Hammerli 280 Barrel Shroud Fabrication

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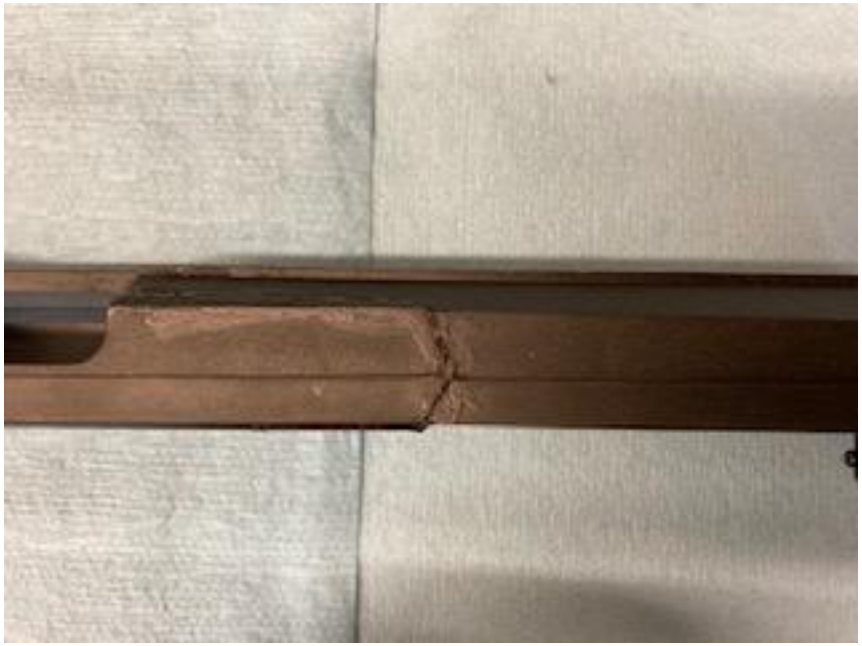
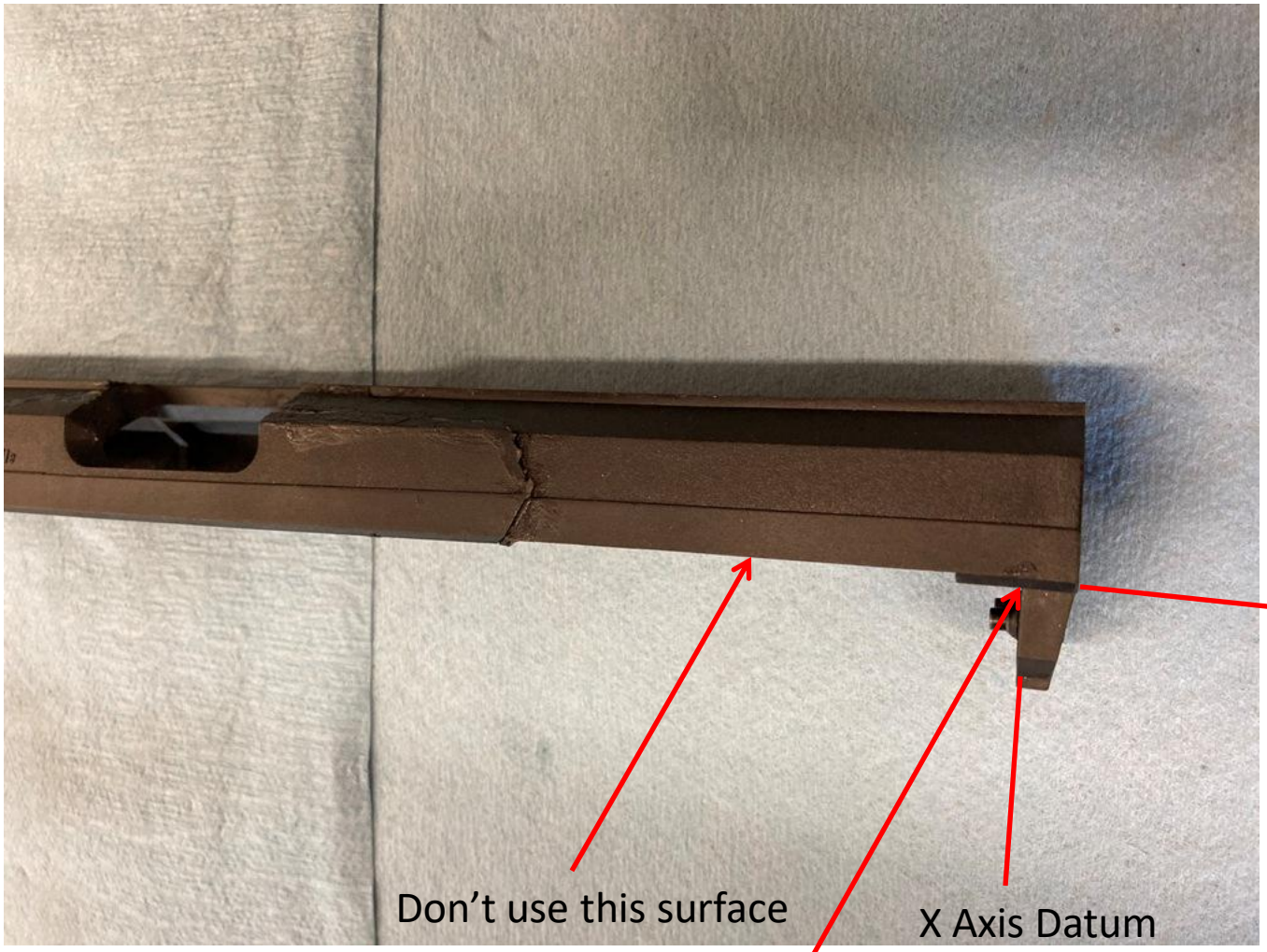


A friend brought me his Hammerli 280. The plastic barrel shroud had broken. We superglued it back together and returned it to service. He asked about making a replacement and I looked at it and decided that it could be done. The breaks you see in these photos happened when I tried to remove the barrel to fabricate the new shroud. I am confidant that if we had simply kept shooting it, the repair would have held.

I did not think to take a picture of the barrel in the shroud, as delivered from the factory. It seems like an unnecessarily complicated way to retain the barrel in the shroud. The barrel traps a spring between two C-clips and supports in the shroud. The spring does not act in any kind of recoil absorption or function enhancement. I simply holds the barrel back against the C-clip and support in the shroud. Likewise, the bushing is held in the shroud with another C-clip. The barrel C-clips are very hard to remove and I eventually rebroke the shroud trying to remove them. I don't have an Owner's Manual, but I suspect the factory did not recommend removing the barrel, even to clean it.


C-clip here
Spring Here
C-clip here



I started planning the new shroud by choosing my X and Y Datum Lines.
I used the inside corner of the bottom of the shroud, because the front surface was tapered.
Notice there is a step in the bottom surface and be sure you use the top of the step, not the bottom.

NOTE- I am not a Draftsman and I don’t have CAD. I will show how I did this project and give dimensions as best I can, but I can’t provide detailed manufacturing drawings with tolerances, finishes, etc. If you decide to build one, you will need to make some measurements and decisions based on your sample shroud. The following slides will show the processes of how I did the work. I will add slides at the end with dimensions that I used and notes.

Now we need some rough dimensions to select what size stock to use.

This is 1.365 at the front, the shroud tapers , so the back will be taller. I used 1.500 stock. This is the Y Axis.

The shroud is 10.900 long, so I cut my stock to 11.250.

This is 1.175 and tapers slightly toward the rear. I used 1.250 stock and left the sides parallel on the finished shroud. The barrel is centered in this X axis.

Now we need to locate the center of the barrel in the Y Axis. You can see the step in the bottom surface of the shroud, that I mentioned in a previous slide. Be sure to measure from the actual bottom surface, not the step. My sample was .110 and the barrel was .550, so the barrel centerline is .385 from the bottom surface (Y Axis) of shroud.

I scribed lines on center and .980 from the bottom of the stock. This will leave about .030 extra material on the bottom of the lip at the front of the shroud. The setup gets a little tedious, because you have to line the intersection of the lines up on your tail center and then indicate and tap the stock in 2 axis' to ensure the stock is parallel to the lathe centerline. Each time you indicate or adjust for center, you have to then redo the other until the part is centered and parallel. Otherwise, you will drill a hole that is not parallel to the top, bottom and sides of the stock.

I drilled a ½ (.500) hole 6 inches deep and then bored to .552 for slip fit on barrel.

Find the center of the .552 bore and drill a 5/16 hole that is 1.500 from the front face. This will be where you measure to the edge of the barrel to match the .110 (or whatever your shroud measures) dimension from Slide 8. Do not drill the second hole you see toward the rear of the shroud. You can then machine the blank to that dimension, leaving material for the lip at the front. Leave the lip oversize for now.

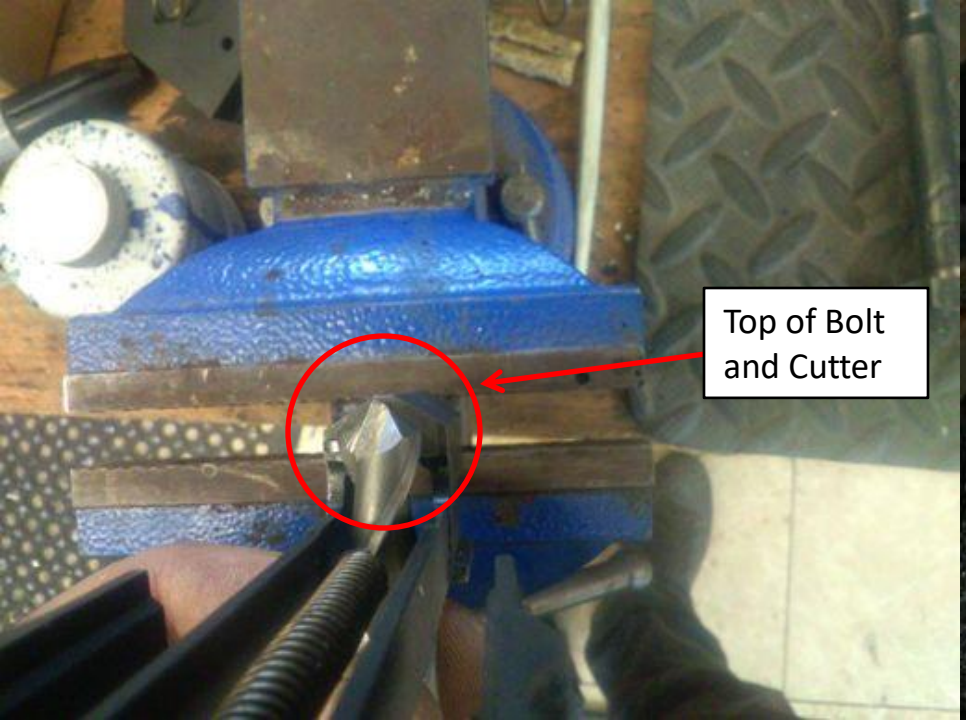
Leave this area solid

Remove this area

Leave this area solid .650 back from front of shroud

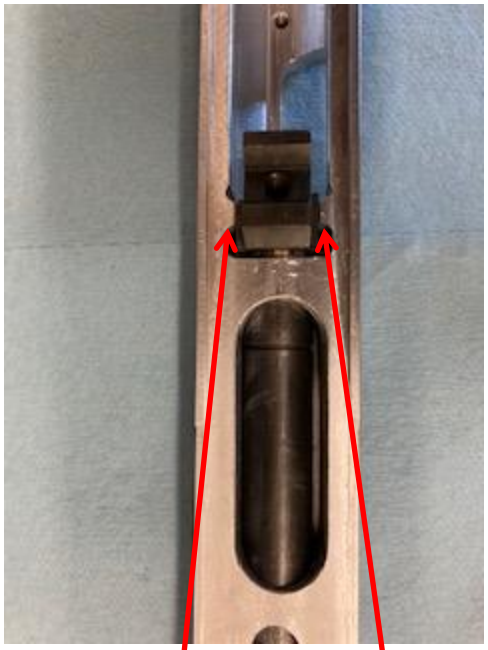
Lay your shroud (with barrel) alongside and make some marks to guide roughing out the recess in the slide. Use the arrows, rather than what you see on my shroud , as I found things out after this picture was taken. I will give you some dimensions in the next few slides.

Take a measurement from your X Datum (top of the rails on bottom of shroud, to the guide rib inside the shroud. This is where the bolt runs. This is the depth you will need to cut when you do bolt clearance.



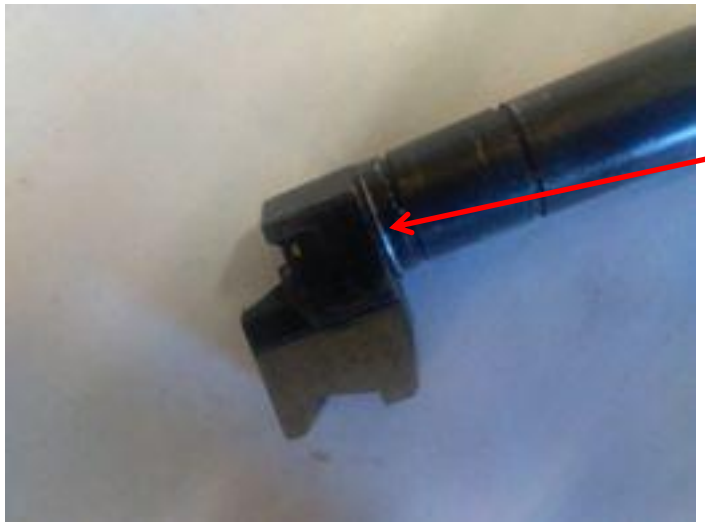
The top of the bolt has a 120 degree included angle. I happened to have a cutter, you can order one or grind your own. I cut a 3/16 (.187) slot down to the measured depth, from the last slide (.682 on mine). Then I widened the cut with the 120 degree cutter to .010 over the width of the bolt, to allow free travel of the bolt. The plastic shroud had a much larger clearance (.030+), but I wanted mine to fit a little better, I doubt it is significant, just seemed better. Theirs might leave more room for fouling.

Here is the rough bolt cut. We will finish the ends and establish final length in another slide. Per Slide 14- The front slot will be different on yours, the one you see was my initial measurement for the barrel. Yours will be a little farther forward and shaped differently. Its really just weight saving and not critical.

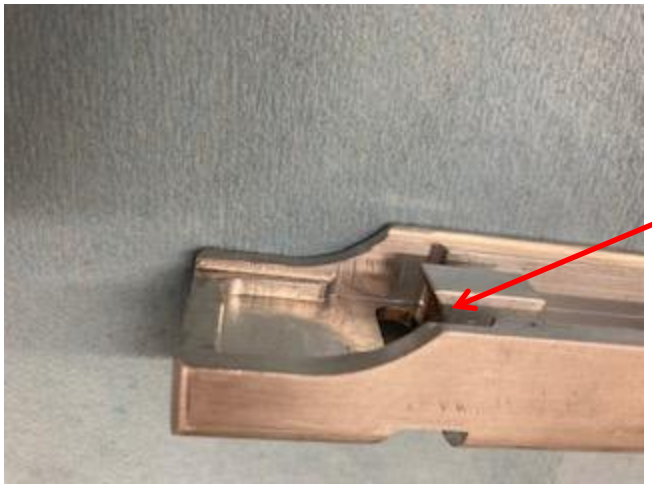


Measure the width of your barrel at this point and cut slot in shroud that is .001-.002 oversize, so barrel slips in tightly.

Use 1/8 endmill to cut square face 3.875 from datum for barrel to stop against.



My barrel had a radius at the edge of the shoulder, that prevented it from butting up against the shoulder in the shroud. I undercut it slightly (.005) and refaced shoulder .002” to clean it up.



There is a tapered locking surface at the rear of the shroud that locks under a pin on the frame. I couldn't get a good picture of the original on the plastic shroud, here is my shroud.

The locking surface has a 30degree tapered face. I reground a I/4" centerdrill to remove the pilot and cut some relief behind the cutting surfaces. It worked "OK" for one part, but I think I would buy a cutter if I had several shrouds to make.

You will need to cut a .260+- slot for the 30degree cutter to go thru to machine the locking surface front edge of slot is 9.200 from datum . Measurement is a little tricky, but here is what I did. The final tatered surface location isn't too critical as long as it will engage the pin in the frame. Less is best, because it can be recut later for the correct fit.

The .260 slot has to end .225 above the Bottom Datum Surface on the shroud, as the 30deg angle starts there. You will have to do some math, based on the thickness of your blank at that location, so you know how far down from the top surface to cut..

This photo shows the finished cut. It is from later in the process, so don't be confused by the relief cuts on the sides and bottom of the shroud.

You will need to make relief cuts on the rear of the shroud, to check fit on frame. Also, if your blank is wider than the frame, make small relief cuts on the sides per right photo. At this point, they are just to check fit. We will resurface the sides later for finish cuts. That is why they are only around .125 tall. Round the rear corners of shroud with 1/8 Radius Corner Rounding Mill, or file to template/radius gauge.

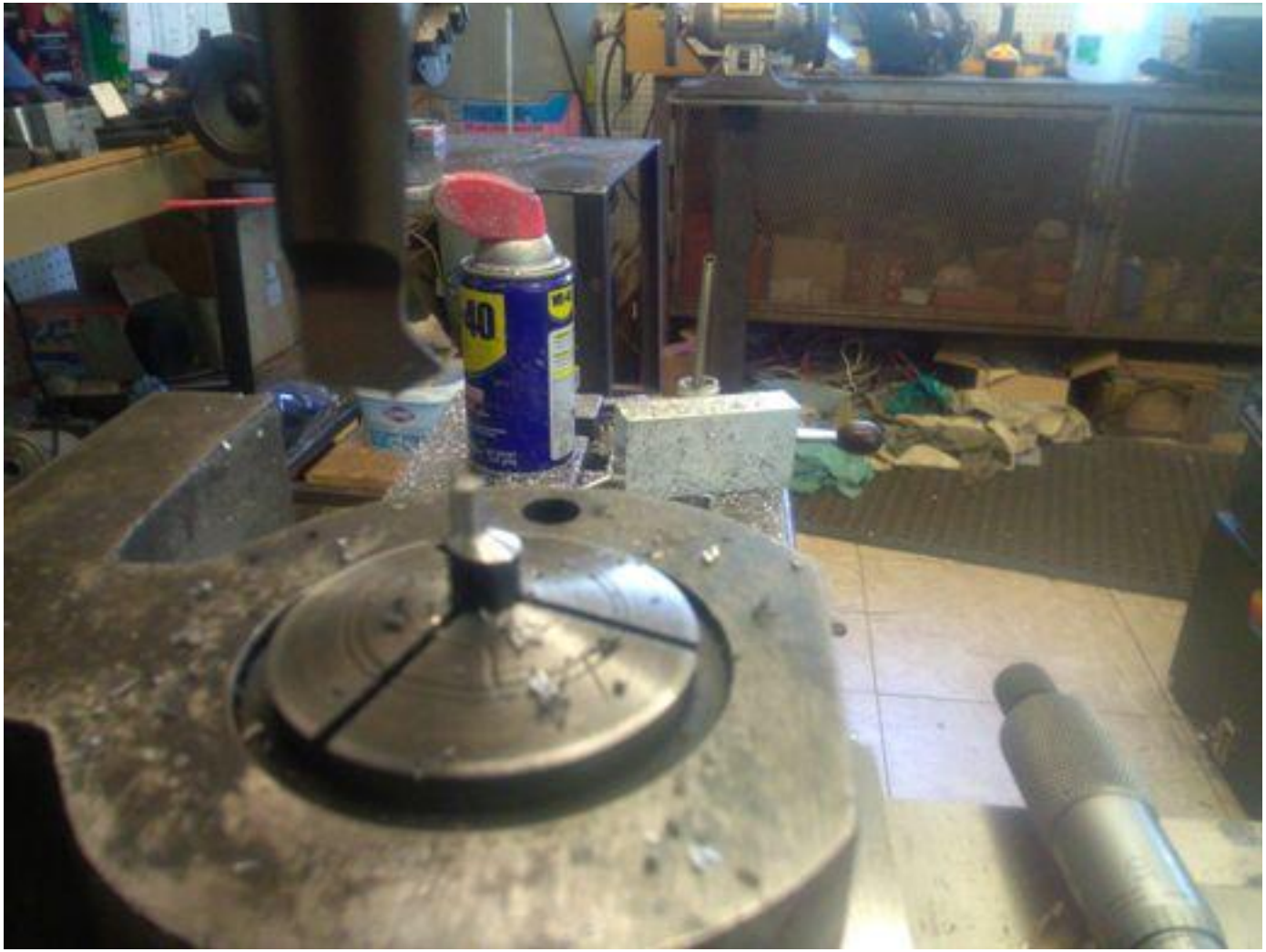
Shape front end of shroud per Slide # 31

Layout and cut ejection port per Slide # 30. Or, use your shroud and duplicate location and shape.

Surface sides per Slide #31 with flycutter or sharp endmill. Be sure to keep the barrel centered in the finished part.

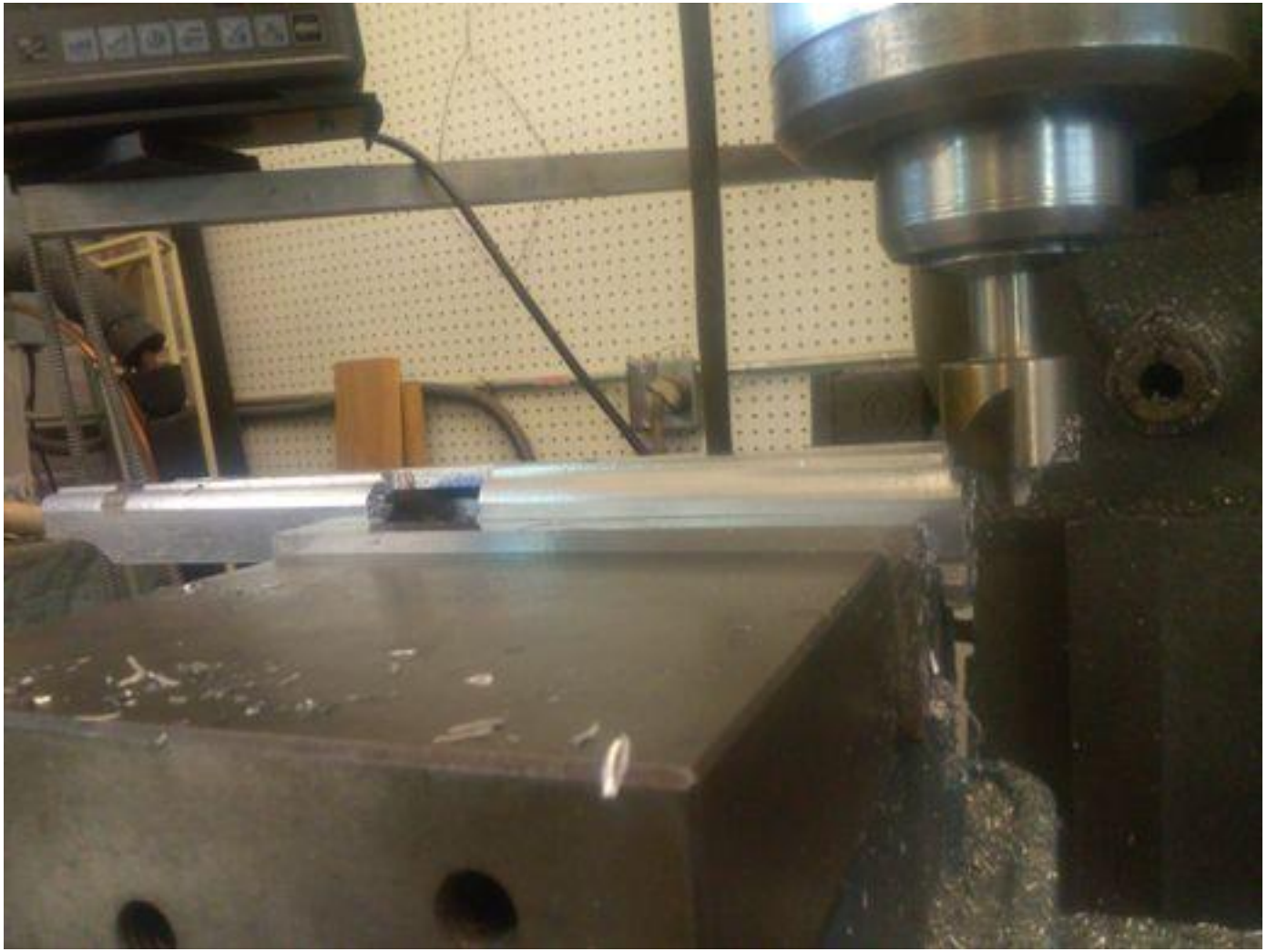
Layout locations of the alignment pins per Slide # 31and drill/tap 1/4x28tpi.

Turn a couple 1/4x28 setscrews with 60deg threading tool, to leave tapered surface and .115diam x .150long pins.



And here is where I messed up. I carefully measured out the screw locations and then misread my dials and drilled the holes .062 too low. I had to make offset pins and loctite them into the holes after I drilled out the threads. When you see my pins in later slides, this is why they are offset.
I will provide the CORRECT locations in the dimension slides.

Here is another chance to use the 60deg cutter you made for the locking surface. Front surface of the rear sight cut is tangent to the front surface of the locking surface cut. Rear Sight needs to fit in cut with .030-.050 clearance at the rear.



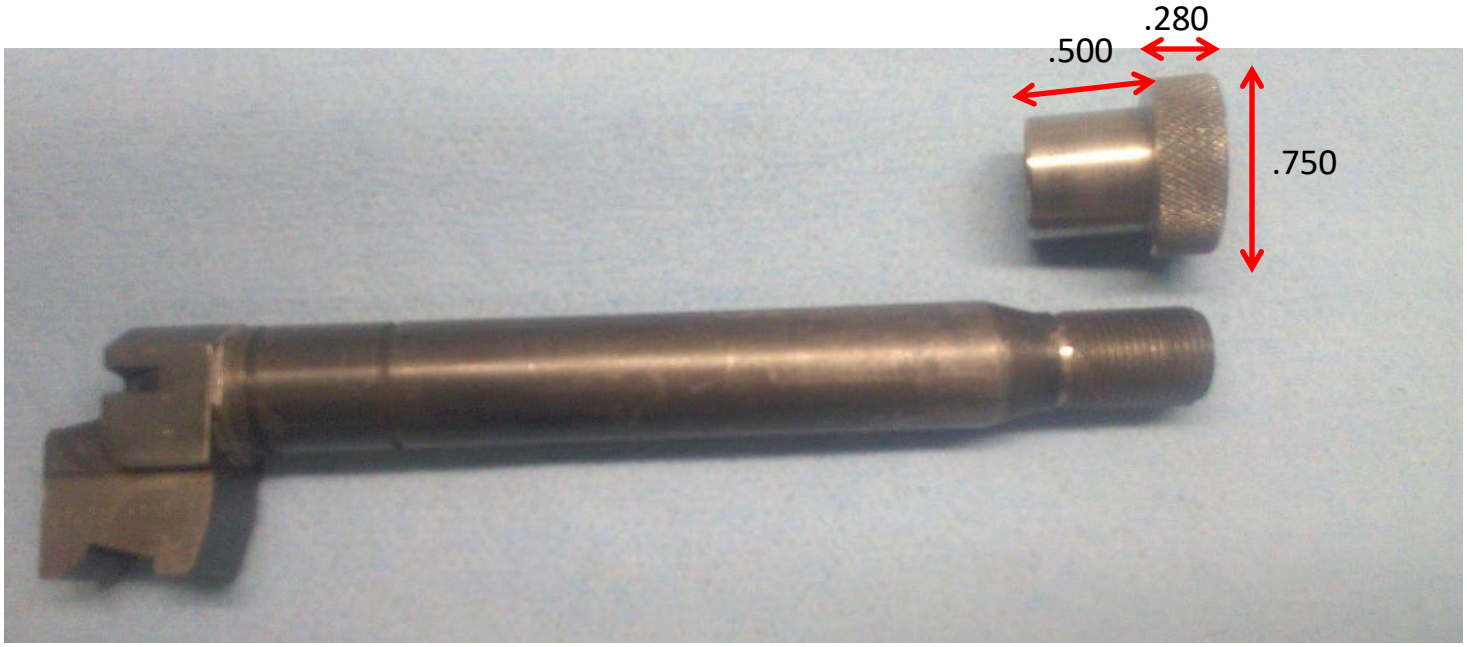
I used ¼ radius Corner Rounding Mill to shape top of shroud. I set up shroud to provide .050 taper toward front of shroud. I left .510 wide rib for rear sight and scope mount.

I used a .062 x 3/8 diameter Woodruff Cutter to make the rear sight cuts. I still ended up fitting by hand, because I wanted a close fit around the sight. Pin is around .100, so I used .125 endmill to cut reliefs before drilling.

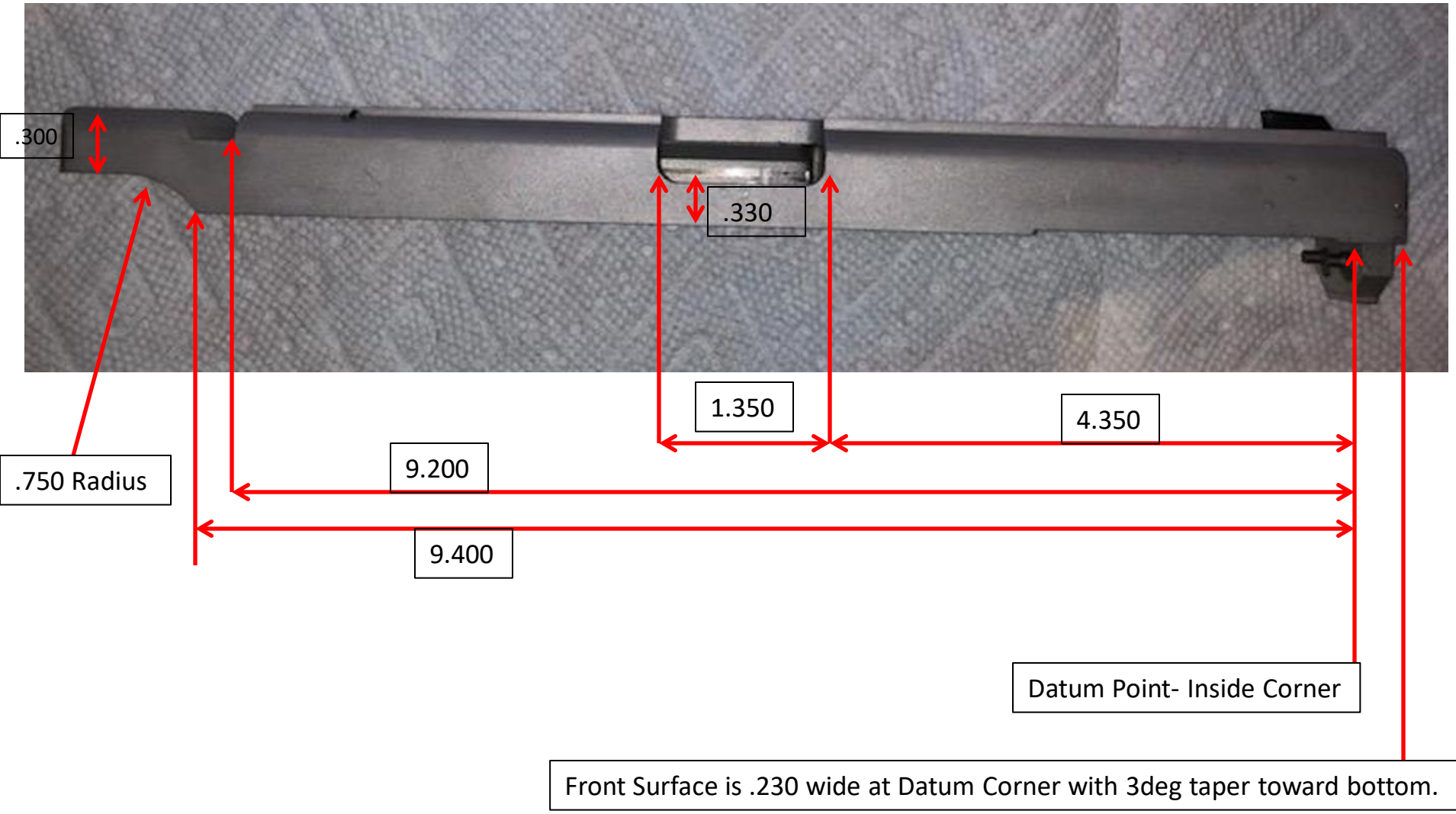
Here is where it got complicated. The factory Elevation Screw was a VERY fine thread and an odd diameter. Best I could work out was 7-72tpi. I even found a source for tap and die. https://www.victornet.com/subdepartments/Special-Pitch-Taps-up-to-1-2/1260.html , but they were out of stock. I eventually chose 8-64, as they were in stock.

I made a brass insert and threaded it 8-64tpi. I then made a screw and used the split die to make a tight fitting elevation screw. Then I drilled a .067 hole thru the head and installed two 1/16" ball bearings and a spring to provide clicks, per factory example. Located insert 9.200 from Front Surface of Shroud- NOT DATUM. Cut recess for elevation spring .210 diameter and .300 from C/L of insert, be careful you do not cut thru, shroud is only about.050 thick.

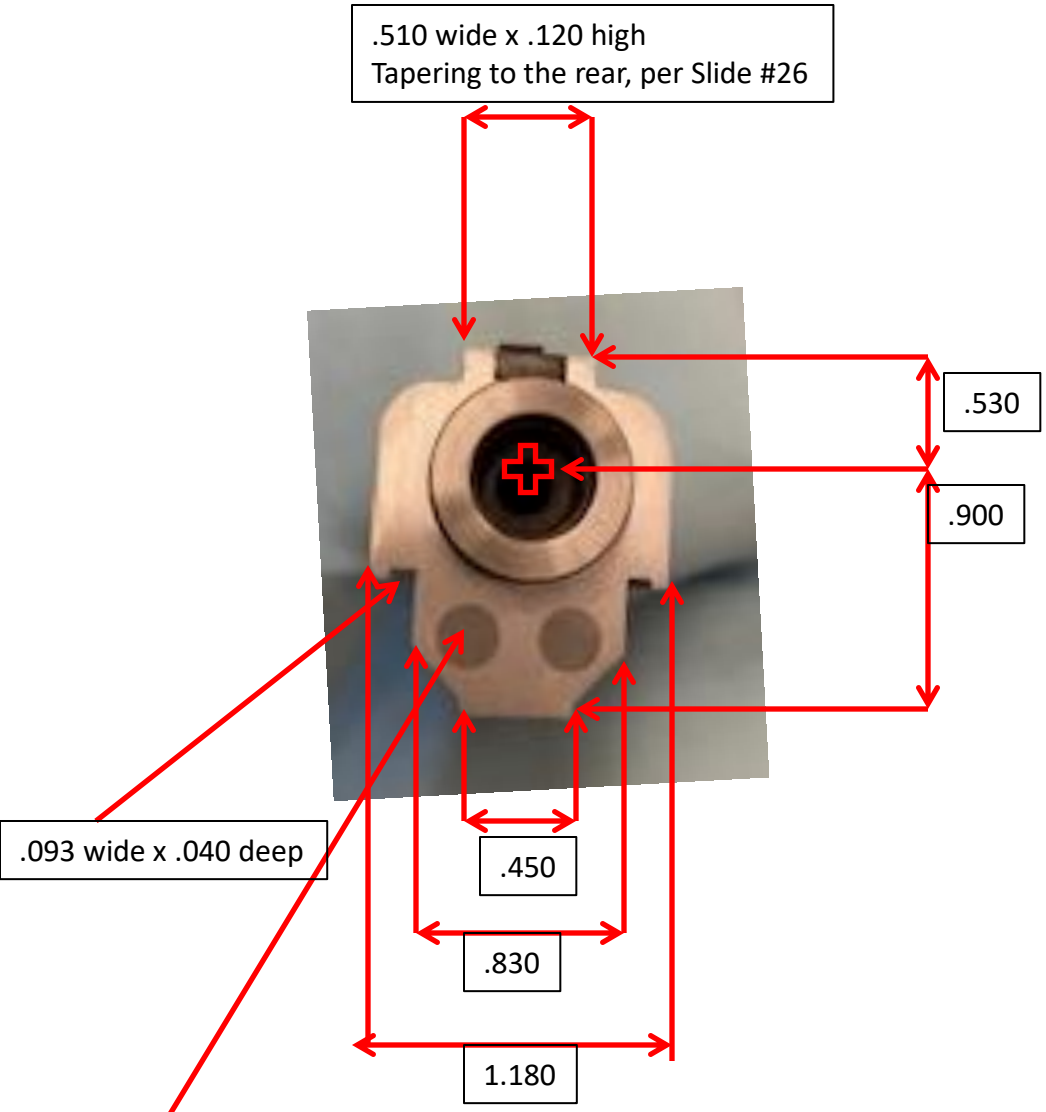
When I had it all finished, I had an epiphany.
Hammerli means Switzerland means Metric. I am a dumbass.
Converting 7-72tpi to metric is 4 x .35mm, and I found them on EBAY. https://www.ebay.com/itm/313402535487
I could have just used the correct METRIC tap! I am a dumbass.
Factory Sight clicks are 10mm at 25m, my Elevation Screw clicks are 11.25mm at 25m (about 1/16" larger).



I had a 7/16 x 28 tpi tap, so I threaded the barrel for it. You can thread barrel as you see fit. The nut should fit closely in the shroud, so measure the hole and size accordingly.



Be sure to check your shroud before using my dimensions. I have seen Forum Threads talking about different variations of Hammerli 280's. Yours might look similar and be different.



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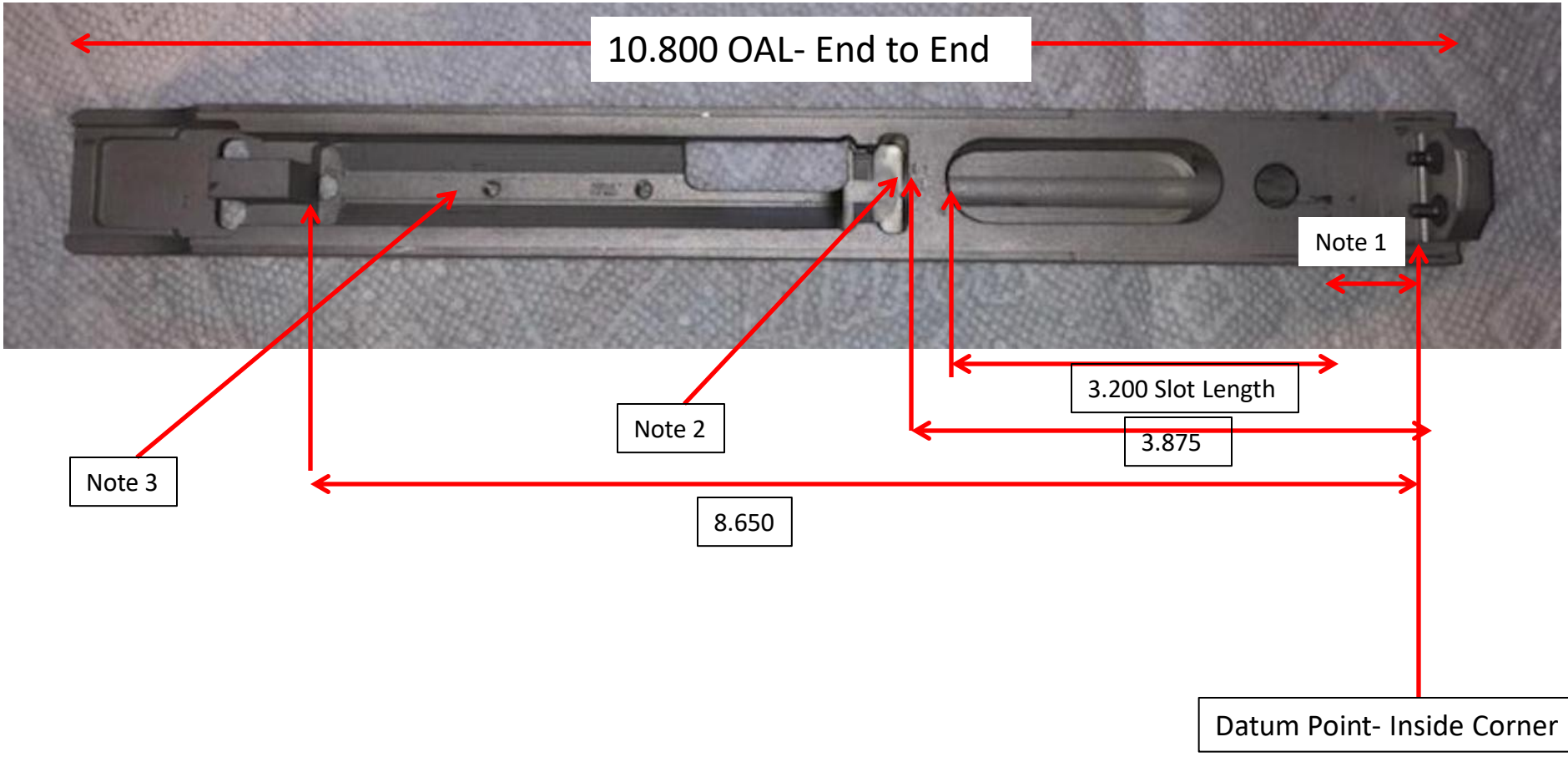

NOTES-

1. Recommend you extend the lightening cut thru the hole to .500 from datum.
2. See Slide #16 for detail
3. Depth from Bottom Datum to Top of Bolt Rib .682

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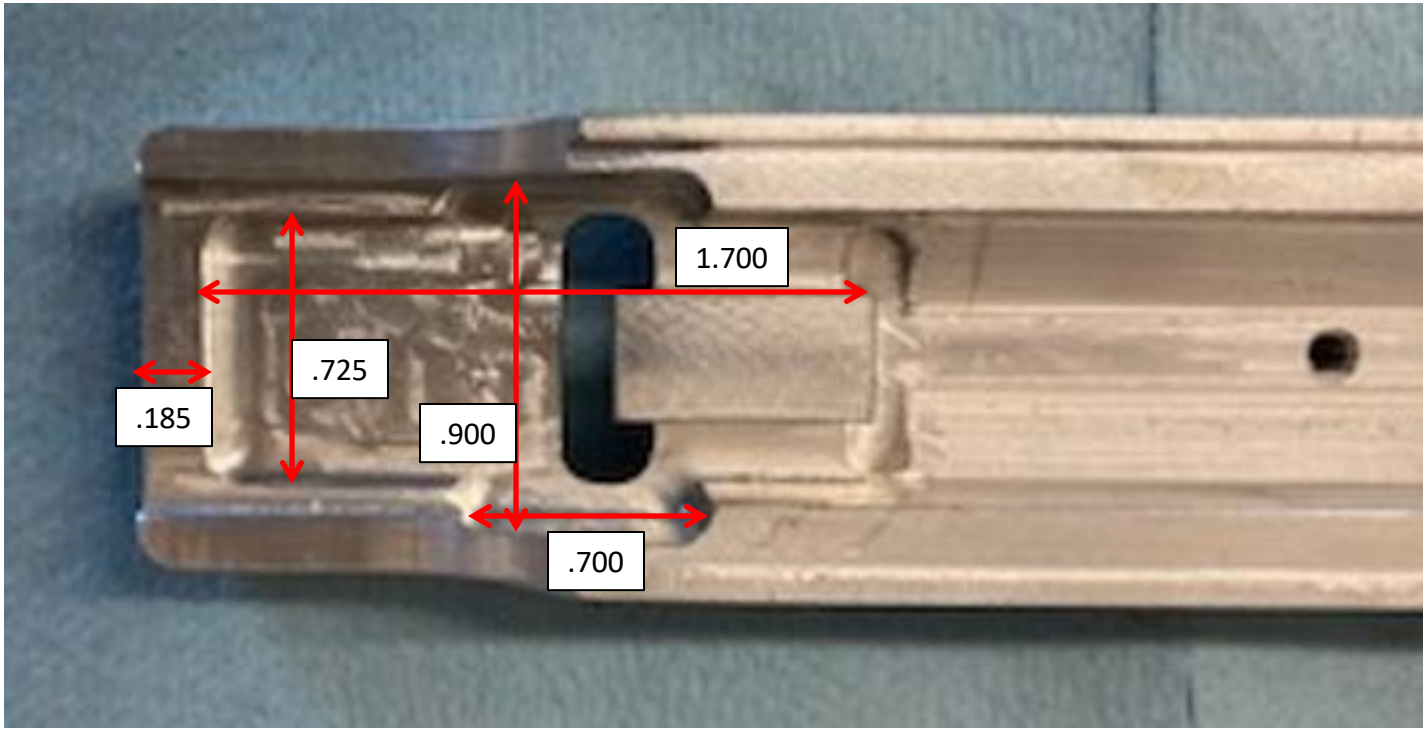

There are relief cuts to fit on the frame. Use my dimensions as guidelines and check fit on your frame. The recess is .470 deep from Bottom Datum Line.

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