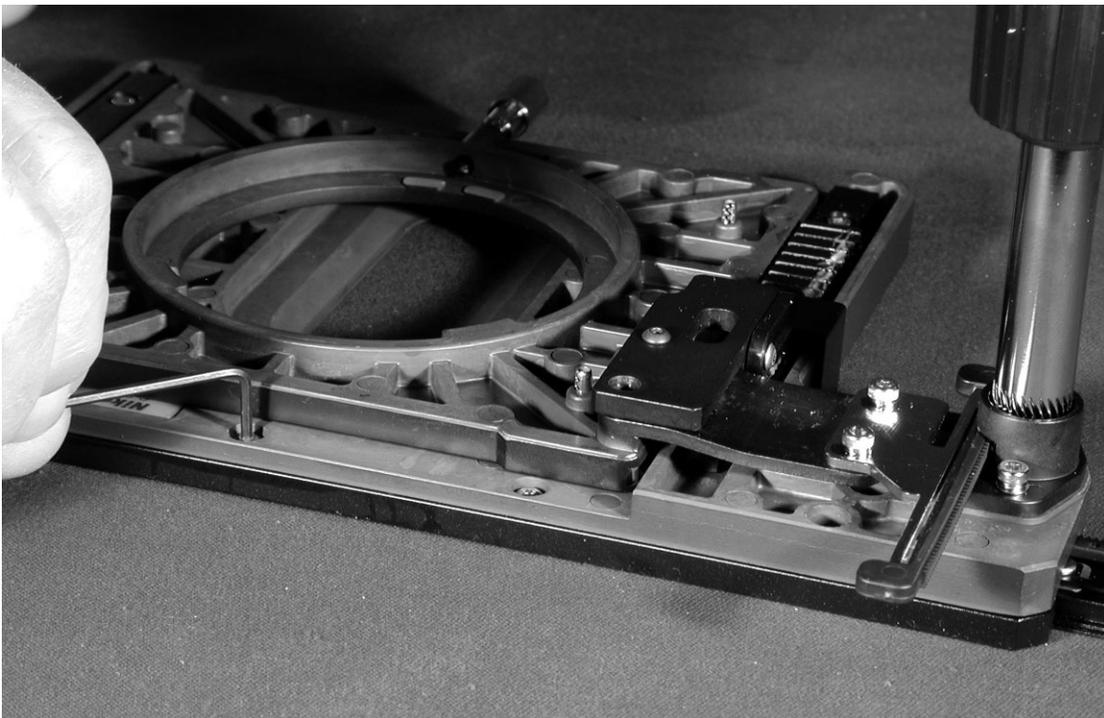


Lubricate the y-axis rack with light grease. It is only necessary to lubricate the side of the rack that will be contacted by the detent ball.

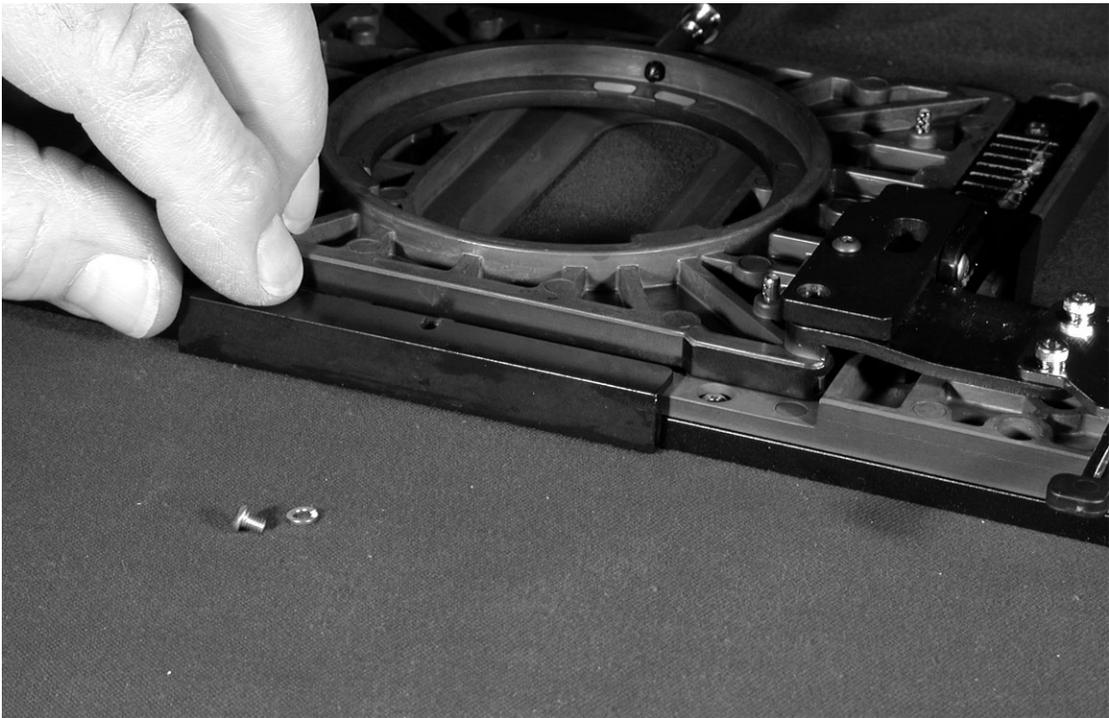


Pivot the y-axis detent arm so that the ball detent engages a groove on the y-axis rack. Apply light downward pressure and tighten the screw.

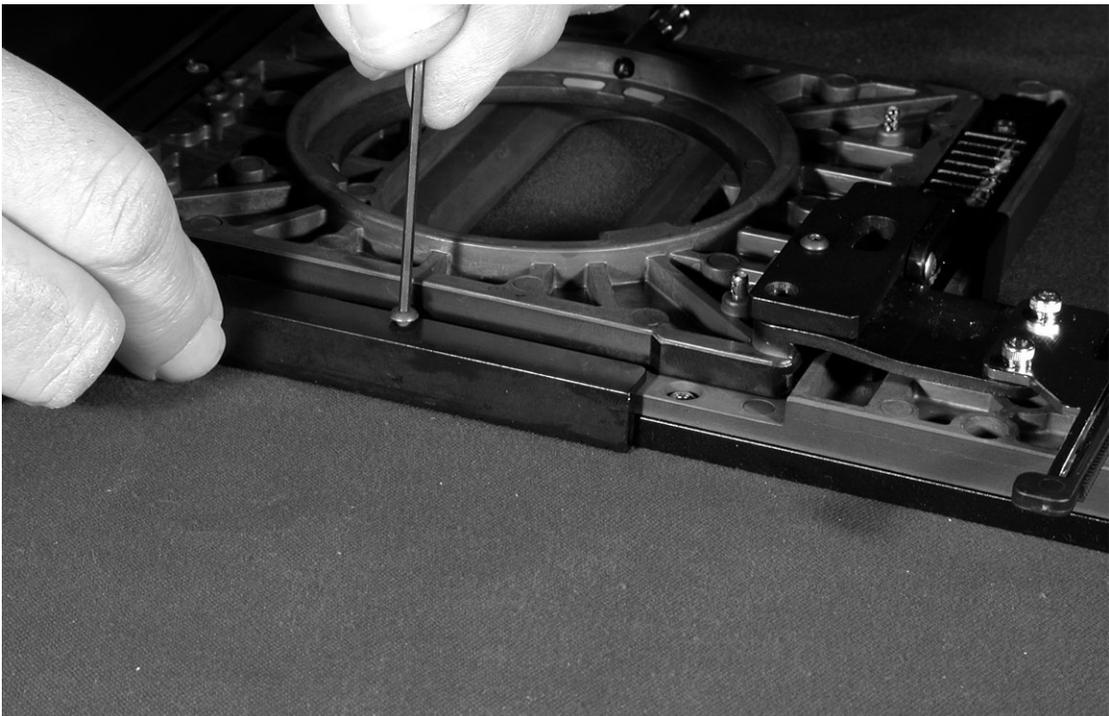
ATTACHING THE X-AXIS DETENT



Remove screw (only one) as shown above.



Place the x-axis rack as shown above.



Insert and tighten an M3 x 10mm buttonhead screw as shown above.



Take the dish holder with two M3 x 14mm buttonhead screws inserted and place it on the top surface of the stage. Align screws to screw holes.



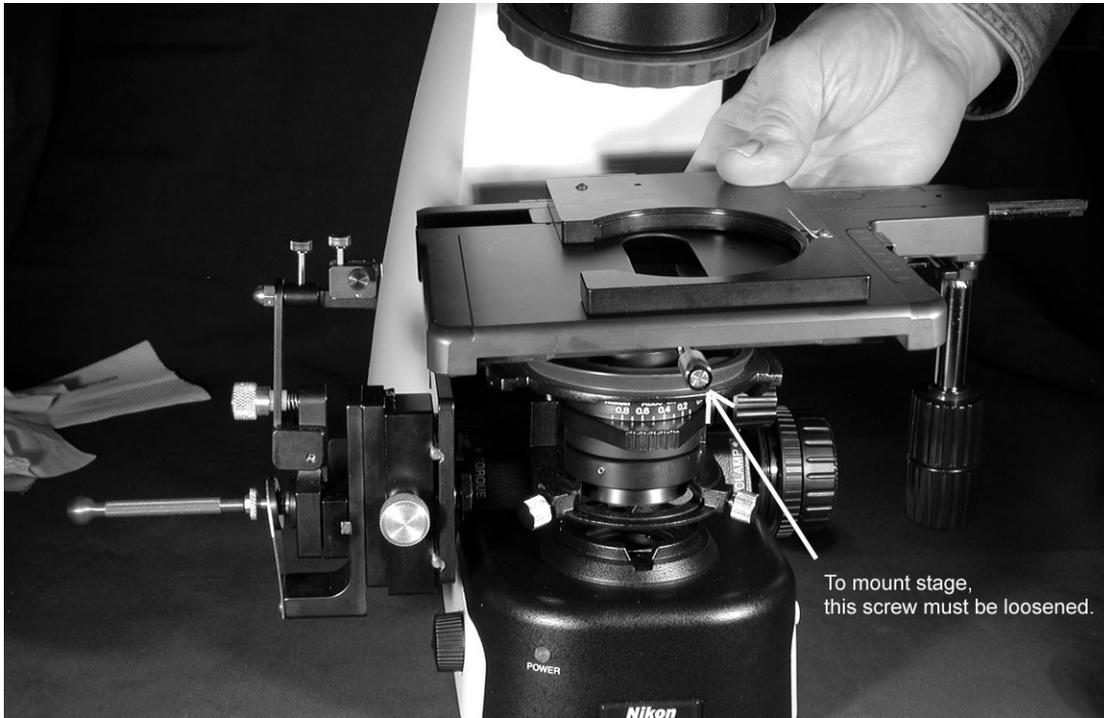
Tighten screws as shown above.



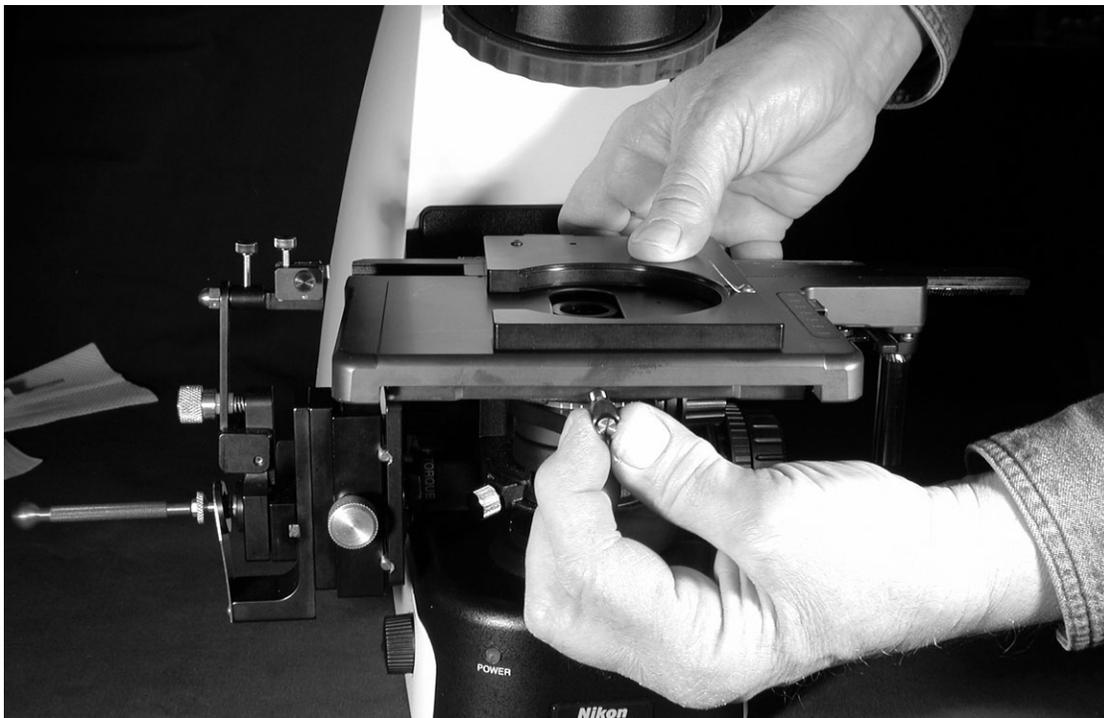
Lubricate the x-axis rack with light grease.



Pivot the x-axis detent arm so that the ball detent engages a groove on the x-axis rack. Apply light downward pressure and tighten the screw.



Place stage on stage carrier of microscope stand. Be sure that it is level.



Tighten stage locking screw.

MICROSCOPE ASSEMBLY

To assemble the remaining components of the microscope see pages 58-62 of the Nikon Upright Microscope Eclipse Ci-S/Ci-L Instruction Manual (English Version).

THE DISSECTING TOOL

Tools for tetrad dissection are not supplied with the system, but are often fabricated by the operator. They are also available commercially; e.g. www.corastyles.com.

OPERATION OF THE MICROMANIPULATOR

1. Center the joystick in its travel.
2. Turn the x-axis adjustment knob to the center of its travel.
3. Raise the micromanipulator by turning the z-axis control knob so that the metal clip in the tool holder is just above the surface of the stage.
4. Rotate the microscope nosepiece to a position with no objective lens.
5. Mount the tool as follows:
 - A. Loosen the tool locking screw;
 - B. Slide the tool shaft between the metal clip and the v-groove in the tool holder;
 - C. Rotate the tool so that the shorter shaft is in the vertical position and it is pointing upwards.
 - D. Tighten the tool locking screw.
 - E. Turn the tool tilting screw to align the tool shaft parallel to the top surface of the microscope stage.
6. Lower the microscope stage using the coarse focus knob.
7. Rotate the 2x objective into position over the tip of the tool.
8. If the tip of the tool is not centered under the objective on the x-axis, loosen the tool locking screw, slide tool to a centered position, and retighten screw.
9. If tool is not centered on the y-axis, loosen screw that attaches the micromanipulator to the bracket and slide entire micromanipulator

forward or backward until tool is centered under objective and retighten. (This procedure should be necessary only during the initial setup.)

CHECKING THE MOVEMENT OF THE MICROMANIPULATOR

1. By first using the microscope coarse focus and then the fine, bring the tip of the tool close enough to focus the tip of the tool.
2. Center the tip by using the joystick and the x-axis adjustment knob.
3. Move the joystick up and down while observing the tip through the eyepieces with the 10x objective. The tip should move above and below the plane of focus without shifting significantly from side to side. If a shift is observed, it is likely that the short shaft of the tool is not perfectly vertical. Use the tool tilting screw and/or slightly rotate the entire tool in the tool holder until the short shaft of the tool is vertical (parallel to the optical axis).

MICROMANIPULATOR SENSITIVITY/TRAVEL ADJUSTMENT

1. Turn the joystick adjustment ring to move it away from the split ball joint.
2. While holding the joystick adjustment ring, rotate the joystick. This will cause the ball to separate or to draw together. When both halves of the ball are touching, the travel is at a minimum. If they are separated, the joystick provides more travel to the tool. Note: If the halves of the ball are separated to their full extent, the joystick will lose its tension and droop.
3. After the proper setting is decided, rotate the joystick adjustment locking ring until it is locked against the ball.



MOUNTING A DISH

1. Rotate the microscope nosepiece to an empty position.
2. Use the z-axis control knob to lower the micromanipulator until the tool is only slightly above the stage. Lower carefully to prevent snapping the tool.
3. Invert and uncover a petri dish.
4. Mount the inverted dish bottom into the dish holder. The spring clip allows the dish holder to accommodate dishes from different manufacturers.

VIEWING THE CULTURE

1. Rotate the nosepiece to move the 2x objective into position.
2. Using the coarse focus, carefully raise stage until the dish is almost touching the objective.
3. Using the fine focus, focus on the surface of the agar.
4. Scan with the stage controls until the yeast is located.
5. Adjust the aperture diaphragm (in the condenser) until the contrast is enhanced enough to render the best image of the yeast. It should be noted that the condenser should be at or near the top of its travel. If possible, it should be at a height that focuses the field diaphragm (in the microscope base) into the specimen plane. The condenser should then be centered as described on page 41 of the Nikon Upright Microscope Eclipse Ci-S/Ci-L Instruction Manual (English Version).

DISSECTION

1. With the 2x objective, find a yeast cell and center it with the stage controls.
2. Carefully raise the micromanipulator using the z-axis control knob until the tip of the tool is close to the agar.
3. Fine focus the microscope on the tool tip.

4. Alternately raise the stage with the fine focus and the tool with the z-axis control knob until the yeast is once again in focus and the tool tip is just below it.
5. Switch to the 10x objective and use the joystick to raise the tip of the tool until it makes contact with the tetrad.
6. Lower the tip (with the bud clinging to it) away from the agar.
7. Move the stage in the desired direction. Note: the stage has detents every 5mm on the x-axis and y-axis to aid in relocating the yeast. The tension of the stage controls can be adjusted as described on page 39 of the Nikon Upright Microscope Eclipse Ci-S/Ci-L Instruction Manual (English Version). Use the joystick to redeposit the bud on the agar.

TROUBLESHOOTING

Image lacks contrast:	Properly adjust condenser diaphragm. Clean optics. If possible, use less growing media.
Tool does not track linearly:	Ball-joint should be greased. Tool is hitting stage or dish. Adjust joystick to reduce travel. Have micromanipulator serviced.

For service send micromanipulator to:

MICRO VIDEO INSTRUMENTS, INC.
11 ROBBIE ROAD
P.O. BOX 518
AVON, MA 02322
USA
TEL # 508-580-0080
FAX # 508-580-8623