Brad + Jason

Mount Lower – Manufacturing Procedure

WATCH THE VIDEO!

https://youtu.be/XL0F5GGvttE

Milling Machine Operations:

Install mill vise on table and ensure it is properly aligned to the table travel. Clamp part in vise on parallels with 1.25" stock dimension between jaws and about .5" stick-out on left side of jaws.

1) **Cut a piece of .75" X 1.25" 6061-T6 aluminum alloy rectangular bar to a length of 2.25" on bandsaw.** *(8:24)*
   Tools used: Combination square

2) **Side mill one end to clean.** *(14:52)*
   Tools used: 6" rule, 1/2" HSS end mill, digital readout

Remove part, rotate 180° and reclamp as before.

3) **Side mill other end to 2.13" overall length. Use *conventional*, rather than climb, milling technique for roughing cuts.** *(18:06)*
   Tools used: 1/2" HSS end mill, dial caliper, digital readout

Remove part and reclamp in center of vise. Select parallels so at least 3/8" of material is sticking up above the top of the vise jaws. Seat part on parallels with deadblow hammer.

4) **Set tool position:** *(21:20)*
   - **Z axis (quill) = .38" below top of part**
     - **Touch off end mill on top of part and zero Z axis (quill) on DRO. Retract tool. Move table to get part out from under tool. Feed tool down .38" and lock quill.**
   - **X axis zero = left side of part**
     - **Turn on spindle and move table to lightly touch off tool on right side of part. Zero X axis on DRO. Move table along Y axis to get part off of tool, move table to dial in a cut of approx. .01" and take the cut. At the end of the cut, move part away from tool along Y axis, but don't move X axis. Stop spindle. Measure part length and set X axis to this value on DRO.**
   - **Y axis zero = center of part**
     - **Start spindle. Move table along X axis to position tool behind part. Slowly feed table by hand in Y axis to lightly touch off tool on *back* of part. Zero Y axis on DRO. Move table to get part away from tool and move table to position tool in front of part. Slowly feed table by hand in Y axis to lightly touch off tool on *front* of part. Hit 1/2 button on DRO, followed by Y axis set button, to set Y axis zero to center of part.**

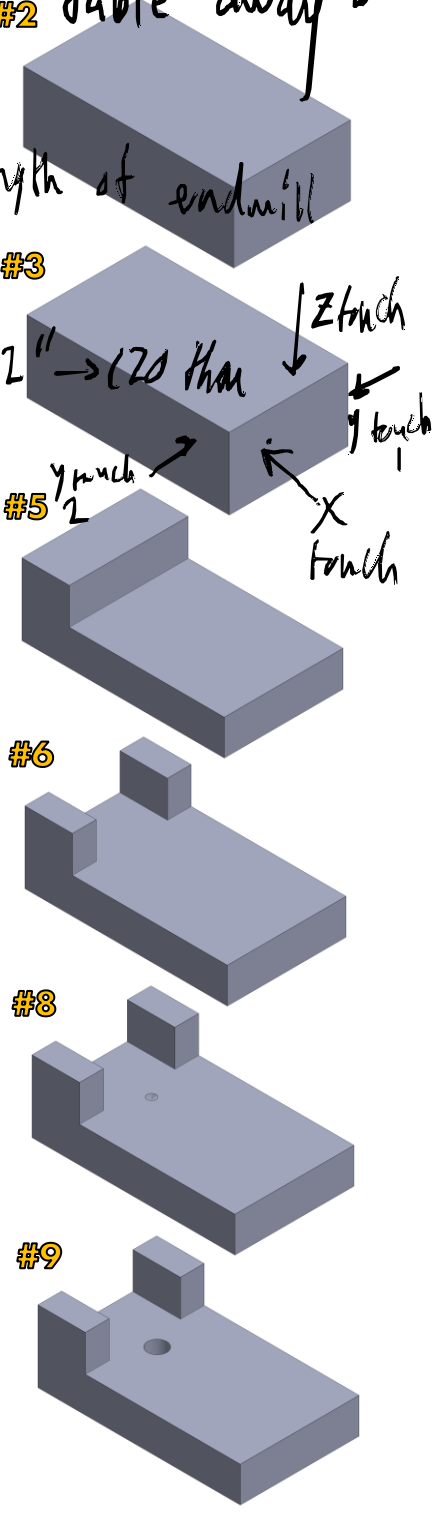
   Tools used: 1/2" HSS end mill, dial caliper, digital readout

5) **Mill step surface .38" from top of part and .5" from left side of part.** *(23:51)*
   Tools used: 1/2" HSS end mill, dial caliper, digital readout

6) **Mill .75" wide slot .38" from top of part and on center of part in Y axis.** *(27:20)*
   Tools used: 1/2" HSS end mill, dial caliper, digital readout

7) **Position spindle .63" from left side of part in X axis and on center of part in Y axis. *Do NOT forget to add radius of edgefinder when locating an edge.*** *(30:53)*
   Tools used: Edgefinder, drill chuck, digital readout

8) **Spot hole for ¼-20 UNC 2B threads.** *(32:54)*
   Tools used: #3 HSS center drill, drill chuck, WD-40 lubricant, digital readout



9) **Drill hole for ¼-20 UNC 2B threads.** *(33:04)*
Tools used: #7 HSS drill, drill chuck, WD-40 lubricant, digital readout

10) **Countersink hole for ¼-20 UNC 2B threads.** *(33:20)*
Tools used: 1/2" X 90° HSS countersink, drill chuck, WD-40 lubricant, digital readout

11) **Repeat Steps #8-10 at a position of 1.38" from left side of part in X axis and on center of part in Y axis.** *(34:02)*
Tools used: #3 HSS center drill, #7 HSS drill, 1/2" X 90° HSS countersink, ¼-20 HSS plug tap, tap wrench, spring-loaded tap guide, drill chuck, WD-40 lubricant, digital readout

12) **Tap hole 1.38" from left side of part for ¼-20 UNC 2B threads.** *(34:42)*
Tools used: ¼-20 HSS plug tap, tap wrench, spring-loaded tap guide, drill chuck, WD-40 lubricant, digital readout

13) **Tap hole .63" from left side of part for ¼-20 UNC 2B threads.** *(36:10)*
Tools used: ¼-20 HSS plug tap, tap wrench, spring-loaded tap guide, drill chuck, WD-40 lubricant, digital readout

Remove part, flip 90° and reclamp in vise so that the bottom of the part is resting against the fixed jaw and the two tabs are sticking out on the right side of the vise jaws. Select parallels so approx. 1/4" of material is sticking up above the top of the vise jaws.

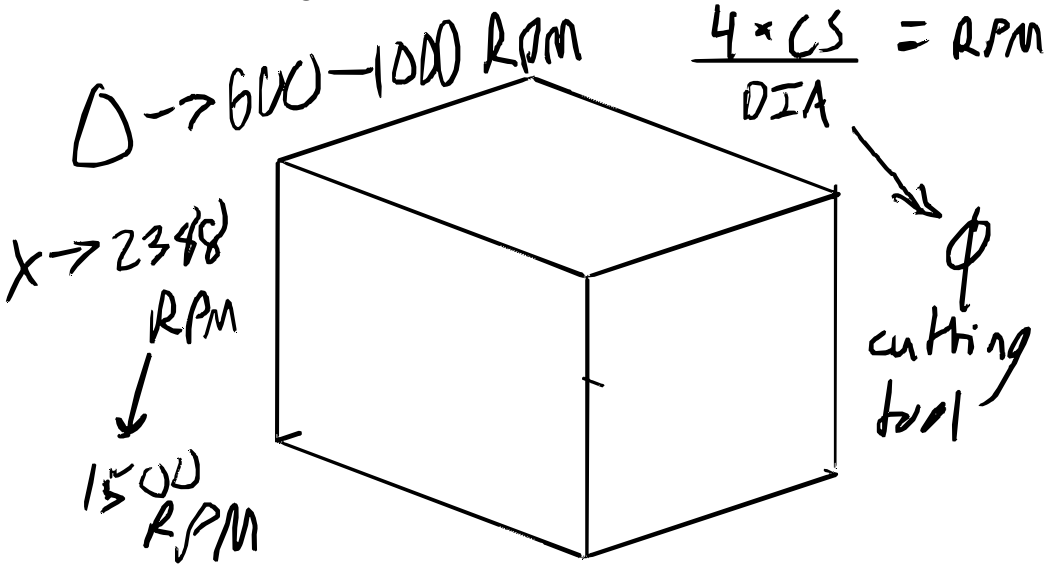
14) **Position spindle .19" from front of part (previously top of part) in Y axis and on center of tab in X axis.** ***Do NOT forget to add radius of edgefinder when locating an edge.*** (38:28)
Tools used: Edgefinder, drill chuck, digital readout

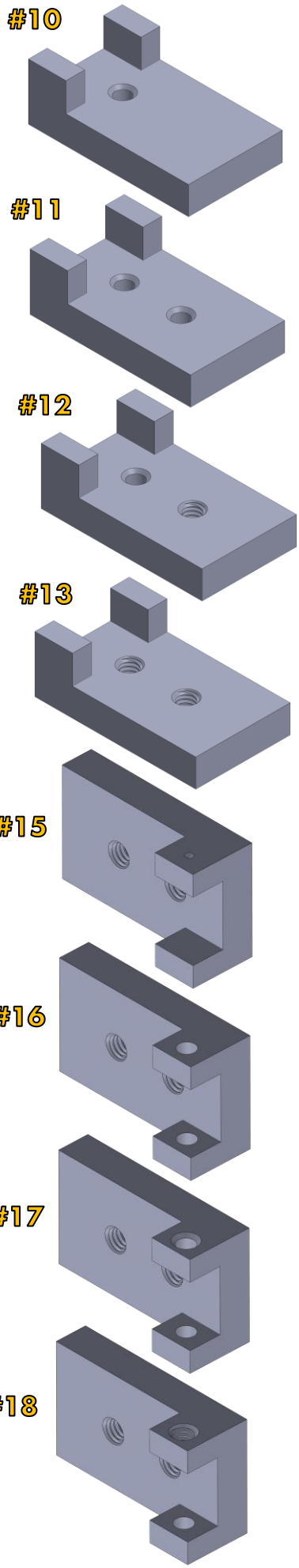
15) **Spot hole.** *(39:40)*
Tools used: #3 HSS center drill, drill chuck, WD-40 lubricant, digital readout

16) **Drill hole through first tab and partially through second tab.** ***Drill should NOT break through second tab.*** *(39:48)*
Tools used: #7 HSS drill, drill chuck, WD-40 lubricant, digital readout

17) **Countersink hole for ¼-20 UNC 2B threads.** *(40:38)*
Tools used: 1/2" X 90° HSS countersink, drill chuck, WD-40 lubricant, digital readout

18) **Tap hole for ¼-20 UNC 2B threads only through first tab.** *(40:53)*
Tools used: ¼-20 HSS plug tap, tap wrench, spring-loaded tap guide, drill chuck, WD-40 lubricant, digital readout





Z-6 → 1200 RPM, 4.8 feedrate

(Center Drill)
↳ Spotting → ~~1200 - 2000 RPM (1920 RPM)~~ → Recommended Max 600-1000

Drilling Holes → 2388 RPM

Countersink → ~~857 RPM~~ → 480 RPM

gear set ↗

Rotate spindle until clacking

High Range ↔ High Gear

Low Range ↔ Low Gear

Don't adjust value of speed unless mill is on

(Extra)

Glassblower → 10/19 $20 entry

KAM Conference Lunch

Berkley
Adams + Chittenden

Installing tools

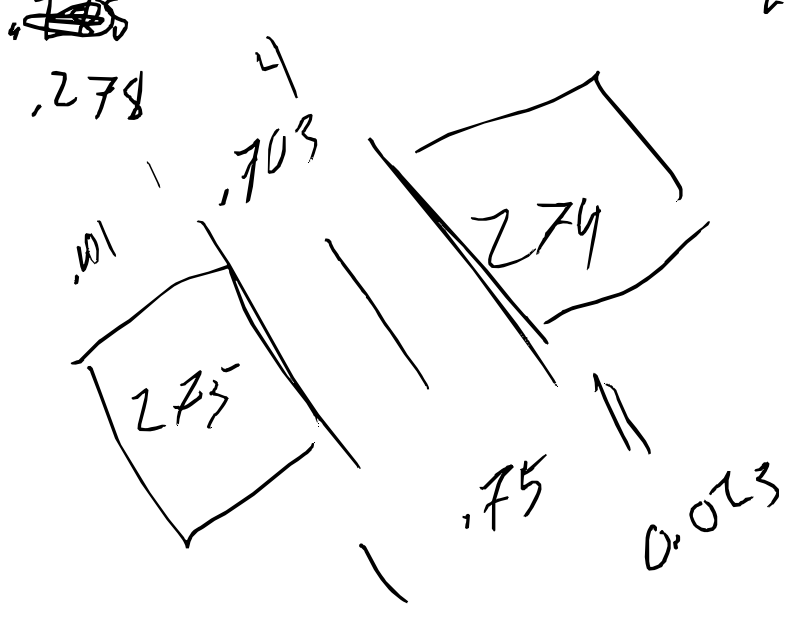
collet holds tool

R8 - 1/2 collet

Install collet, twist draw bar on top

Install tool into collet, engage break, then use wrench to tighten twist bar

"Lock the quill" → rotate reel dial near top of quill

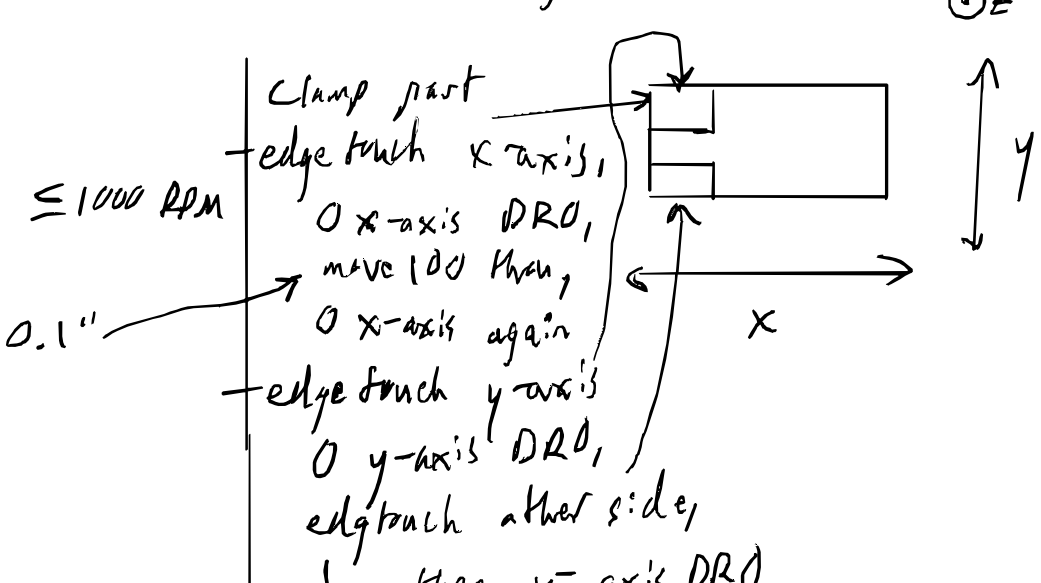


Countersink portion of holes ~ 0.280" ϕ

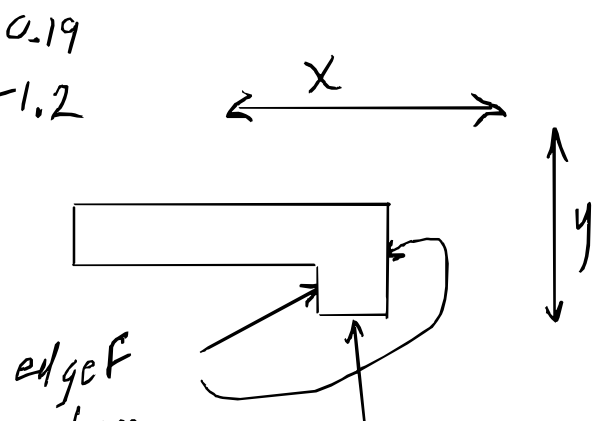
10/6 | Sunday

You need to tap holes

First you need to reposition your part
↳ clamp w/ parallels → bigger than 1-3/8"
↳ use edgefinder, don't forget to account for the edge finder radius



DRO → X 0
Y 0.19
Z -1.2



Center drill → spot hole

Drill → machine off, touch and 0 - z axis, drill through 1st tab, partially through next
↳ Z axis to -1.2"

Counter Sink → 0.280" ϕ

Tap assembly → [ ]