



# SD Series Tramming Guide

A CNC can become out of square and require adjustment. Ridges along either the X-axis, Y-axis, or both when surfacing or pocketing with a flat bottom bit is a common indicator adjustment is needed. This guide walks through the steps of tramming the router/spindle along Y then X to remove those ridge lines.

For the purpose of this guide; all testing, tramming, and surfacing will be completed on top of an unsurfaced spoilboard attached to the machine.

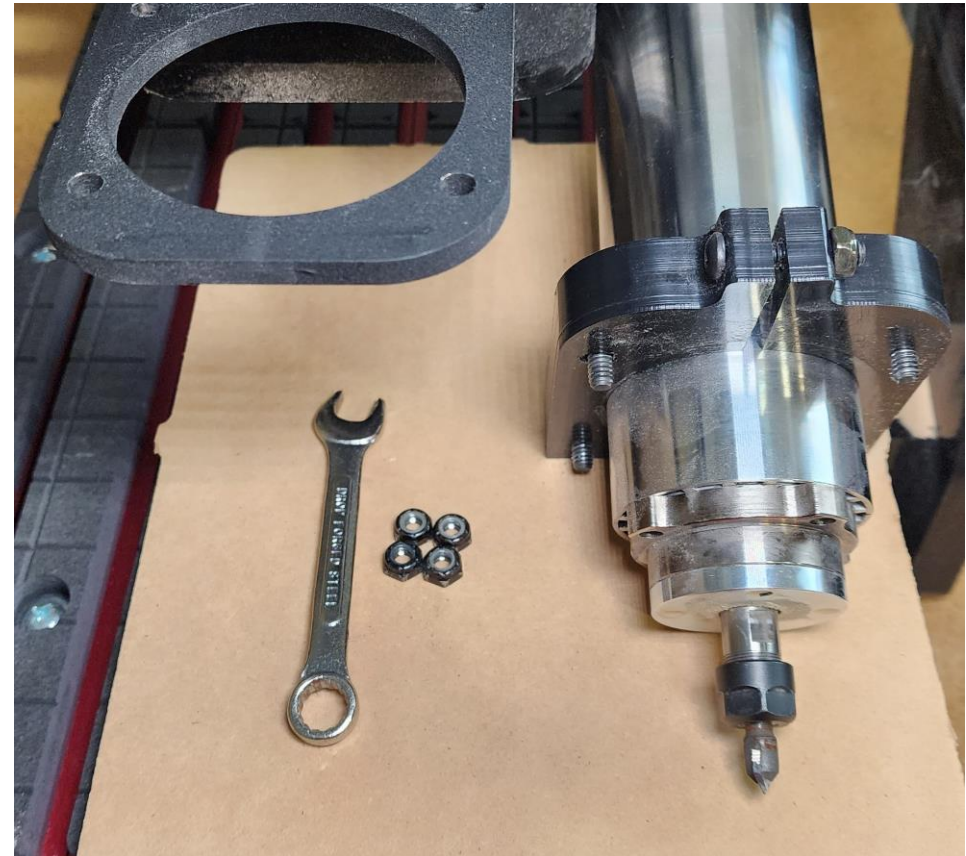
## Tools Needed:

- Four 3"x12"x1/2" MDF (can be thicker)
- Aluminum foil or aluminum shim stock
- 5/32" Allen wrench
  - or T27 Torx screwdriver
- 7/16" socket or wrench
- 1" planing or surfacing bit

# Removing the router and clamp

During the tramming process, it will be necessary to detach the clamp that is holding the router in place on the router cradle. When instructed to, use a 7/16" socket or open-ended wrench to secure the locknut beneath the router cradle, and then loosen the bolt using a 5/32" Allen wrench. You only need to loosen the bolt enough to remove the locknut. Once all four locknuts have been removed, lift the router and clamp from the router cradle.

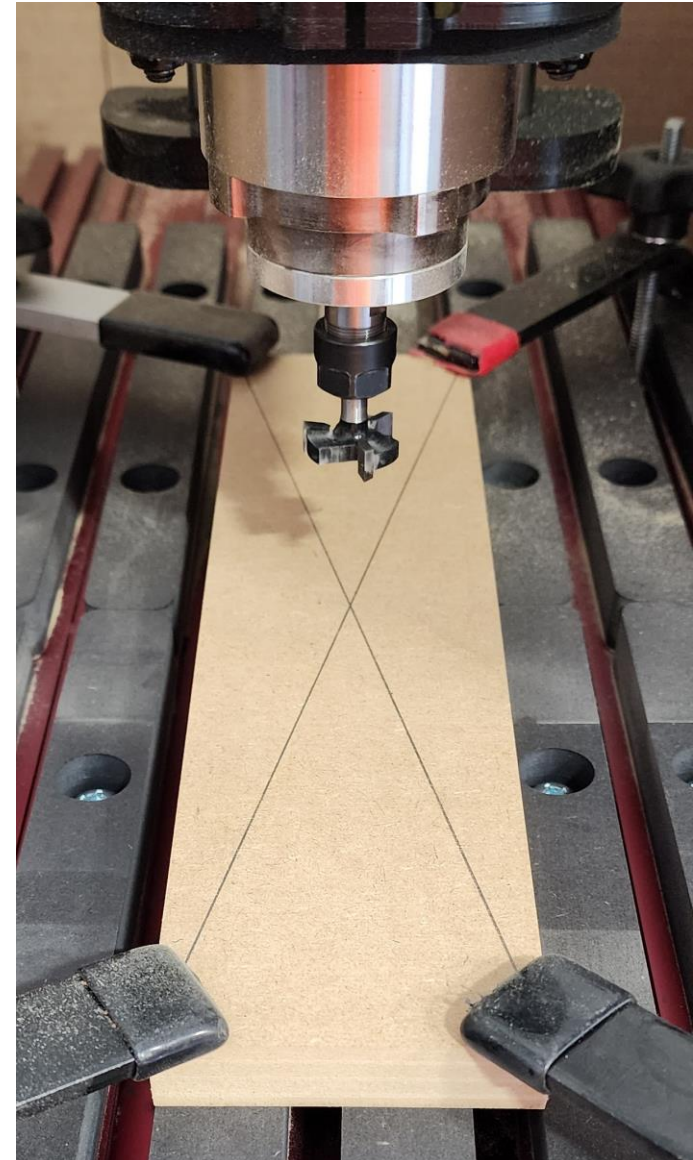
To make reassembly easier, it is recommended to leave a part of the bolt exposed beneath the clamp, which will help realign the clamp and router cradle.



# Part 1: Y-axis tramming Setup

The first step is tramming or adjusting the tilt forward or back along the Y-axis of the machine.

- Mark the Center of the 3"x12" MDF board, then place it on the machine with the 12" aligned parallel with the T-track slots.
- Clamp the material down at the edges, ensure an unobstructed 8" area in the middle.
- Move and zero the 1" surfacing bit to the center and surface of the material.



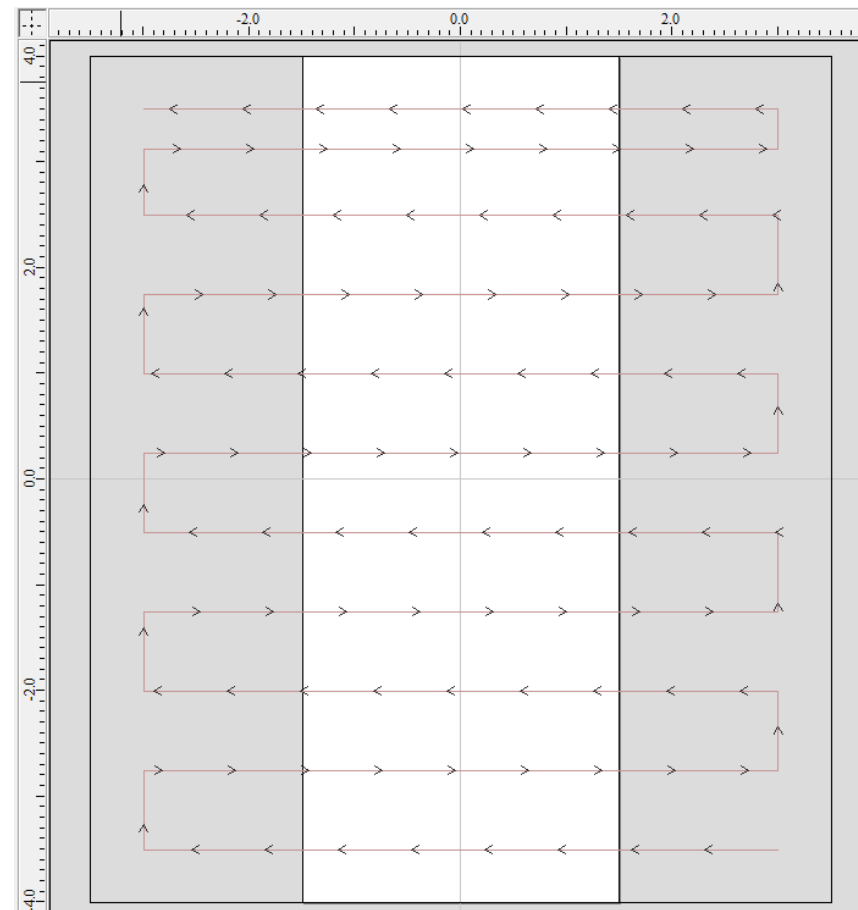
# Y-axis tramming

## Toolpath layout

Once the 1" surfacing bit is zeroed in X,Y, and Z, run "Y-tramming.tap" through the LCD Pendant or Ready2Control.

- The toolpath is designed with a 0.00-degree Raster for left and right movement
- The tool will travel off the material on each pass
- The tool uses a 75% step over

The file is designed in this manner to exaggerate and create ridges in one axis.



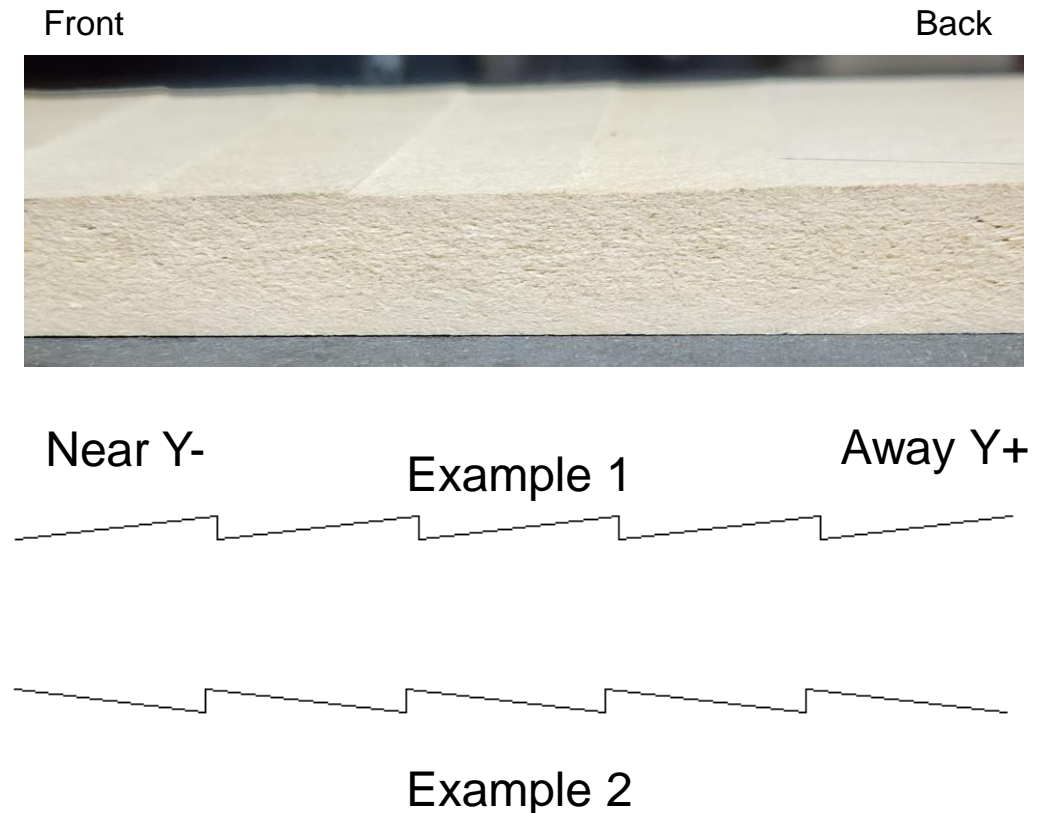
# Y-axis tramming

## Reading the ridges

Interpreting the horizontal ridges created when the toolpath has completed can sometimes be tricky.

The profile displayed in example 1 shows the front of the surfacing bit is lower than the back. You can feel this ridge with your fingernail moving back to front.

Example 2 shows the front of the surfacing bit is higher than the back. You can feel this ridge with your fingernail moving front to back.



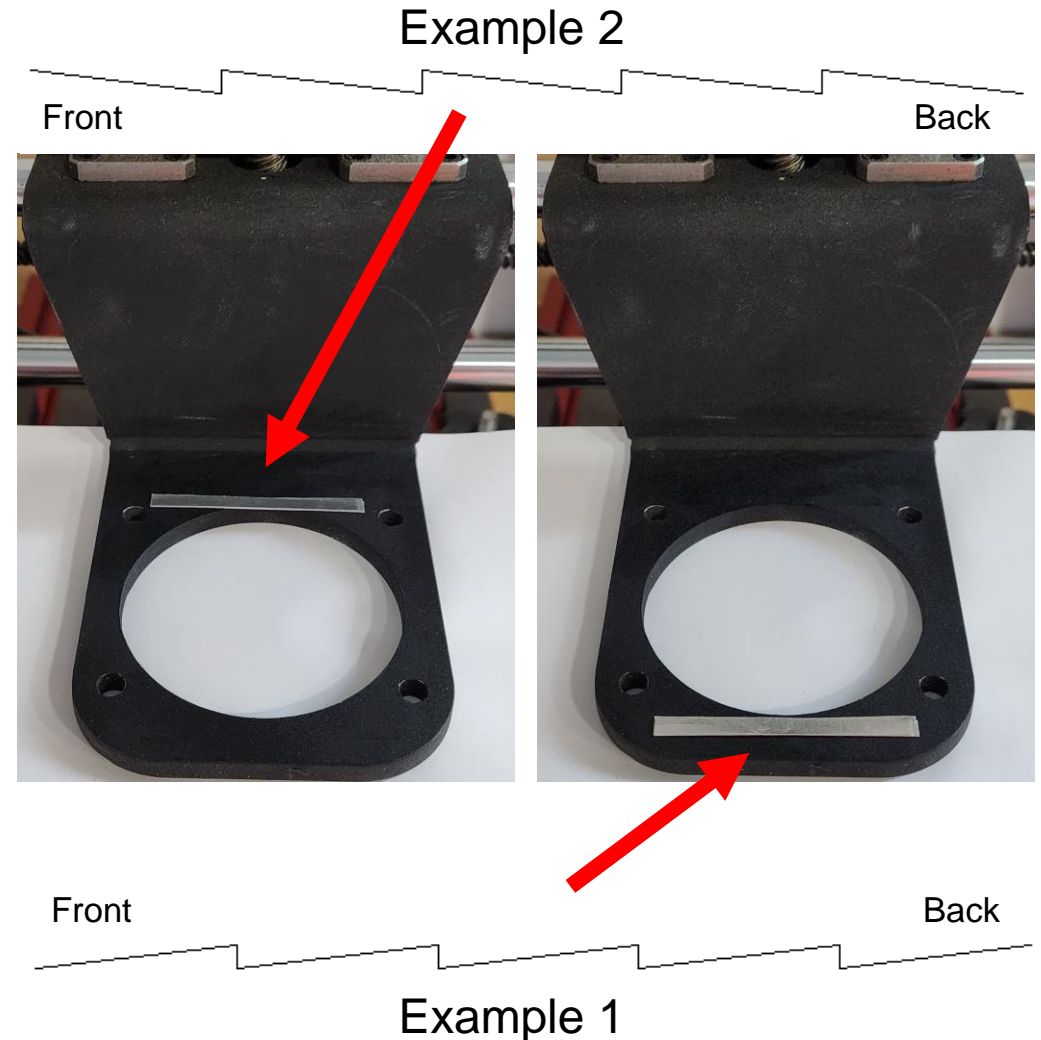
# Y-axis tramming

## Shimming

Remove the router and clamp from the router cradle. Place folded or layered aluminum foil or shim stock between the clamp and Z-axis router cradle to correct the front or back pitch of the router/spindle.

- Ridge lines similar to Example 2 (top) are corrected by adding folded aluminum foil or shim stock at the rear of the clamp.
- Ridge lines similar to Example 1 (bottom) can be adjusted by adding folded aluminum foil or shim stock at the front of the clamp.

Place the router and clamp back into place then tighten the clamp bolts back into place.



# Y-axis tramming

## Repeat

After shims have been added and the clamp tightened; zero the Z-axis to the surface of the material, then run Y-tramming.tap.

Repeat the process of tramming, zeroing the Z-axis, and running Y-tramming.tap until you can no longer feel the ridges.



# Part 2: X-axis tramming Setup

The next step is tramming or adjusting the left or right rotation along the X-axis.

- Mark the Center of the 3"x12" MDF board then place it on the machine with the 12" aligned left to right. (Perpendicular to the T-track slots)
- Clamp the material down at the edges ensuring there is an unobstructed 8" area in the middle.
- Move and zero the 1" surfacing bit to the center and surface of the material.



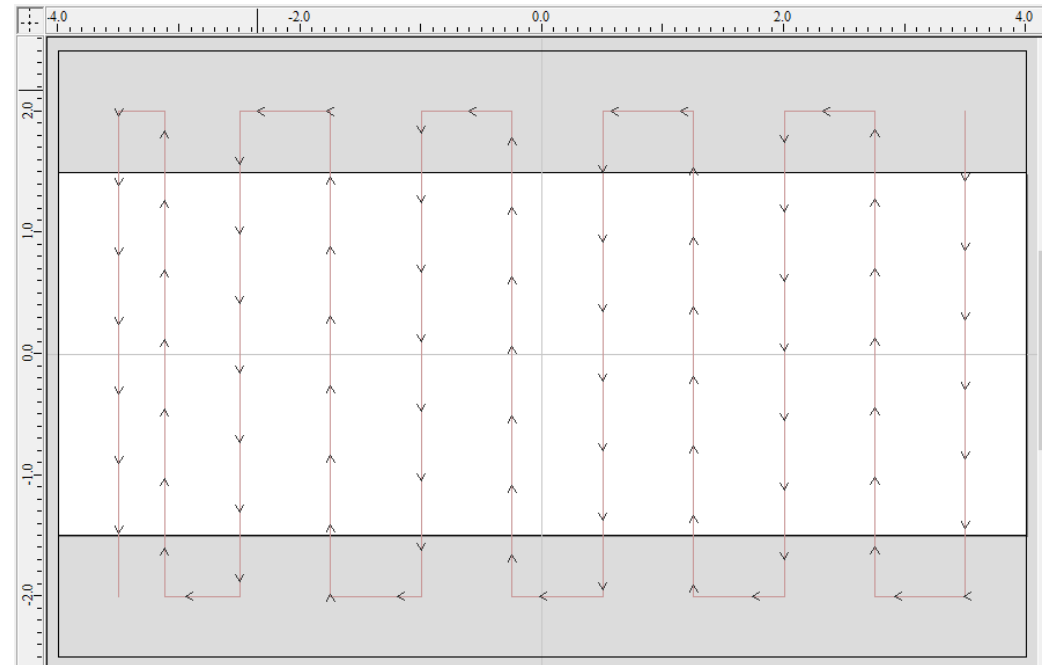
# X-axis tramming

## Toolpath layout

Once the 1" surfacing bit is zeroed in X,Y, and Z, run "X-tramming.tap" through the LCD Pendant or Ready2Control.

- The toolpath is designed with a 90.00-degree Raster for front to back movement
- The tool will travel off the material on each pass
- The tool uses a 75% step over

The file is designed in this manner to exaggerate and create ridges in one axis.



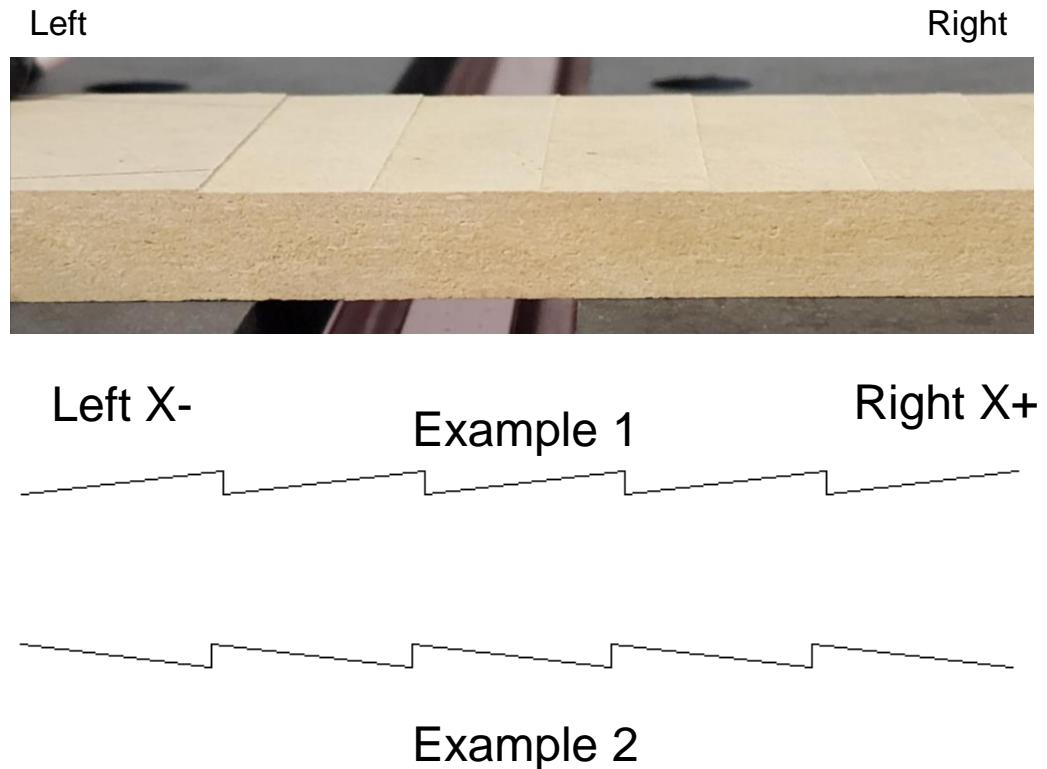
# X-axis tramming

## Reading the ridges

Interpreting the vertical ridges left when the toolpath has completed can sometimes be tricky.

The profile displayed in Example 1 shows the left side of the surfacing bit is lower than the right. You can feel this ridge with your fingernail moving right to left.

Example 2 shows the left side of the surfacing bit is higher than the right. You can feel this ridge with your fingernail moving left to right.



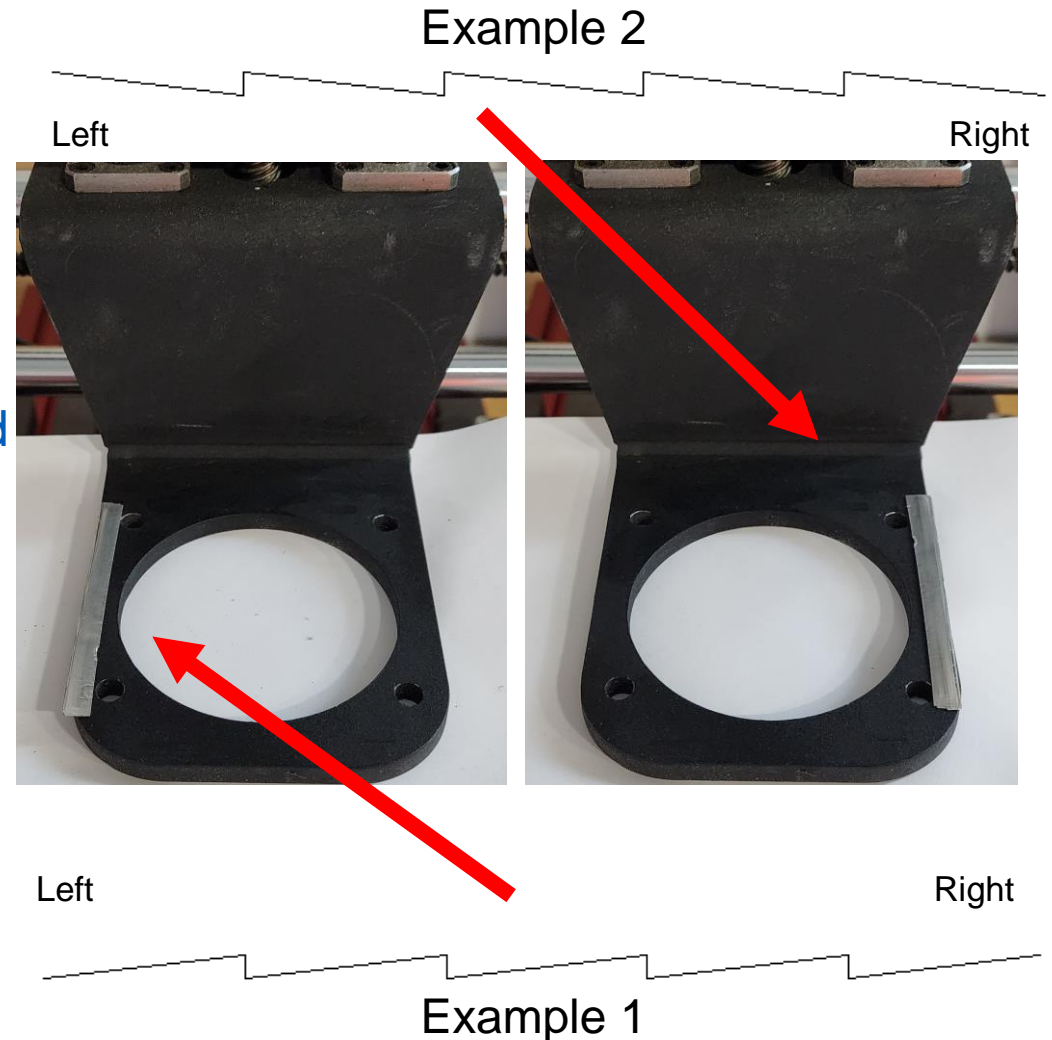
# X-axis tramming

## Shimming

Remove the router and clamp from the router cradle. Place folded or layered aluminum foil or shim stock between the clamp and Z-axis router cradle to correct the left or right rotation of the router/spindle.

- Ridge lines similar to Example 2 (top) are corrected by adding folded aluminum foil or shim stock to the right side of the clamp.
- Ridge lines similar to Example 1 (bottom) can be adjusted by adding folded aluminum foil or shim stock to the left side of the clamp.

Place the router and clamp back into place then tighten the clamp bolts back into place.



# X-axis tramming

## Repeat

After shims have been added and the clamp tightened; zero the Z-axis to the surface of the material, then run X-tramming.tap.

Repeat the process of tramming, zeroing the Z-axis, and running X-tramming.tap until you can no longer feel the ridges.



