Mod 9 Assembly suggestions

I don't want this to be the end all be all of instructions. Think of it more as a guide when you get stuck, almost every step of this can be done a different way with different tools, processes or parts. This is a very adaptable and forgiving design.

Table of contents

Tools

- Power drill
- Standard bit drill bit set (29 piece from harbor freight)
- Semi round metal file
- Philips screw driver
- Allen wrenches
- Dremel with cutoff wheel and grinding wheels
- Micrometer
- welder(super cheap flux core ~$100 works perfect for this)
- Tape measure metric and standard
- Sand paper
- 3d printer
- Rubber mallet
- Wire cutters
- Hacksaw

Parts list

if you don’t have it just use what you do have

- AR lower parts kit
- 2kg pla, abs, or pla+
- (2) 4mm x 40mm machine screw - upper to lower retaining pins
- 4mm x 45mm machine screw - magwell bolt
- 1/4in x 40mm rod - bottom end cap retainer pin
- 1/4in x 30mm rod - top end cap retainer pin
- 38mm long piece of 1.5mm stainless wire - mag catch spring
- #4 x 1/2in sheet metal screw - feed ramp screw
- (4) #8 machine screw 1-1/2in - barrel retainer screws
- #6 sheet metal screw cut to 25mm - mag catch
- #6 x 3/4in sheet metal screw- Front magwell screw
- (2) #6 x 1in sheet metal screw - ejector retainer
- #8 x 3/4in sheet metal screw - ejector pivot
- 9mm glock 17 barrel or longer
- ak recoil spring
    - Standard strength cut in half(recommended)
    - Dead center coil spring cut to 7in
- 1/8in x 25mm steel pin (allen key or old drill bit) - firing pin retaining pin
- 7/32" OD x .015" WG compression spring cut to 17mm - firing pin spring
- firing pin
    - Lathe pin
    - Collet and shaft pin
    - Duplex nail pin (recommended)
- Bolt material
    - Lathe bolt
        - 3/4in metal rod x 265mm
    - No lathe bolt
        - 3/4in metal tube with 1/16in wall x 100mm
        - 5/8in metal rod x 210mm
        - 3/4in metal rod x 55mm
- 0.845" OD x 0.685" ID 0.08" WG compression spring x 2-5/8 to 2-1/2 in - secondary buffer spring
- Carbon shaft .340in x 115mm(arrow shaft) - charging handle shaft
- 2 part epoxy

Print all the things

Print guide available here:
keybase://team/wtf9/Unofficial%20Print%20Guide%20MOD9

- Whatever works for your printer and filament combination
- Calibrate before you start
- Layer height 0.15-0.2 is common
- 2.4mm walls and 100% infill
- Hotter bonds better than cooler
- Calibrate before you start
- Tree supports are easier to remove than regular supports
- Only the End cap and the barrel retainer require supports
- Calibrate before you start

Drill all the holes

Some things to keep in mind.

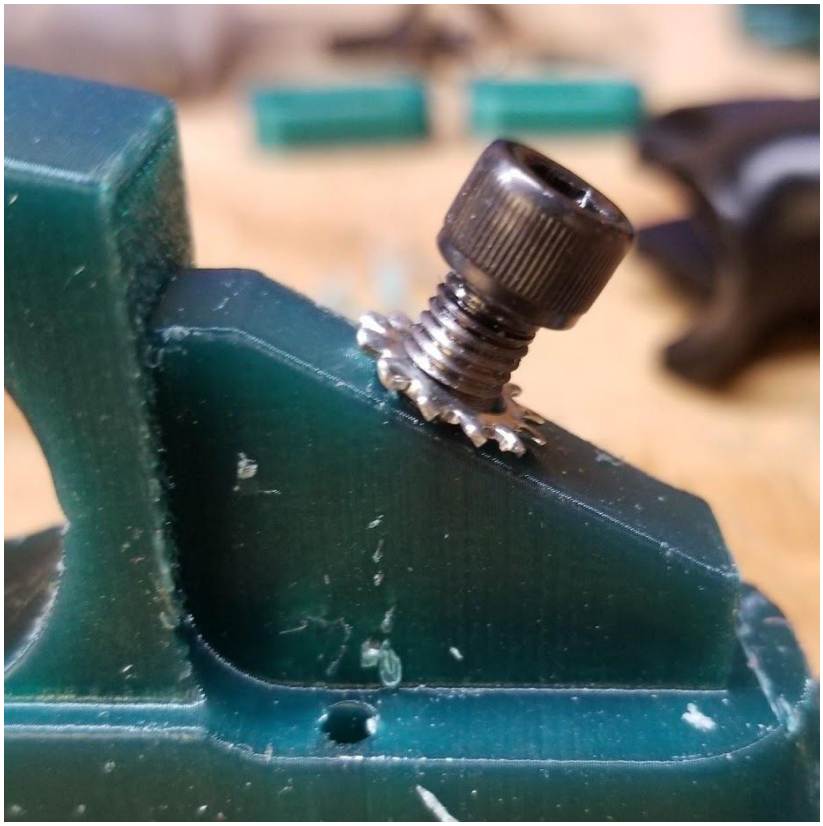
- Hot drill bits melt plastic and will get stuck. Let the bit cool down or cool it with water often.
- Don’t overdrill the holes they will start to deform quickly
- Start slow and shallow and use multiple passes if necessary

Lower receiver

Handle

Use a 7/32in drill bit on the handle screw hole **if you need to.** Overdrilling this hole will make the hole too big and the threads will not hold.

Thread the hole with grip screw from parts kit



Safety

Use a 9/64in drill bit to clean out the safety detent spring hole, do not enlarge.

Use a 25/64in drill bit to clean the safety lever hole. Start with a 23/64 (then 3/8) and work up testing with your safety lever.it should be snug but not tight.

Fire control group pins

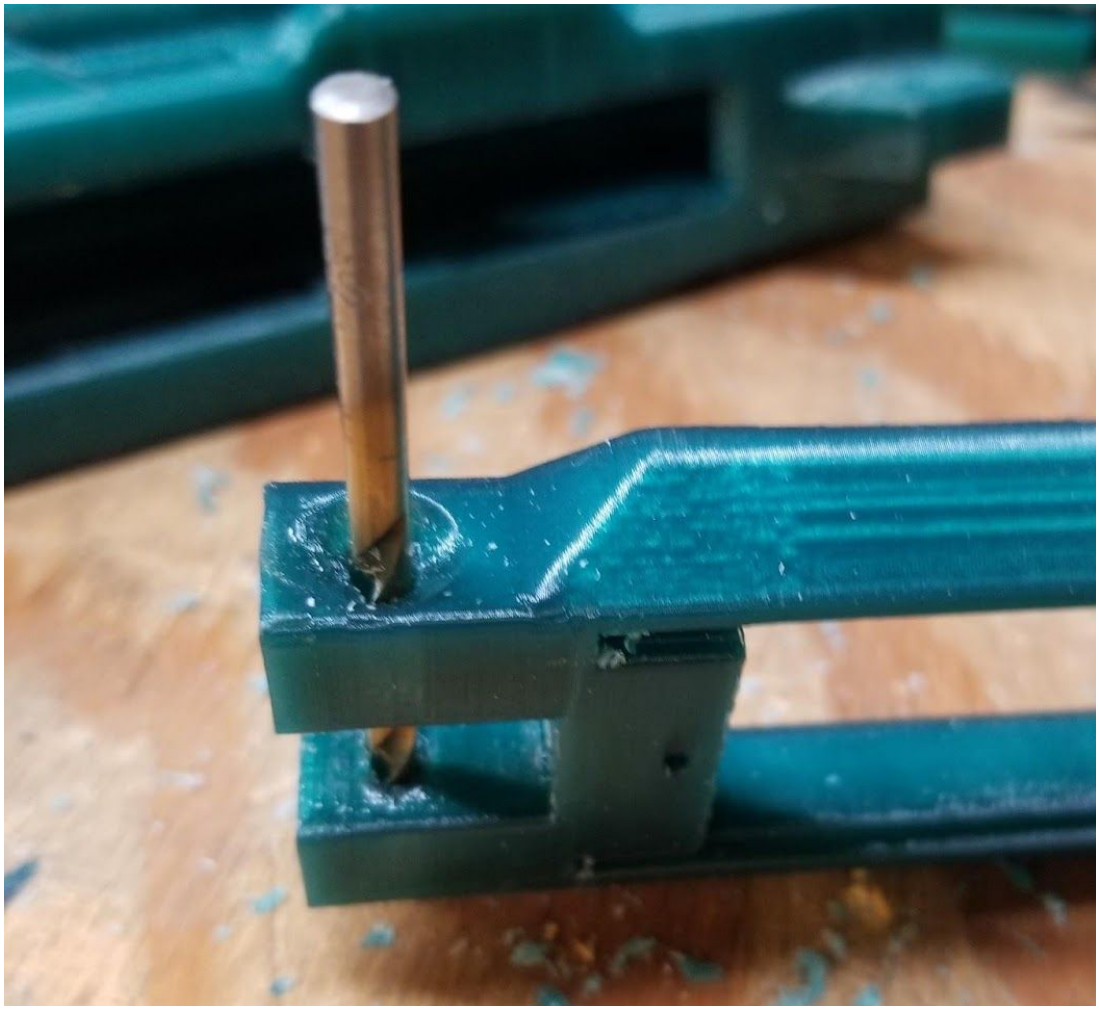
Use a 5/32in drill bit for the hammer pin and trigger pin holes. Do not enlarge these need to be tight.

Magwell

Use 5/32in drill bit and a 4mm x 45mm bolt to attach the magwell

Front and Rear lug

Use a 5/32in drill bit and 2 4mm x 40mm to attach the front and rear lug to attach the lower to the upper



Rear retainer pin

Rear hole for end cap 1/4in

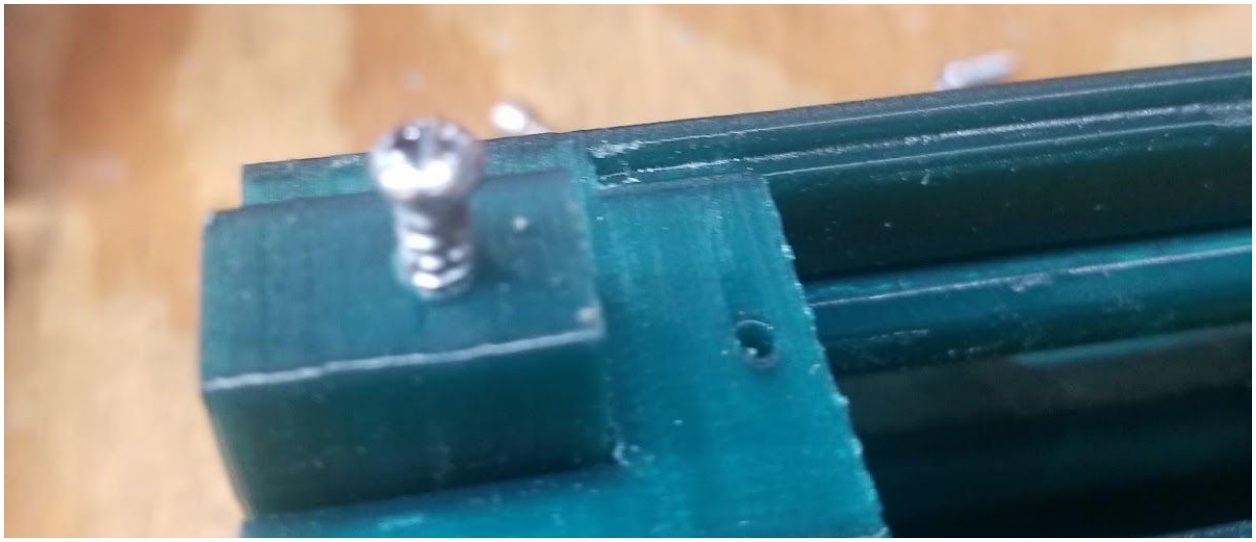
Upper receiver

Front magwell screw

7/64in

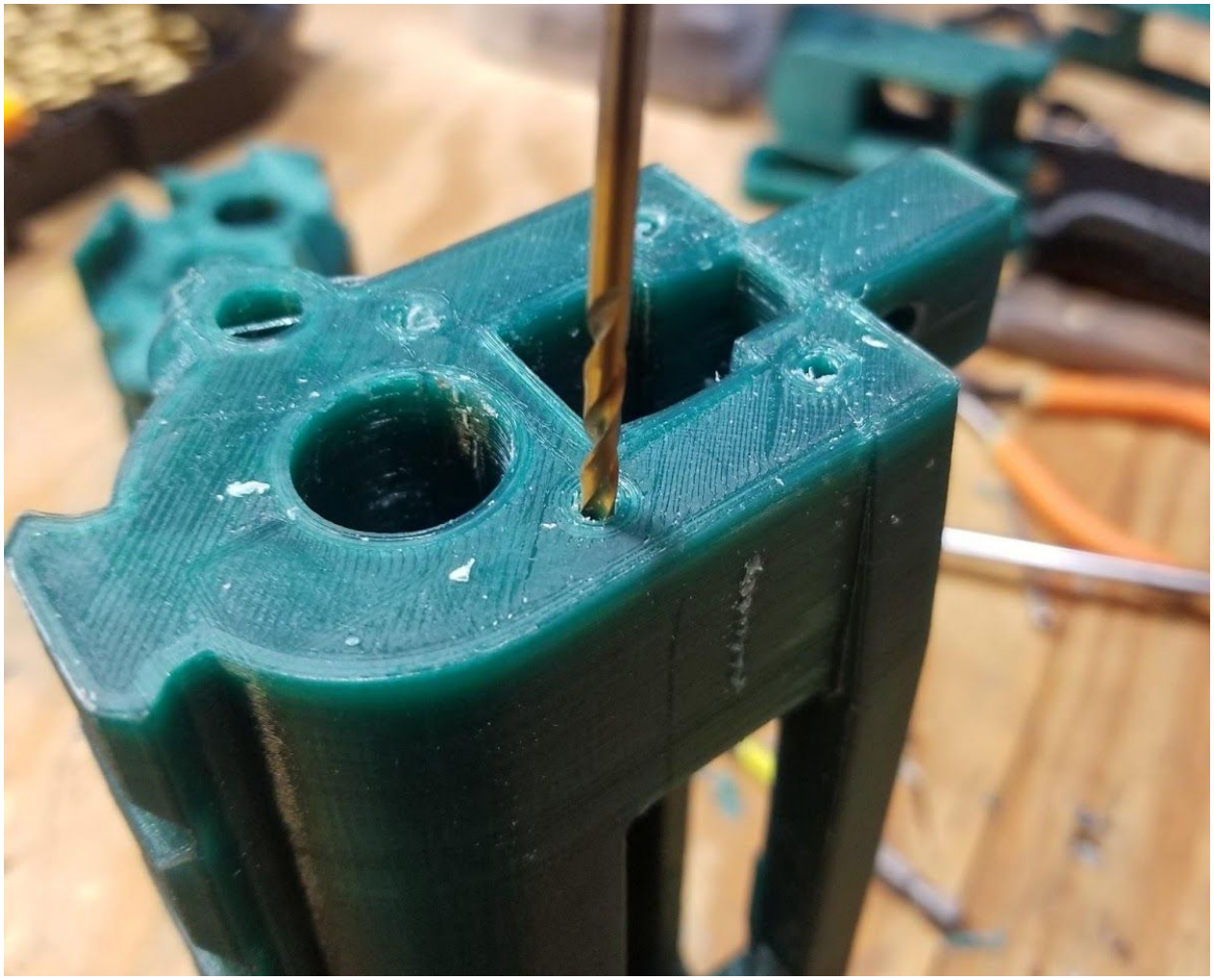
File the end of the #6 x 3/4in sheet metal screw off

Thread the hole in the upper receiver with the screw



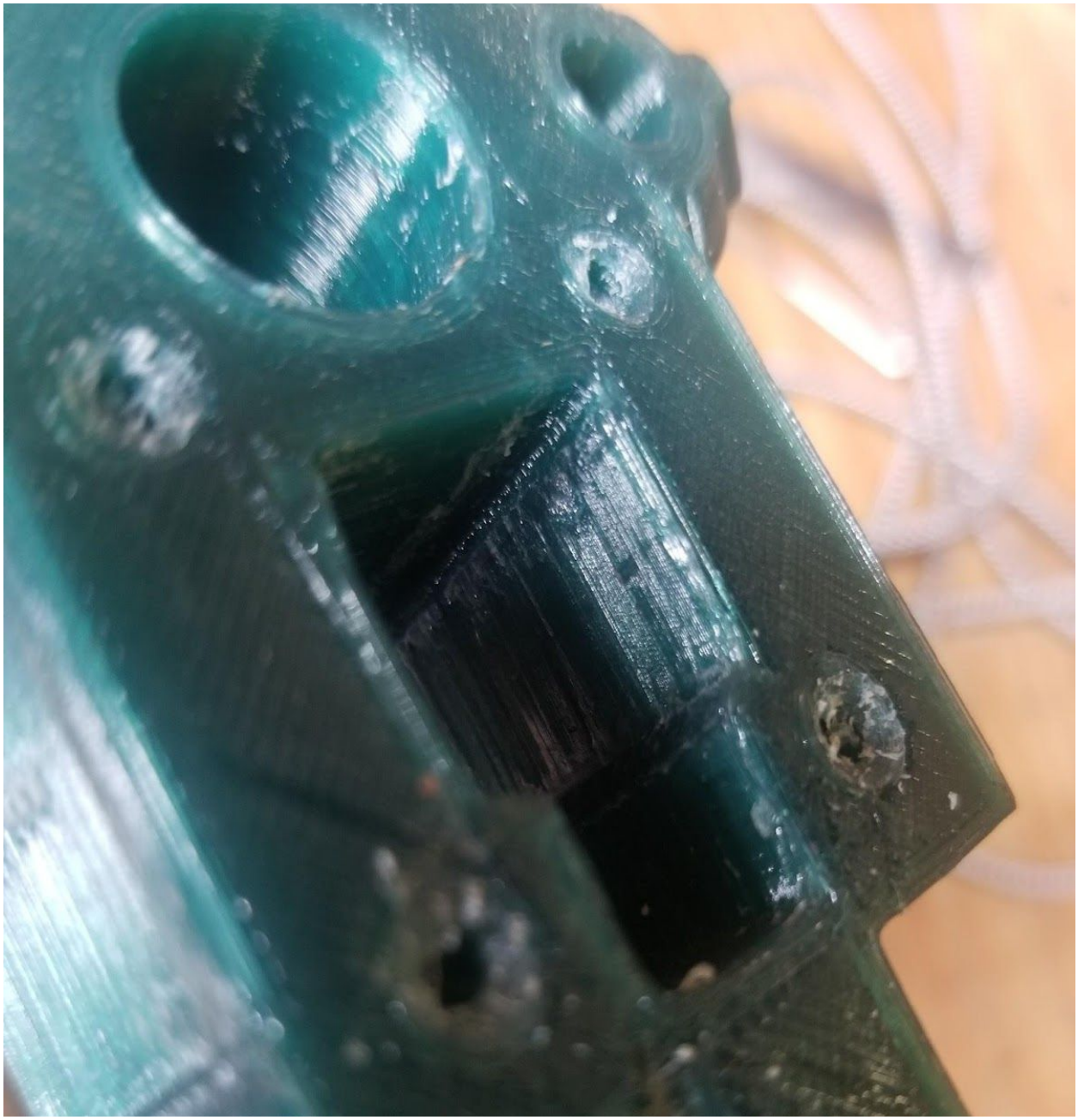
Barrel retainer

Use a 7/64in drill bit and drill 1/2 in deep (12mm) pilot holes



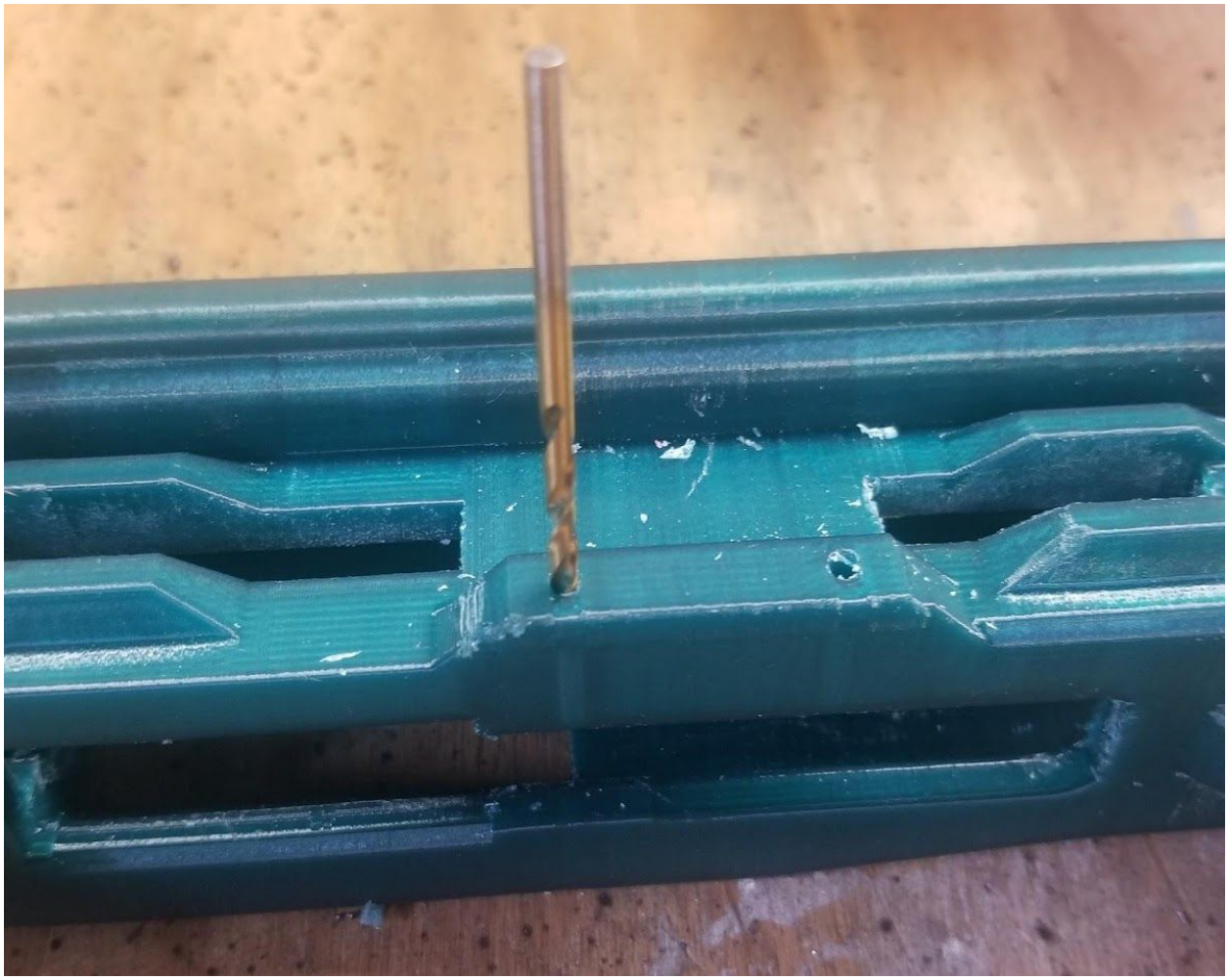
Before you seat the barrel use the screws to tap the holes. This will make the screw hot make sure to let it cool down or it will get stuck.

After you tap the holes with the screws you will want to clean and countersink the top of the screw holes. A 1/4in drill bit will work for this, just go slow and don't dig too deep.



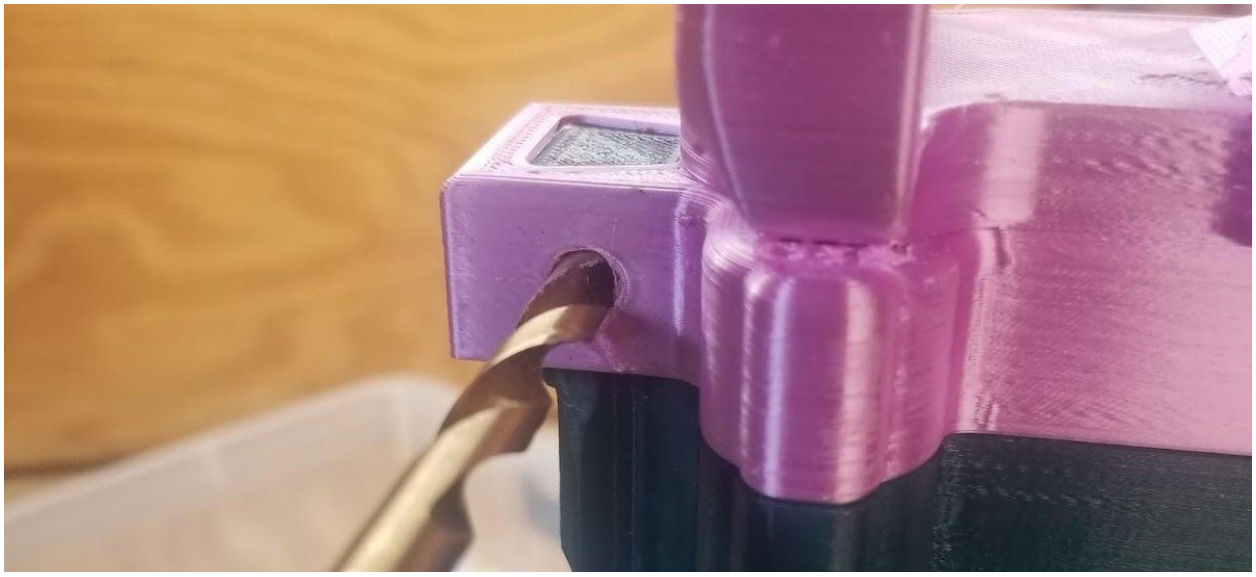
The ejector retainer

7/32in drill bit



End Cap retainer

1/4in



Charging handle hole

Use 5/16in bit to ream the hole

Operation parts

Magwell

Front screw for mag well 7/64in drill bit

Ejector mount

Pre tap the holes using the (2) #6 x 1in sheet metal screw using the ejector pivot as a guide

Feed ramp

9/64in

Bolt housing

1/8in hole in the side for retaining pin, this needs to be tight so do not overdrill

Assemble

Mount the ejector

the curved larger end forward.

Should be free moving in the slot

But not loose

Attach the ejector to the retainer using #8 x 3/4in sheet metal screw through the top

Attach the retainer using the (2) #6 x 1in sheet metal screw into the side

Charging handle

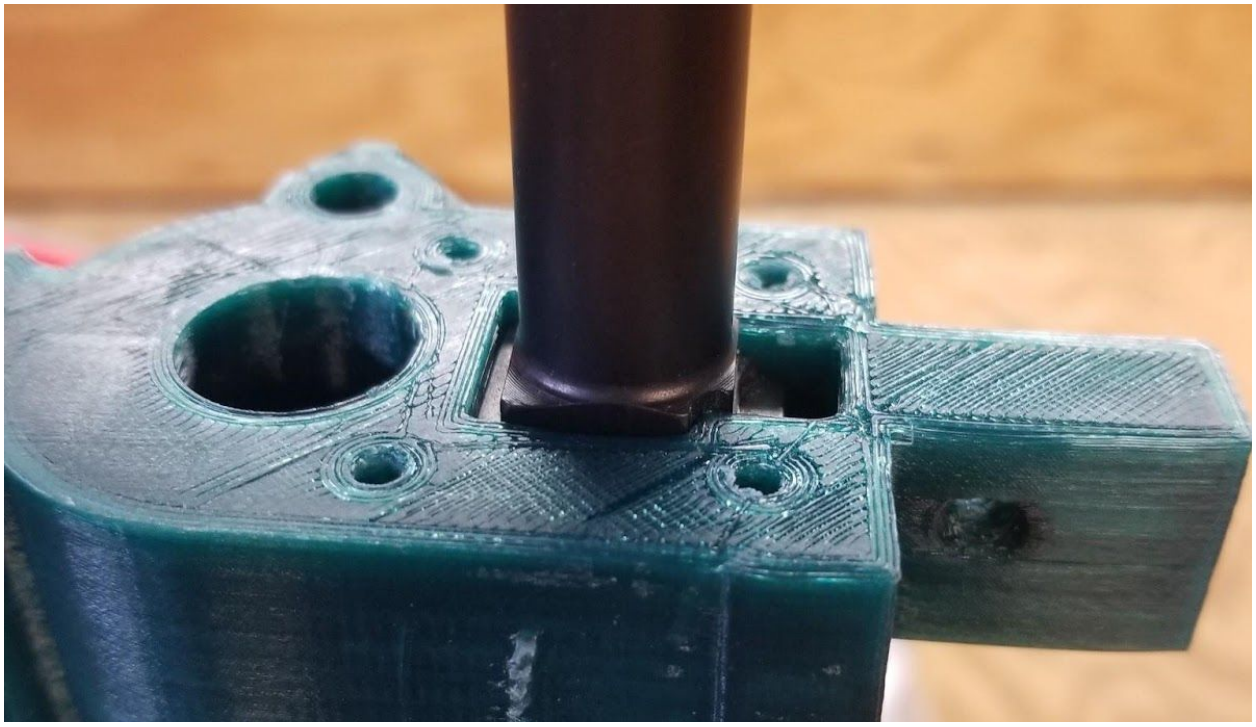
Carbon shaft .340in x 115mm(arrow shaft) use tape on the shaft before cutting to prevent splintering

Seat the barrel

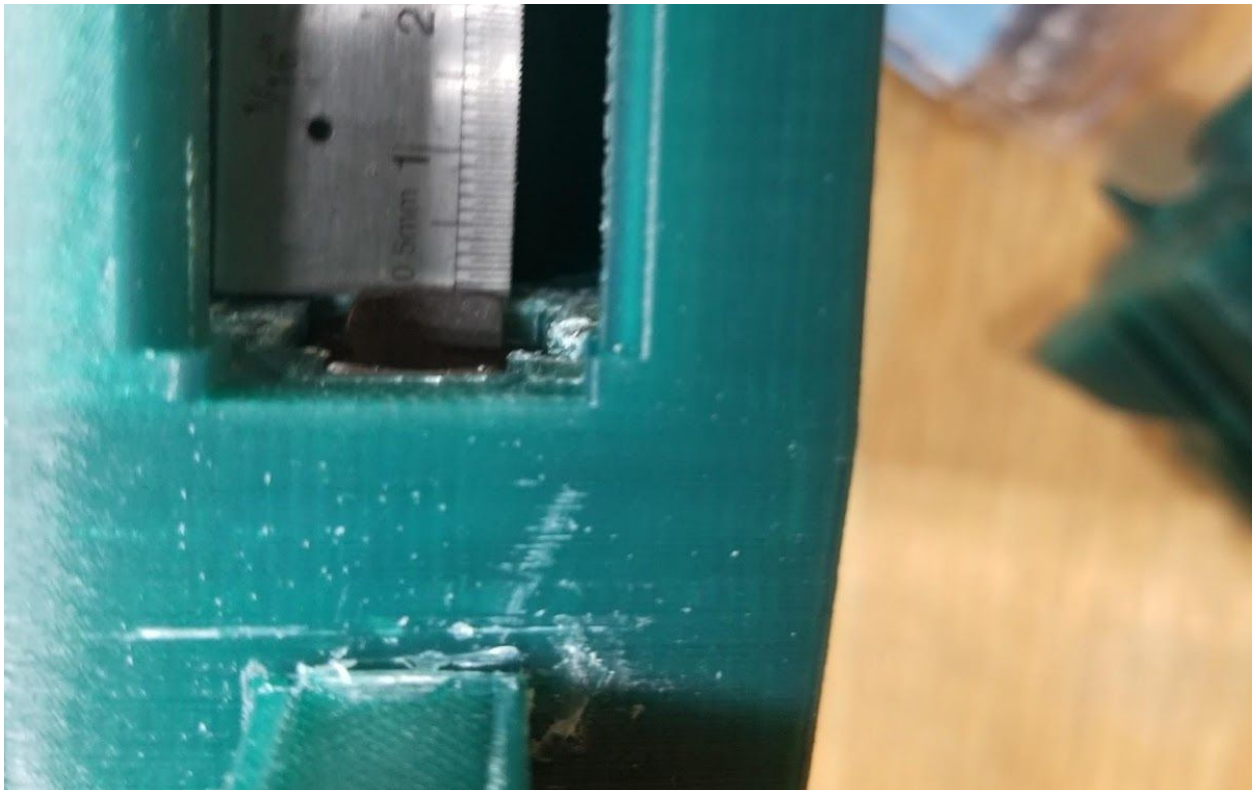
Set the barrel on the end of the receiver and lightly tap into place and make sure it is straight.

Use a rubber mallet or a 2x4 or something not steel to hammer the barrel into place. It will not look like it will fit but it will. The angled bottom corners of the barrel will shave off the extra plastic.

When it is all the way in it will be slightly recessed on the top and bottom edges

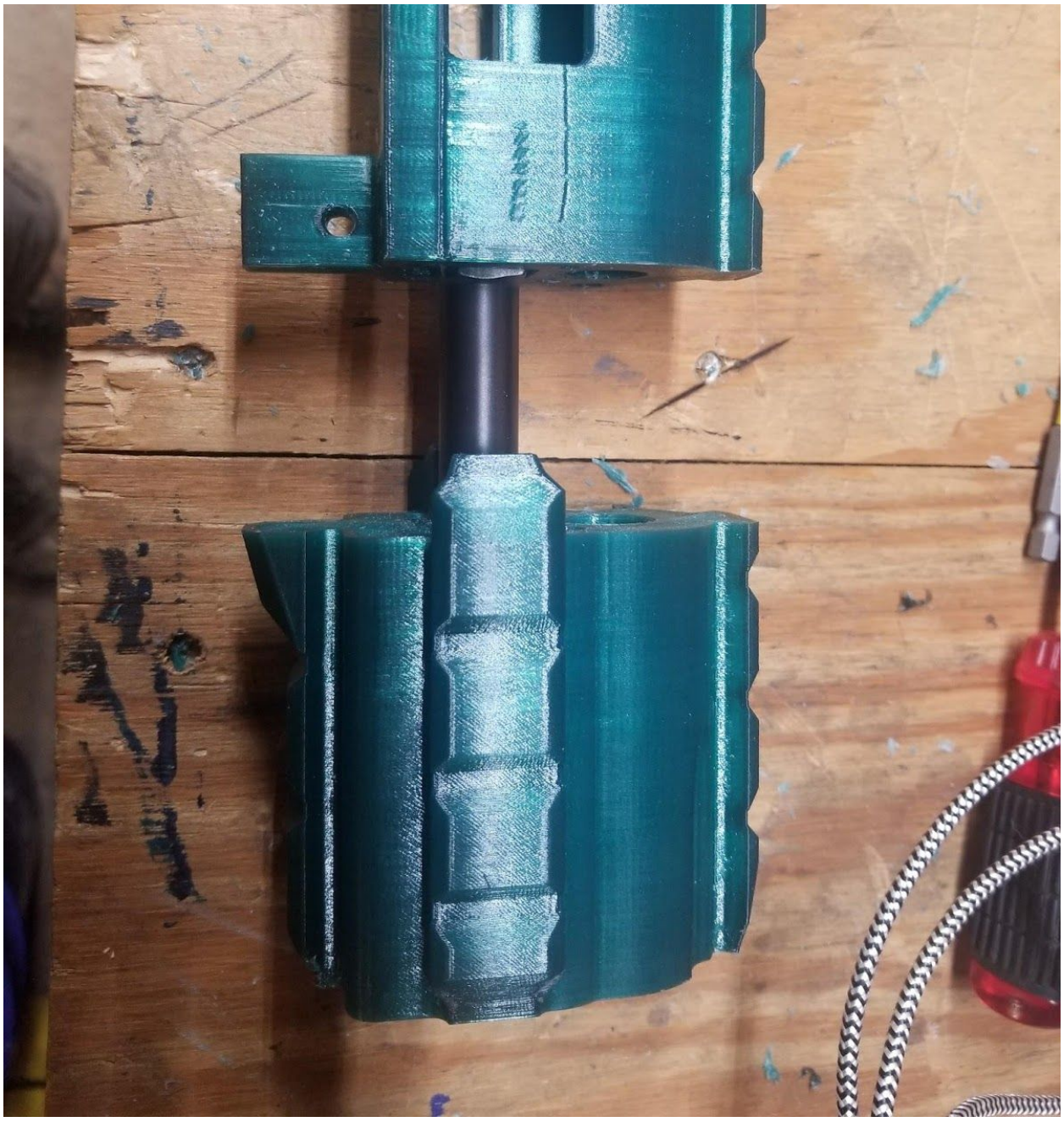


The barrels chamber should stick out slightly on the top and be flush on the bottom feed ramp.

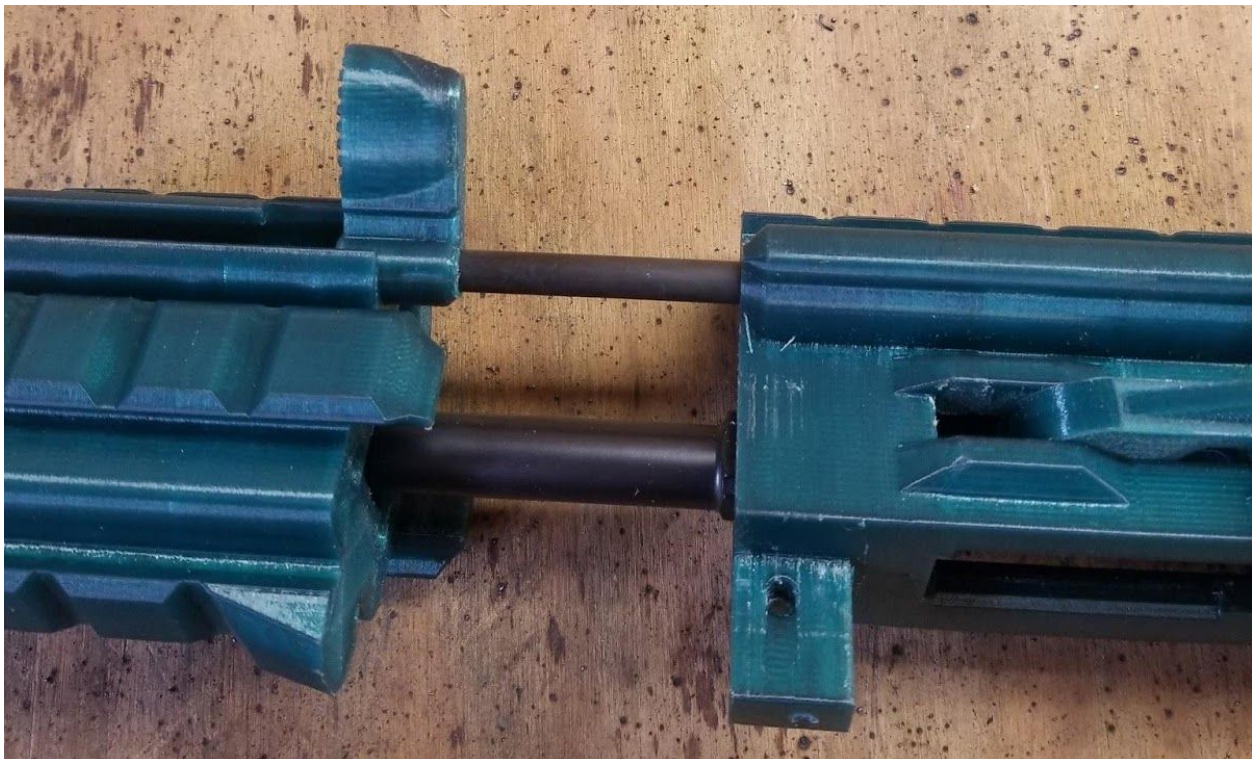


Barrel Retainer

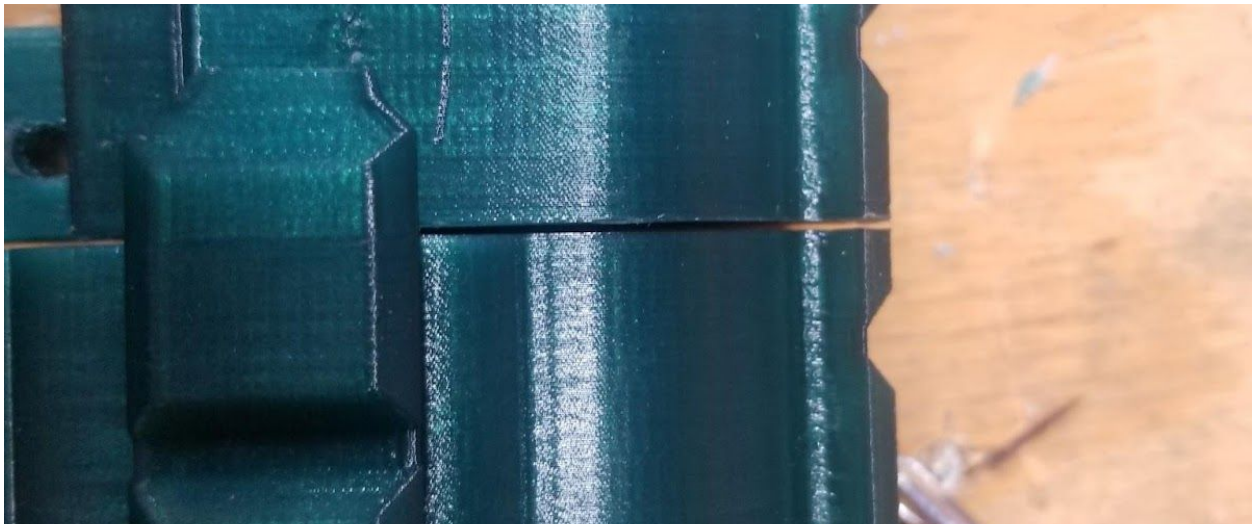
Shove the barrel retainer onto the barrel in this orientation,you might need to sand or round file the hole but do not make it loose it should require a good push or smack from a mallet to go on.



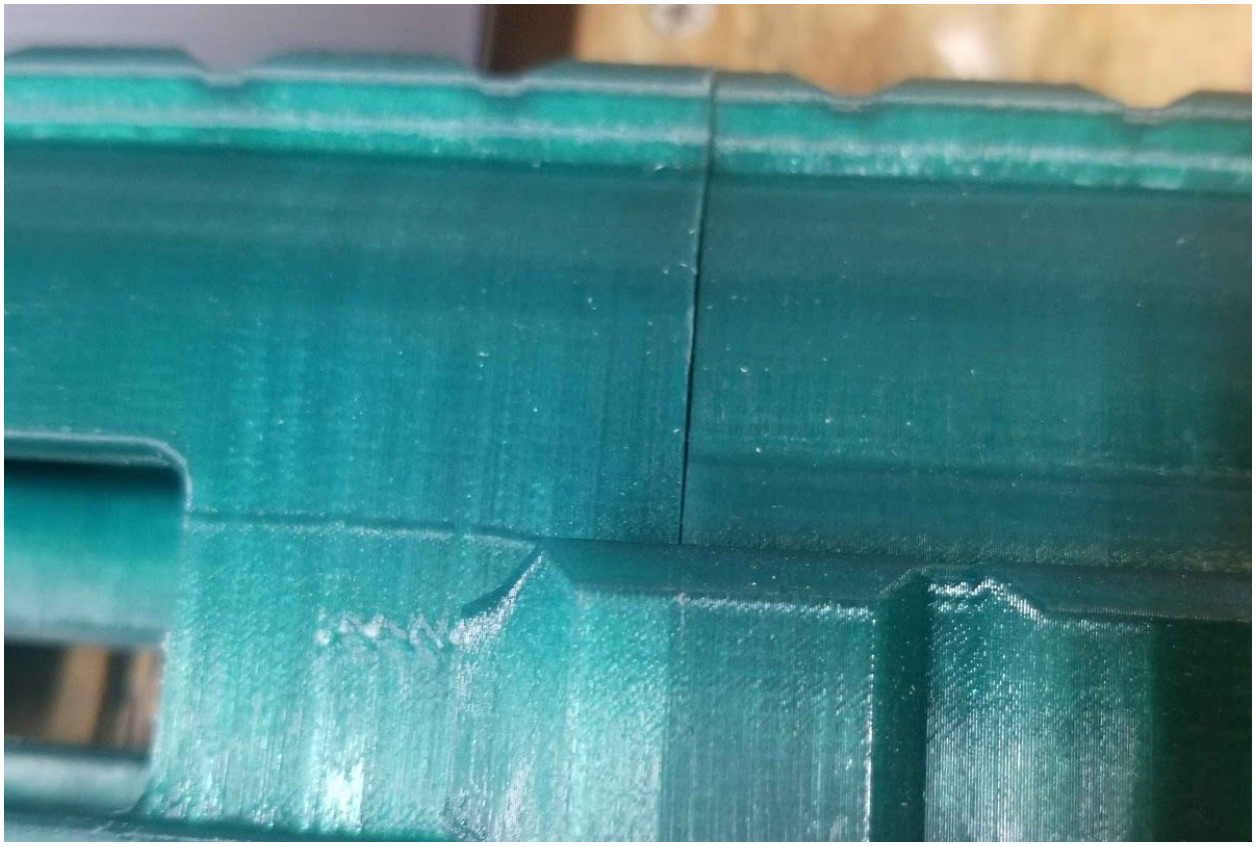
Don’t forget to install the charging handle and rod at this point or you will have to take it all apart for the 5th time.



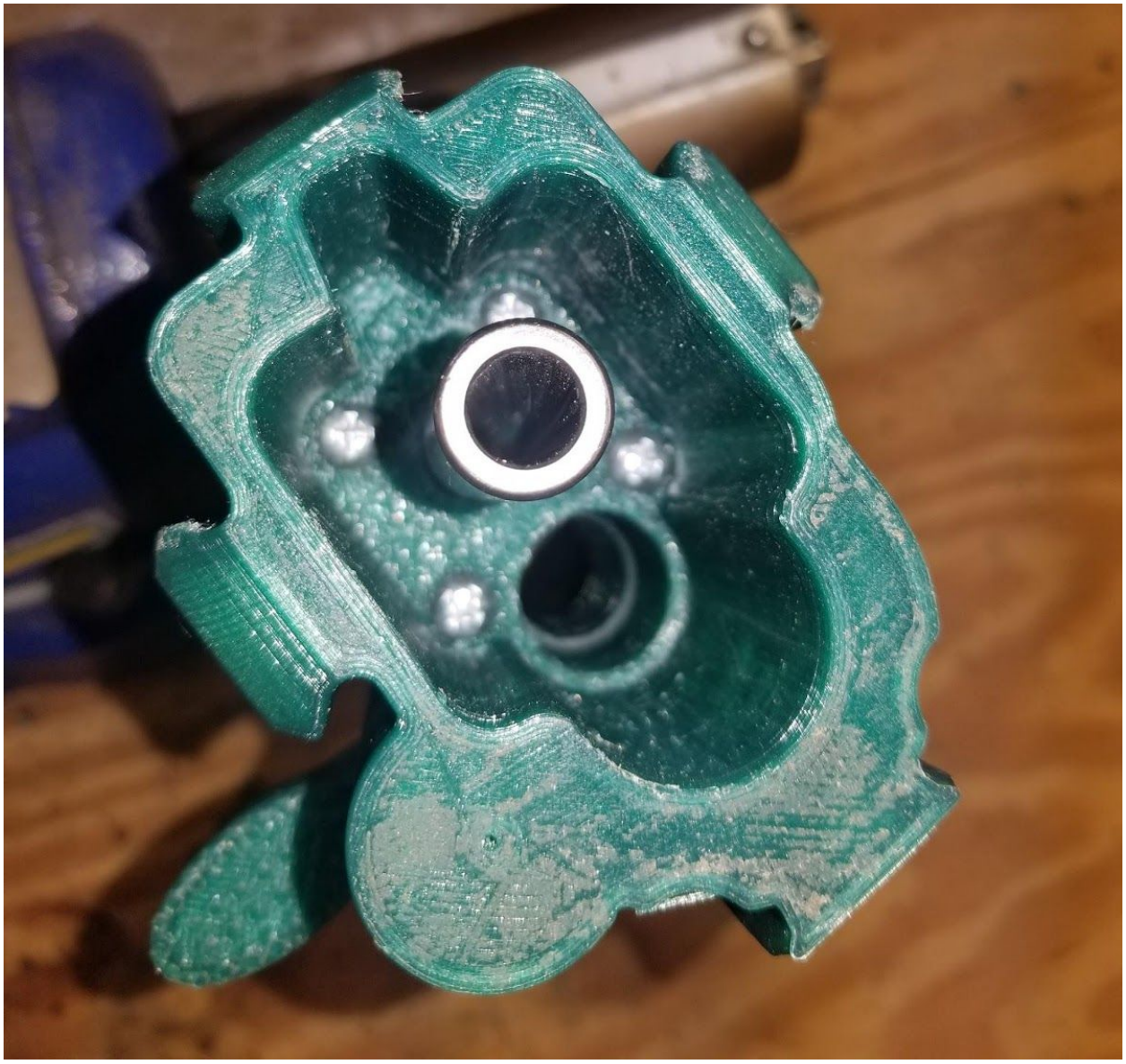
If you have a gap like this keep going it needs to be flush all the way around.



No light, the retainer is what keeps the barrel from moving.



Install the (4) #8 machine screw 1-1/2in tight but do not overtighten

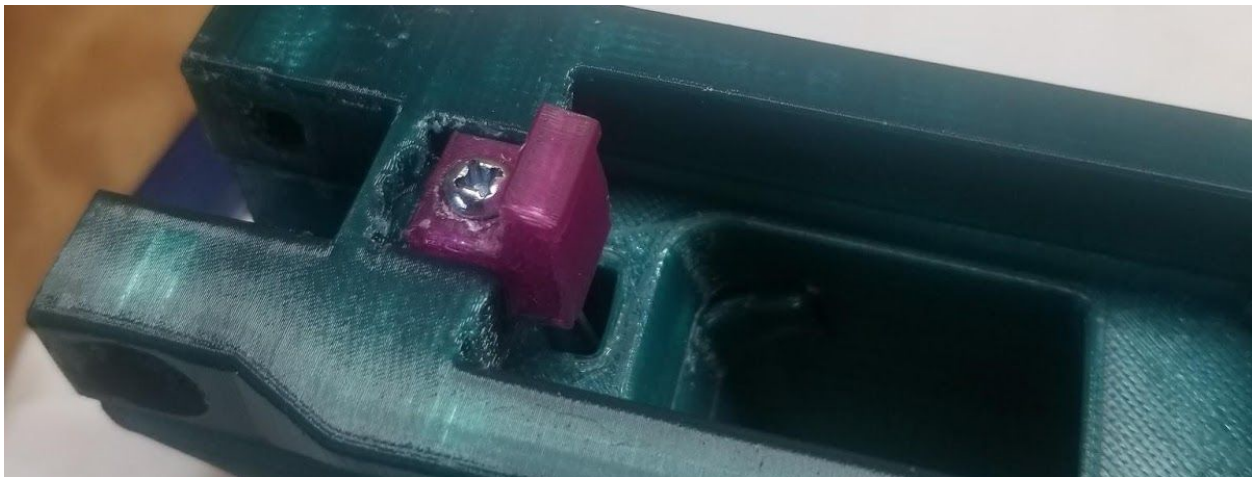


Install the fire control group

See youtube on assembling an ar lower..
This one seems good. Just ignore the parts you don’t need.
https://www.youtube.com/watch?v=nen5iNNzVXE

Feed ramp

Use a #4 x 1/2in sheet metal screw to attach the feed ramp to the lower.

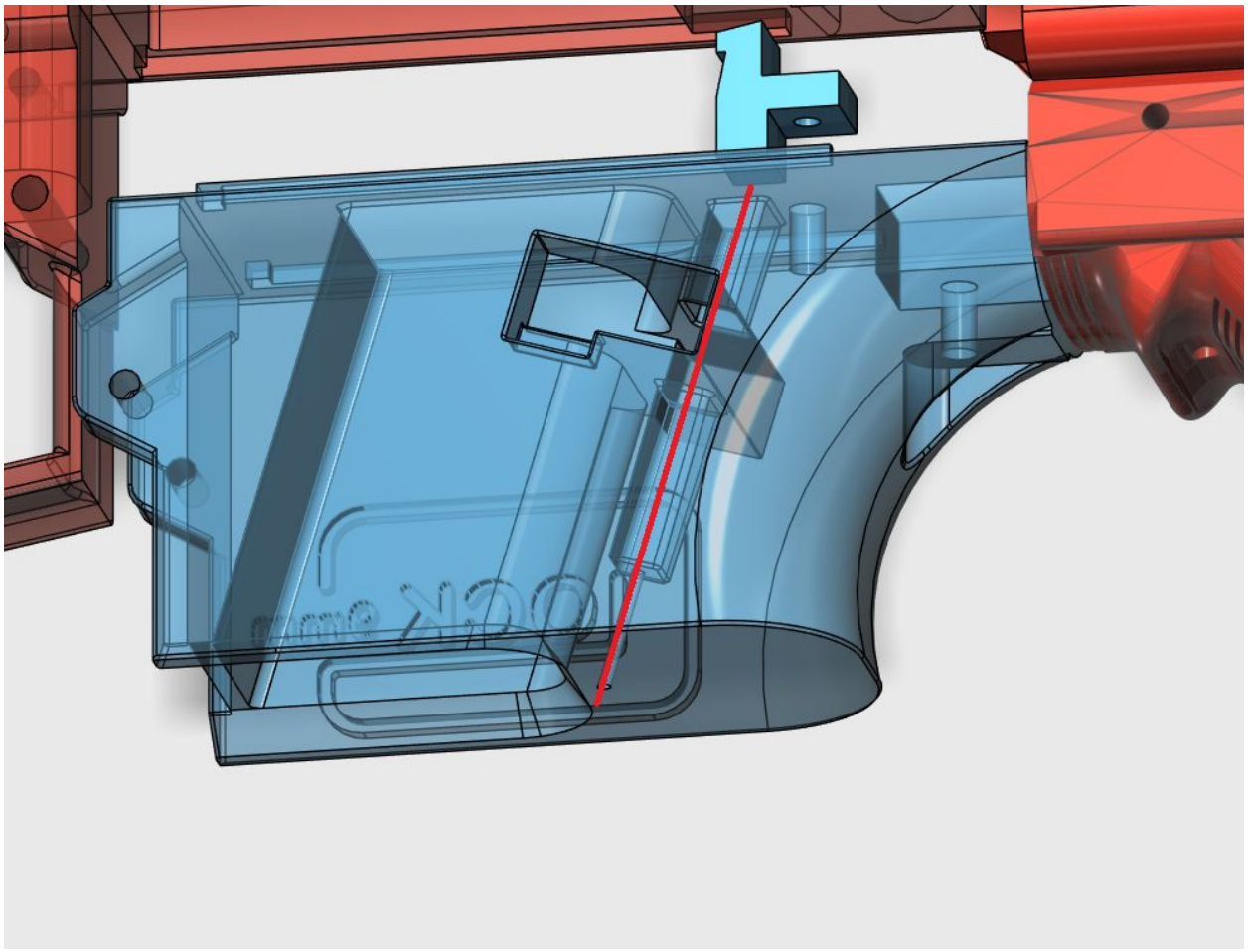


Magcatch

Take the wire and heat it up and shove it through the hole on the top of the mag catch, doesn't take much heat

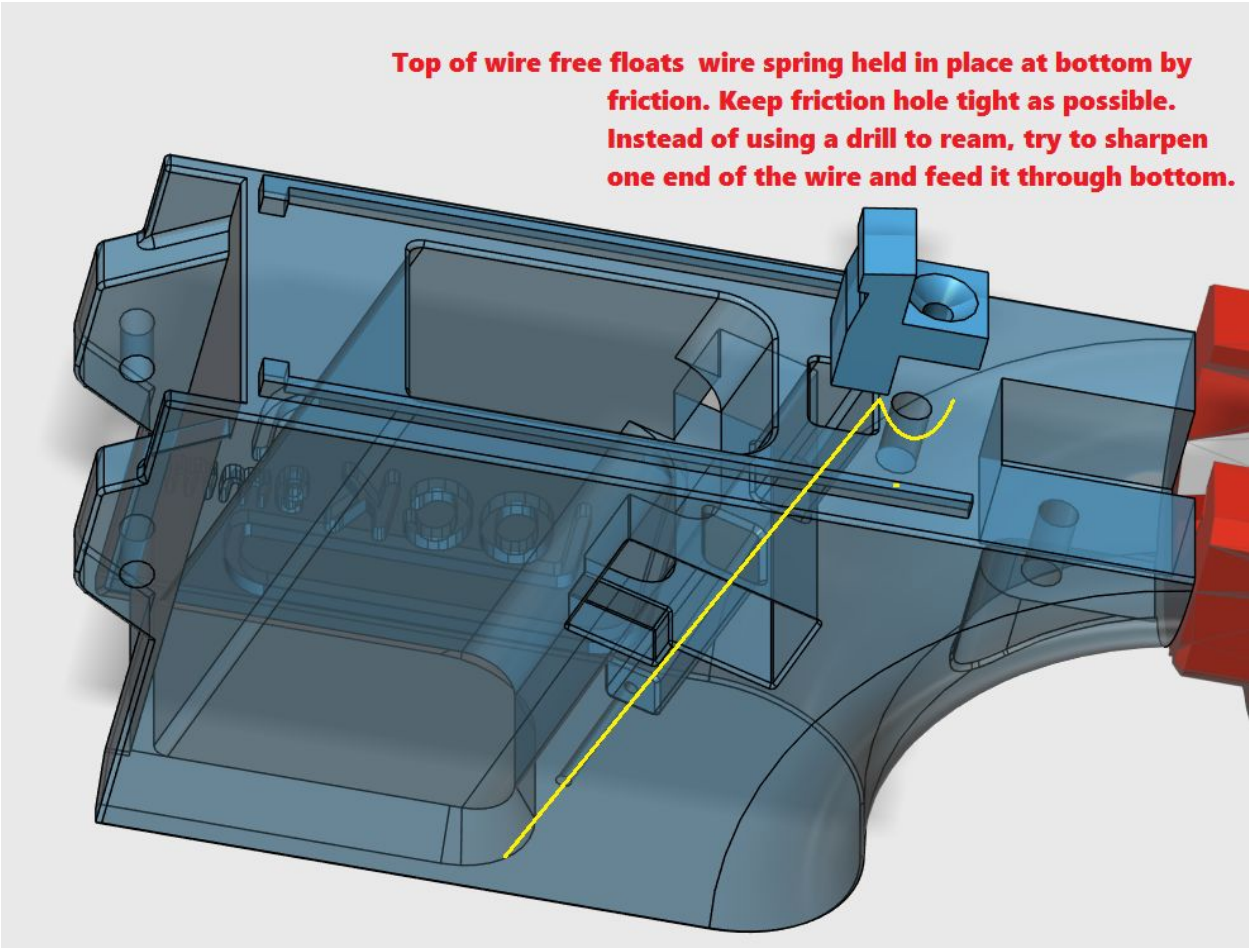
Carefully remove the wire, clean the plastic ooze off and insert the mag catch into the hole

Reheat just the tip of the wire and shove it through the hole into the pocket below with the mag catch pressed all the way in on the L side



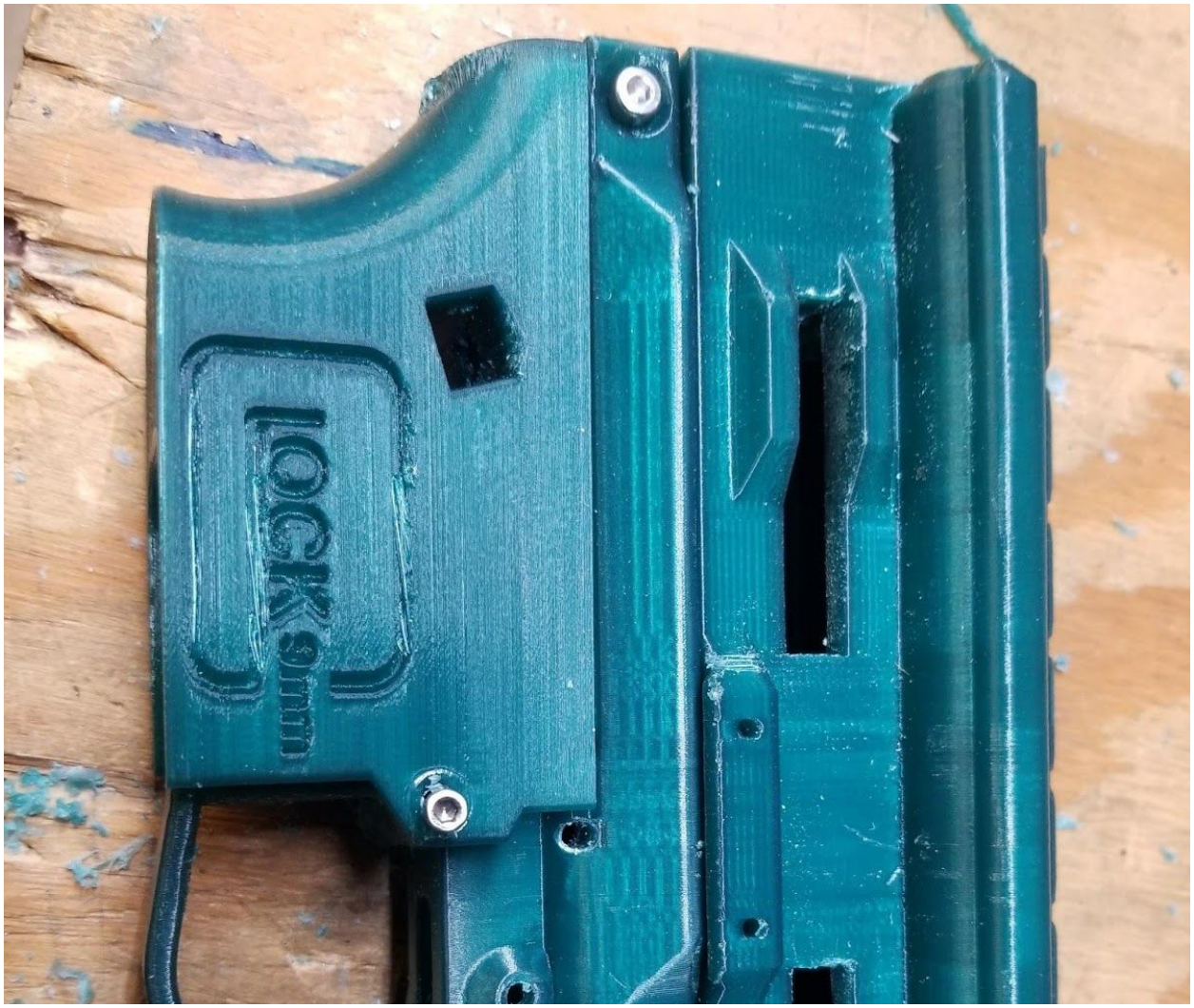
Test to ensure the mag is retained

Trim wire to flush with the top of the magwell


Top of wire free floats wire spring held in place at bottom by
friction. Keep friction hole tight as possible.
Instead of using a drill to ream, try to sharpen
one end of the wire and feed it through bottom.

Magwell

Insert the 4mm x 45mm machine screw in the side of the magwell



Attach lower to upper

Use the (2) 4mm x 40mm machine screw to pin the upper to the lower

Using the #6 x 3/4in sheet metal screw in the front lower receiver.

Firing pin

66.50mm long

On a lathe

See firing pin reference diagram

Duplex nail

More info in Machining-Welding Jigs folder, duplex_nail_mod.txt

Collar and shaft

See making a firing pin document in WTF-9 manufacturing jigs and techniques folder
keybase://team/wtf9/WTF-9%20manufacturing%20jigs%20and%20techniques/How%20to%20Make%20a%20WTF-9%20Firing%20Pin.pdf

Build a bolt

Lower bolt

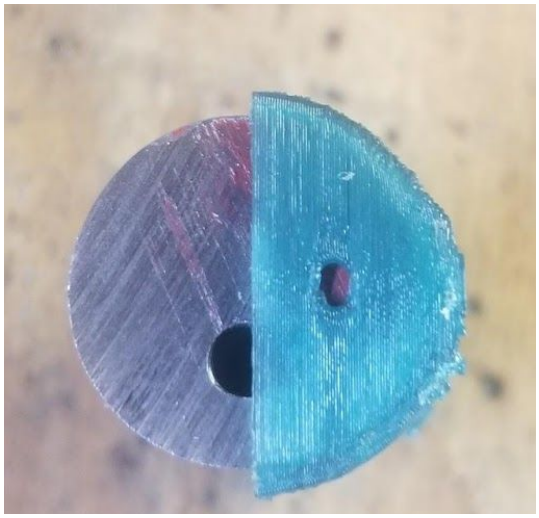
3/4in x 51.3mm stock with an offset from center 9/64in hole drilled straight through.

Use the hole alignment tool to mark both ends of the lower bolt.

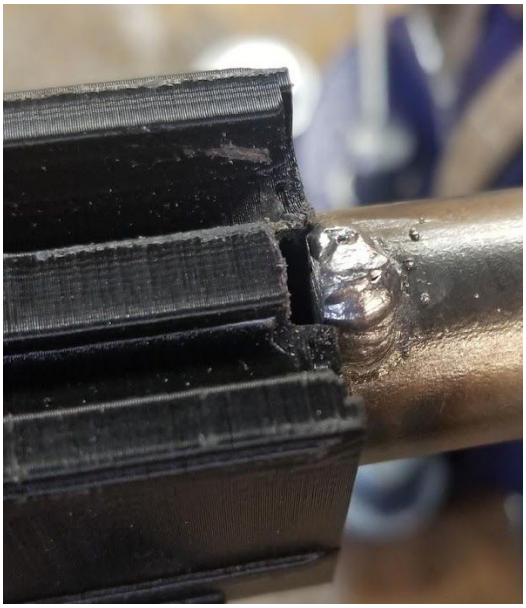
Drill the 9/64in hole in both ends of the bolt making sure that the end you are using for the bolt face is not reamed out.

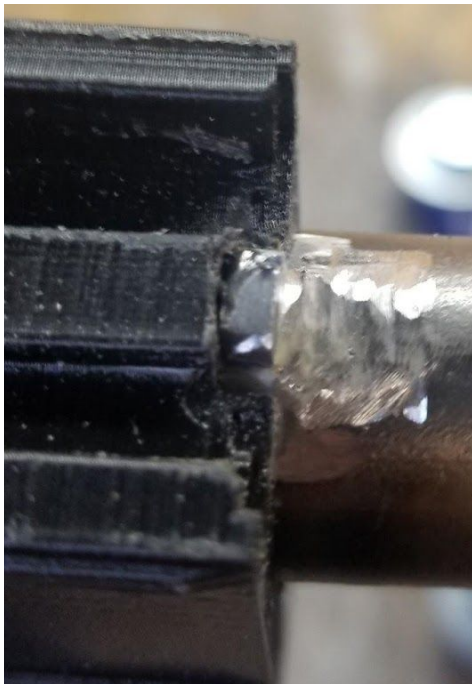
Check the firing pin to ensure that it fits and makes it smoothly through.

Use the half circle hole alignment tool to mark a line under the firing pin hole for reference



Use that line to weld a glob of metal on the end of the bottom of the bolt, then file or grind to shape. Using the bolt housing as a guide.





Completed lower bolt

Upper bolt

Lathe method

Start with 3/4in stock and turn it down and then weld to the lower bolt
See reference diagrams

No lathe method

Start with 3/4in pipe and 5/8in stock and weld that together then weld to the lower bolt
See making a lathe free bolt in WTF-9 manufacturing jigs and techniques folder

keybase://team/wtf9/WTF-9%20manufacturing%20jigs%20and%20techniques/No%20lathe%20upper%20bolt%20instructions.pdf

Bolt Spin Jig method

keybase://team/wtf9/WTF-9%20-%20Bolt%20Spin%20Jig

Assemble the bolt

Print the bolt alignment tool

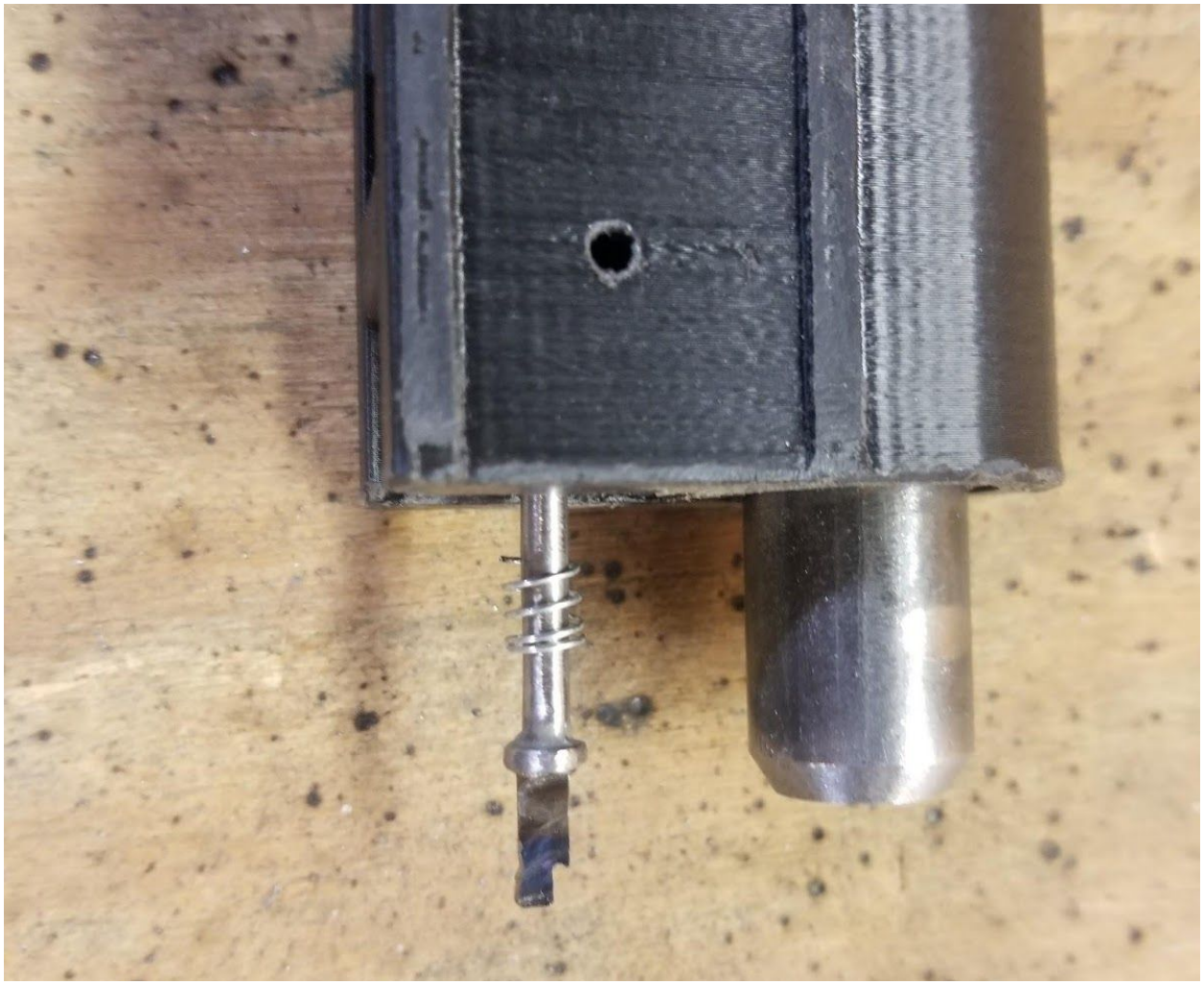
Insert the parts in the alignment tool and make sure that the bolt face on the lower bolt and the edge of the upper bolt align

Tac the Bolt together, putting out any fires let cool completely before flipping over and repeating.

Remove the plastic and weld both sides of the bolt together.

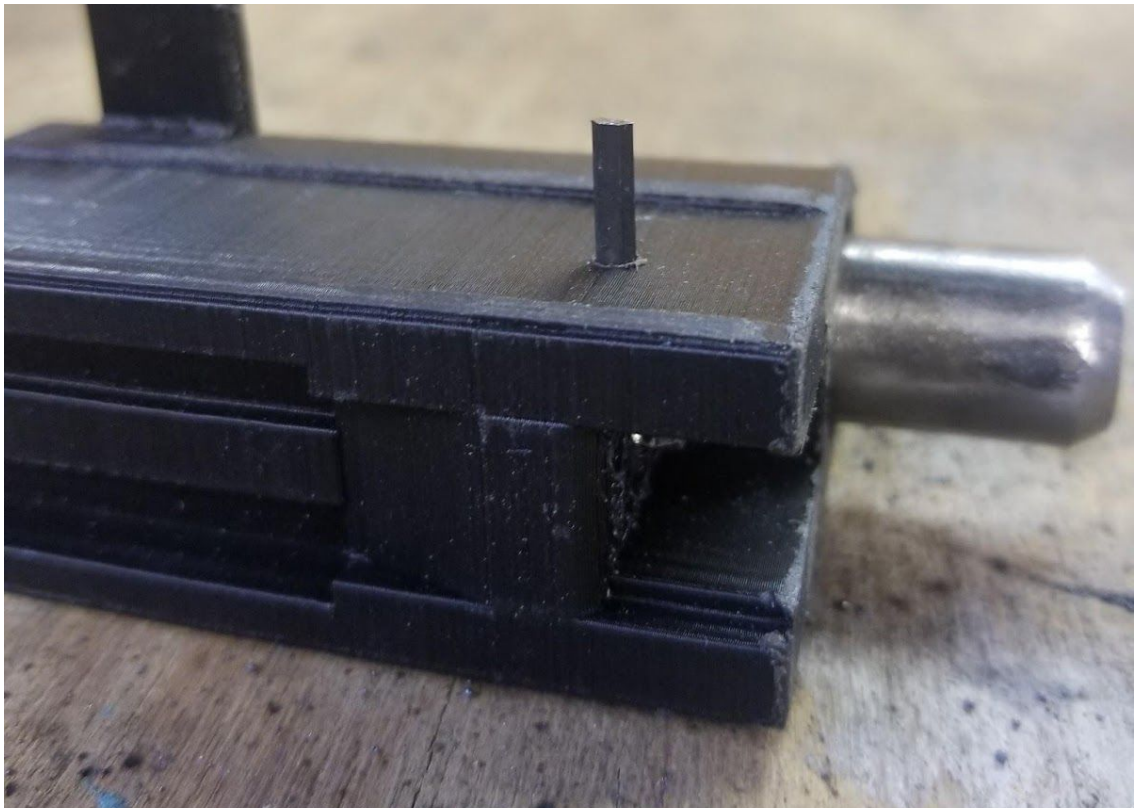
Clean the splatter and grind down the weld to fit in the bolt housing without warping it.

Using your new firing pin and 7/32" OD x .015" WG compression spring cut to 17mm. Insert the bolt into the housing and ensure the firing pin and spring fits, lines up and moves freely, a small amount of sanding might be necessary.



Epoxy the housing in place, Do not get any in the firing pin hole. Wait for however long your epoxy says to wait.

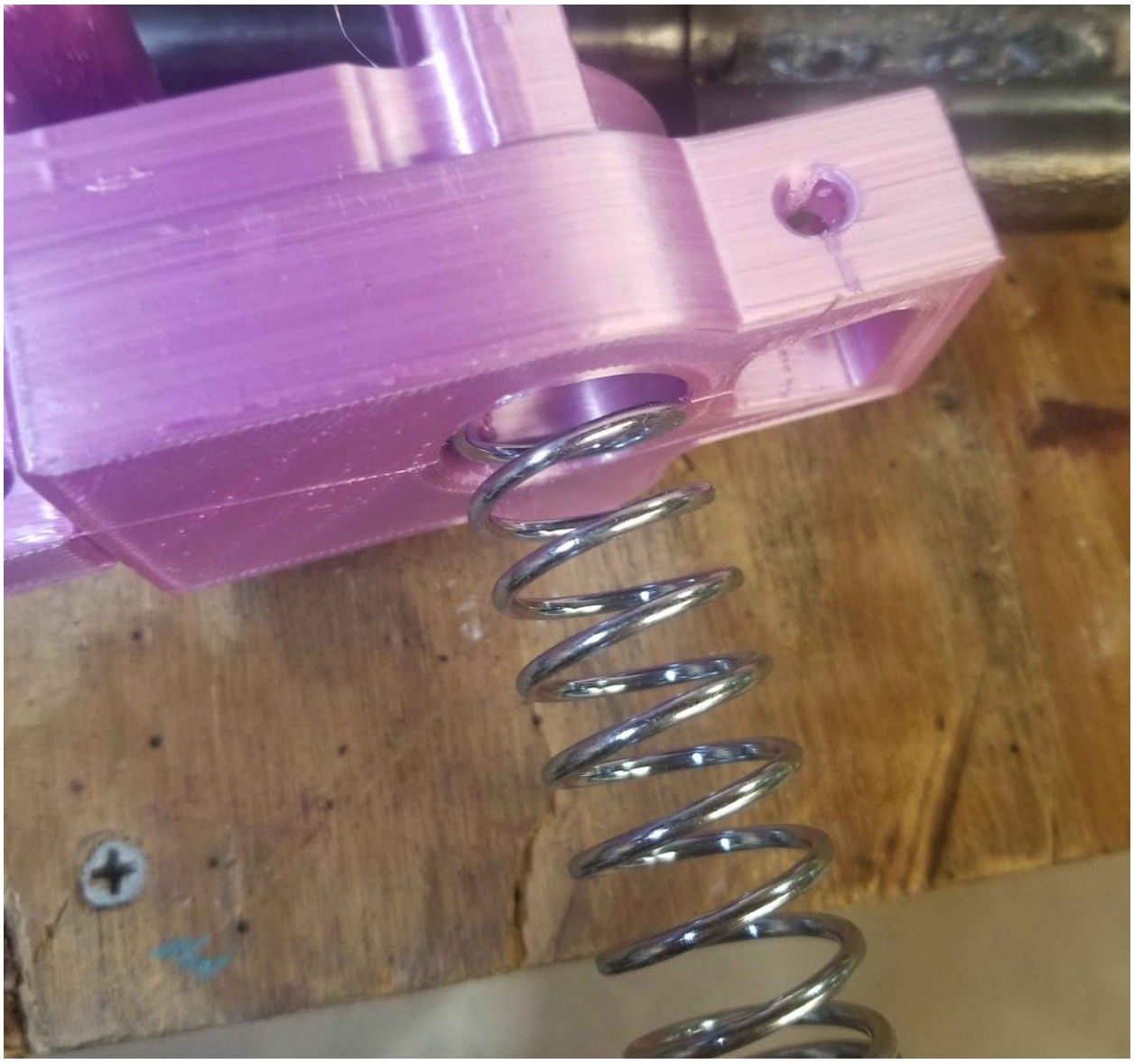
Insert firing pin with spring then insert the 1/8in x 25mm steel pin



Secondary buffer spring

- 0.845" OD x 0.685" ID 0.08" WG compression spring x 2-5/8 to 2-1/2 in

Bend the tail of the spring out to help keep it in place in the end cap



Insert the bolt

If the bolt is tight and does not freely move, lightly sand the lands on the top or on the sides. Testing often. Do not sand the bottom, it will throw off the barrel alignment.

Insert the buffer spring

Insert with the cut end out. Make sure that it is not sharp or it will eventually stab you.

Install the endcap

Use the 1/4inx 30(top) and 1/4in x40 (bottom) pins to install the endcap

Function check

Check the safety

- It should click into place into the 2 positions
- It should prevent the hammer from activating if in the safe position

Check the charging handle and ejector

- Charging handle should move smoothly without catching on anything
- Ejector should move freely with minimum wiggle in the ejector slot when the bolt passes it

Check the barrel seating and retainer

- Let the bolt slam home a couple of times and see if the top part of the barrel still protrudes into the chamber of the upper

Check the magazine catch

- Does the magazine stay in place when tugged and knocked around
- Does the magazine come free when the button is pressed

Checking the firing pin alignment

For this you need a **snap cap(works better)** or a spent case.

1. Place the snap cap or spent case into the chamber
2. place a piece of paper over the end of the chambered dummy round.
3. Fold or mark the paper to show how it is aligned.
4. Let the bolt slam home.
5. put the gun into fire mode and pull the trigger if you are totally sure that it is pointing in a safe direction.
6. Look at the paper and see if the firing pin is aligned with the primer.

Oh shit I fucked something up

The threads on the hand grip screw

- You can use a helicoil
- You can grease the screw and epoxy it into place
- You can just epoxy the thing together
- You can use a heated brass insert

Made a hole too big

 (let the drillbit get too hot and it melted in)

- Use a bigger screw
- Use an insert
- Plastic welding
- Reprint it with your extra filament
- Just go with it

My firing pin function check fails

- Firing pin not hitting at all or too soft?
    - Check that it is not jammed
    - Check the length
    - Check the barrel is seated properly
    - Spring too long
- Firing pin not hitting the center of the primer?
    - Too low could be part separated while welding
    - Offset from center, the two bolt pieces were not aligned while welding
    - You sanded the bottom of the bolt housing (unless it is hitting high then sanding the bottom will lower it slightly)

My primers blow out

- Firing pin too long or pointy
- The hole for the firing pin in the lower bolt is too big

Then tada you have a complete MOD9


Hey Ron. You're not gonna slaughter that pig here, are ya?
Citytv
Not to worry. I have a permit.
Citytv
This just says, "I can do what I want..."
Citytv
I can do what I want.
Ron
Citytv

Credits

All the thanks for getting this document assembled Sorry if someone is missed.
Keybase wtf9 https://keybase.io/team/wtf9
insertmeow
sg2020
derwood1 (original mad wizard)
mussy
chuckschumer
parallax222
imrcly