



POLYMER80

G100 80% Lower Receiver Instructions

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Parts List

Part Description	ITEM	Qty per Lower
AR15 Lower Receiver	G150	1
Set Screw Bolt Catch Pin	3mm	1
Dowel Pin for Bolt Catch	5/8in	1
Pistol Grip Nut	3/8in	1
Pistol Grip Screw	1.5in	1
Allen Wrench (Hex Wrench)	1/16th	1
Jig Parts List	ITEM	Qty per Jig
AR15 Jig	J100	1
End Mill and Stop Collar for Fire Control Pocket	7/16" end mill	1
Drill Bit, Safety Selector Switch Hole	3/8" drill bit	1
Drill Bit, Pin Holes for trigger and hammer	5/32" drill bit	1
Screws for tightening Jig		6

Methods to Finish the Lower Receiver:

The goal of finishing the lower receiver is to mill out the fire control pocket area utilizing the jig as your guide. These instructions will guide you through the process of removing this material. There are different techniques utilized, in general I'm going to cover utilizing a Drill Press. I will not go into much detail for those who have Milling Machines, the assumption is a user at this level would already have a strong sense of what to do.

Regardless, I've provided exact measurements for all techniques, because even a person using the milling machine will need the depths which would allow them to properly configure the machine.

Different techniques will result in different qualities of finish. Utilize this grid based on desired end-results and your access to tools. In all cases, use the jig and drill bits and always level the jig in your vice:

Type of Finish	Tools Required
Excellent (recommended)	Drill Press with vice, bench vice and basic tools like a Dremel tool and hand drill
Highest Quality (recommended)	Milling Machine, plus a hand held drill and bench vice for the pin holes.

I prefer to utilize the drill press because it is faster, requires less time to set up, and you have absolute control if the vice is utilized properly, and you use the drill stop that comes on most drill presses. Use a dremel tool to do fine



tuning after utilizing the Drill Press or Milling Machine. The challenge with the dremel is to shave off small amounts, don't get in a hurry and use a cutter such as the 9904 tip, link provided below.

<http://www.dremel.com/en-us/Accessories/Pages/ProductDetail.aspx?pid=9904>.

Example Tools

Example Tools	Web Link	
Vice For Drill Press	http://www.northerntool.com/shop/tools/product_200199324_200199324	
Drill Press	http://www.harborfreight.com/catalogsearch/result?q=drill+press	
Level	Utilize small level to ensure you are drilling straight down, and then level on the floor of the fire control pocket.	

Jig Hole Descriptions & Purpose

Jig Hole	Function	Depth from top of Jig to floor of Fire Control Pocket	Depth from top of Receiver to floor of Fire Control Pocket
Hole #1	Clears out the small black wall and stepped up area just below the rear take-down pin holes	44.5mm or 1.79in	.63in
Hole #2	This hole opens up a pocket for the rear side of the trigger mechanism. This hole is the trickiest, do not penetrate into the right side where there's a slight protrusion of the polycarbonate material. The safety selector switch detent pin goes in this area.	44.5mm or 1.79in	1.25in exact
Hole #3	The back side of the fire control pocket	44.5mm or 1.79in	1.25in exact
Hole #4	The front side of the fire control pocket, closest to the magazine well.	44.5mm or 1.79in	1.25in exact
Trigger Hole	Drilling this hole opens up the trigger hole.	Drilled through holes	Drilled through holes

Note how the jig with the End Mill bit set at 44.5mm creates a consistent drilling depth. Just move the drill press table up or down to position properly as you move from holes 1&2 to the Fire Control Pocket.

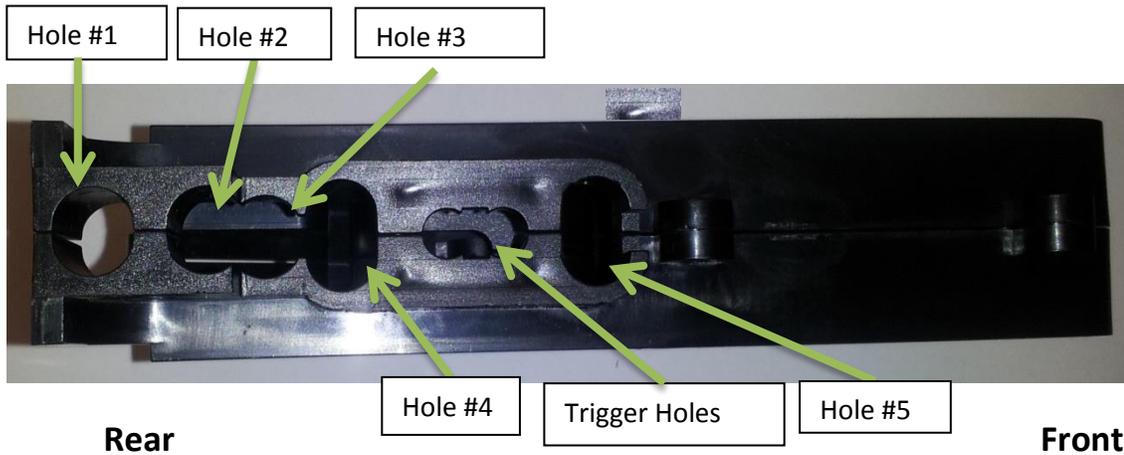


Getting Familiar with the Jig and Lower Receiver

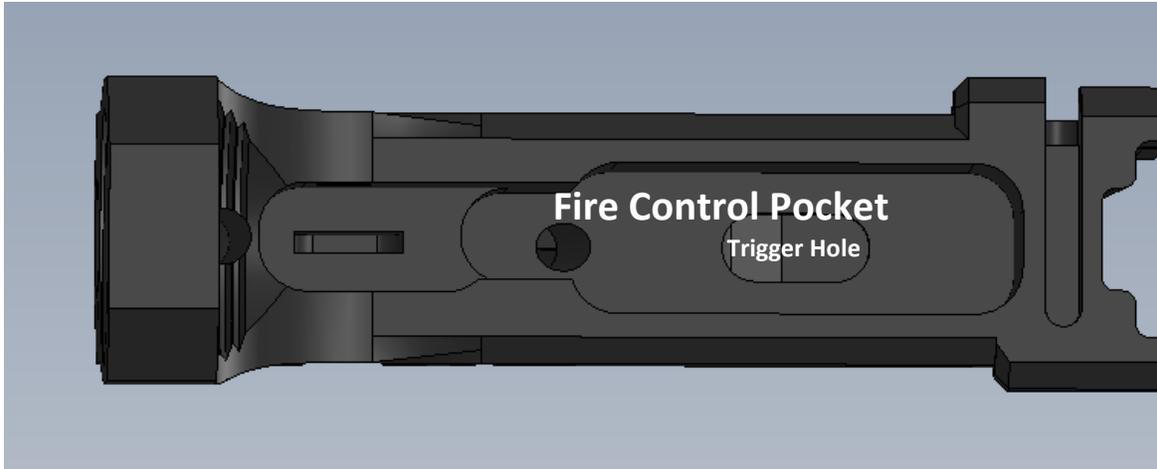
The goal of finishing the lower receiver is to remove most, if not all, of the red core from the receiver. The core section fills the entire fire control pocket, these instructions will guide you through the process. There are different techniques utilized, in general I'm going to cover utilizing a Drill Press that will result in a very nice finish. I will not go into much detail for those who have Milling Machines, the assumption is a user at this level would already have a strong sense of what to do. Regardless, I've provided exact measurements for all techniques, which would allow anyone to properly configure the machine.

It's important to note the features of the jig and the lower before you start working on the unit.

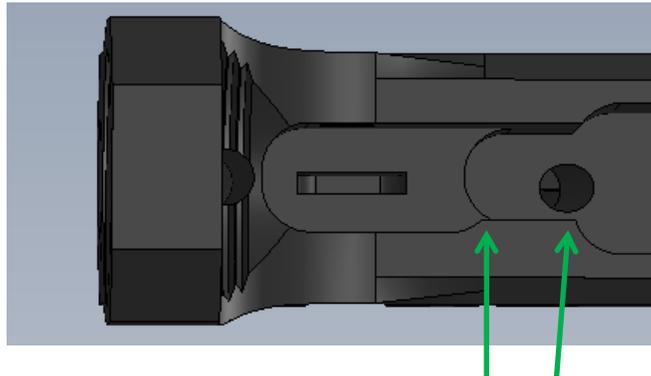
The Features and Description of the Jig



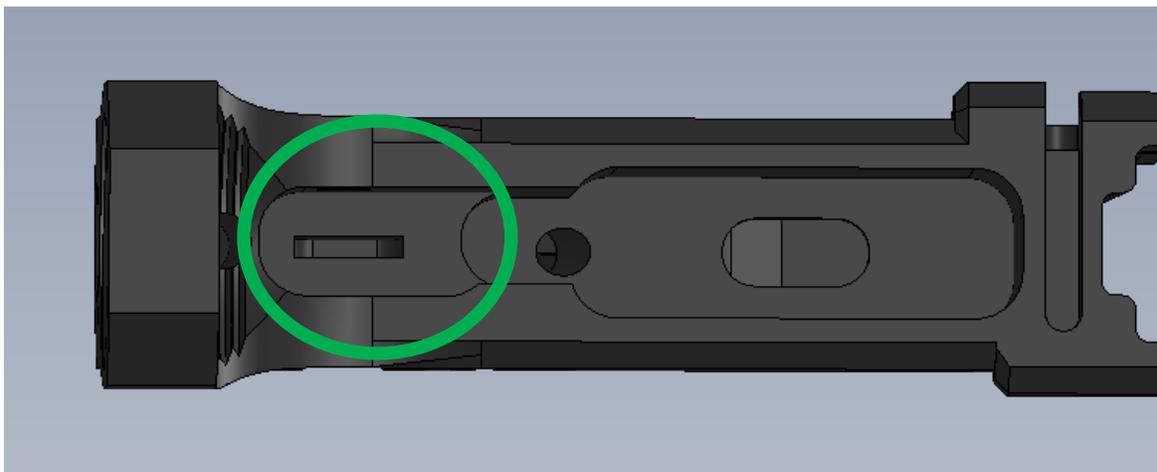
The Features and Description of the Lower Receiver



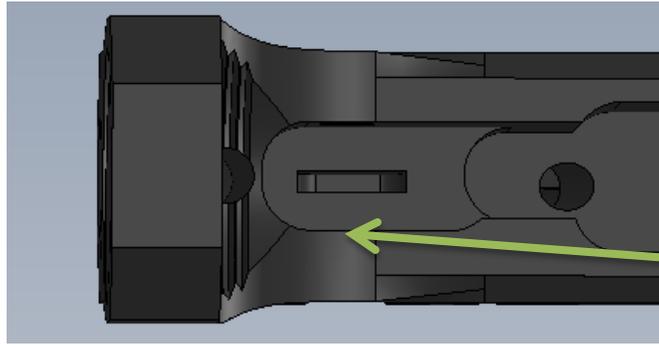
Looking Down into the Fire Control Pocket



NOTE THE SLIGHT INDENTATION, DON'T DRILL THIS OFF



This area near the rear of the Fire Control Pocket is higher or stepped up compared to the deeper pocket. If you have a finished lower receiver from a previous gun, it might be helpful to take the rear take down pin out and look inside. Make sure the firearm is unloaded first.



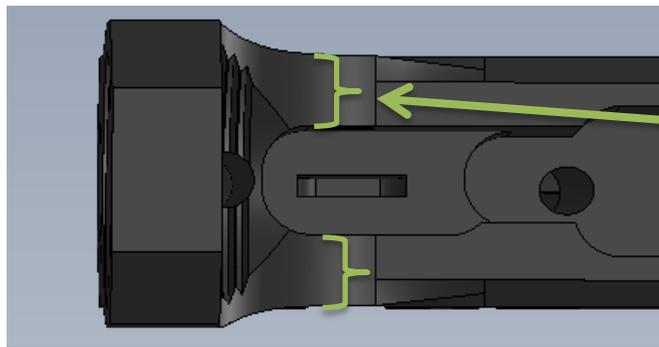
Prior to fitting the upper receiver on, you should leave a little extra material here to ensure you aren't milling out too close to the detent pin hole inside the rear take-down pin hole on the right side of the receiver.

The rear take-down pin area has very little room for error. The milspec leaves a tiny amount of material on each side of the hole where the detent pin and spring fit. You should leave extra material at first in this area (on the right inside) during fitting because the pin has little clearance from the interior wall to the pin hole.

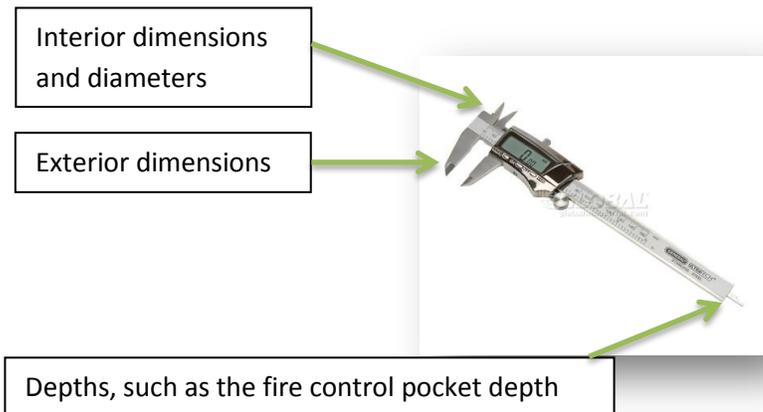
In some cases, a longer dowel pin can be installed very easily. If you need to install it, send email to support@polymer80.com and we can mail one to you if it wasn't already included in your kit.

Finally, and very important: The thickness between the side walls need to be consistent with each other above and around the rear take down pin holes. When the upper receiver mates to the lower, you want the bolt assembly to smoothly operate down the center of the buffer tube housing during recoil...if not, and the bolt assembly hits the buffer tube edge, or rubs, it can cause a tremendous amount of stress on the lower receiver in a very short amount of time.

To prevent stresses, ensure the safe operation by making sure the upper receiver is seated between the two side walls equally, and the charging handle operation and bolt assembly are smooth with no conflicts, causing no major resistance.



Use calipers to ensure equidistance between the two side walls. This ensures proper upper receiver seating AND smooth bolt action operation during recoil and while using the charging handle



Interior dimensions and diameters

Exterior dimensions

Depths, such as the fire control pocket depth

Example Digital Calipers: These are essential to your shop. They can also measure interior holes and depths (in fractions, mm or standard).



Preparation (Assumes you are using a Drill Press)

1. Prep the drill press. When using a drill press, the spinning head of the drill press needs to be firmly attached by slamming it with a mallet up into the press, or the vibration of the below procedure can sometimes make the entire head fall out (spinning and ruining things in the process). Take any drill bits out, get a mallet and hit upwards to securely implant the head.
2. Level: Must have a level to create a level interior fire control pocket
3. The end mill slide vice on the drill press (a link is provided above) is the absolute fastest and most secure way to finish this part. Using a tool like this as opposed to just using a dremel tool, you're going to be done much sooner with outstanding results. We utilize the slide vice in various ways around the shop, it's great tool that can be mounted on the drill press table directly, or on your bench underneath a smaller bench drill press and utilized for many other projects.
4. Final Mental Prep: Building a firearm takes craftsmanship and pride, **so don't be in a hurry!** Slow down and work precisely and methodically **Measuring Twice and Cutting Once!!** After you drill something out, you can't put it back, especially polycarbonate or nylon injection molded materials. In my personal experience, if I'm feeling like I have no patience, I just stop. I'll put the tools down and walk away from the bench and go take care of whatever made me be in a hurry in the first place. Sounds sort of simple, but I've destroyed too many things in the past from my lack of patience, and if you do it on this part it's going to cost much more time and money (and yes, I have ruined some lowers).

Procedure:

1. Put the lower in the jig. **PRE-TAP THE 6 SCREW HOLES** for all 6 screws on the jig. The 3 holes across the top are the most important, the lower 3 holes along the bottom can be used at your discretion.
2. Level the jig on the drill press in a vice. Each time you take the jig out, you must re-level when putting it back into the vice.
3. Insert the End Mill Bit on the drill press, adjust the tip of the bit to exactly even with the top of the jig at hole one and two (bend down and look closely, sometimes as you tighten the drill press table, it drifts up). The table that the vice is on or attached to must also be tightened (example: The tables for the floor drill press must be tightened on the back tightening knob or they can move). Crank it down hard!!
4. Adjust the drill press stop to 44.5mm (make sure the stop collar is set to 44.5mm and continually check it). If the stop collar drifts, tighten it, if it becomes cumbersome remove it.
5. Drill holes 1 and 2 (the holes are somewhat oval shaped so it will take several plunging procedures to clean them out). Go exactly 44.5mm down each and every drill procedure visually checking to make sure the bit is not sliding up or down within the drill press chuck. Again, the bit starting position is dead even with the top of the jig before you move to the next hole.
6. Take the screw out between holes 1 & 2
7. Staying within the confines of the edges of holes 1 and 2, drill through the jig and go all the way down as you did before (Figure 1). Go slow to reduce vibration.

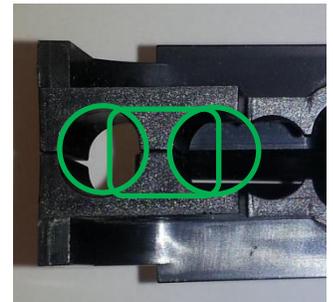


Figure 1



Figure 2

8. If you have a vice that allows X and Y axis movement, (like a **drill press slide vice** pictured in the link above) take advantage of the End Mill Bit and clean out the pocket floor and sides slowly moving along the edge to create a smooth side wall on both sides.
9. **Cut away the section pictured in Figure 2. Don't penetrate the Lower Receiver or touch the top of the receiver, just cut the upper section of the jig to prepare hole #3 drilling. I usually just leave the unit in the vice and slowly drill it off with the drill press..**
10. If you took the jig/lower out of the vice to cut the upper section off, replace it in the vice **AND LEVEL THE JIG AGAIN** using a small level.
11. **Figure 3:** Before we get started on the lower or deeper section of the fire control pocket, on all AR15 lowers, there's one important feature that you must pay attention to. There's a slight but **IMPORTANT** indentation that you can't drill through because the safety selector switch hole is drilled through that area. Don't drill this out!! You'll see later once the trigger mechanism goes in, the backside of the mechanism is just barely nudging this area since it's offset compared to the trigger hole. We'll use a Dremel tool during the trigger fitting stage to shave off a little bit of the material if need be to make the trigger move freely.

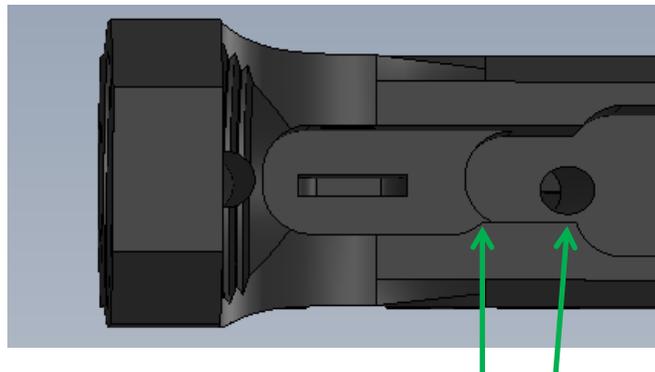


Figure 3, NOTE THE SLIGHT INDENTATION, DON'T DRILL THIS OFF

12. Let's go back to the drill press: Adjust the drill press table similarly to before so that the top of the bit starts dead even with the top of the jig. Now focus on holes 3, 4 and 5. Position the bit exactly even with the top of the jig at those locations, **checking each time before you drill** that the bit is dead even and not getting loose within the chuck. Go only 44.5mm down, if there are stop collars provided in the kit, they too will help you from going too deep.....but double check depth of stop collar to make sure it doesn't slip. **Remove it or tighten it if necessary and mark the End Mill bit at 44.5mm, and set the stop on the Drill Press too for extra security!!**
13. Once these holes are done, cut off the top of the jig at the line pictured in Figure 4. This allows you to see where you are cutting the rest of the fire control pocket out and gives you a very clear sight picture of side walls. When you do this, you lose your 44.5mm reference point at the top of the jig. That's ok, from the top of the **receiver it's exactly 1.25 inches down. In the video we show how to measure that as you conservatively reach that depth. Use a straight-edged ruler as seen in the video to check depths. You can adjust the table UP to bring the bit to the top of the receiver, THEN adjust the the drill stop to 1.25 inches.**



Figure 4

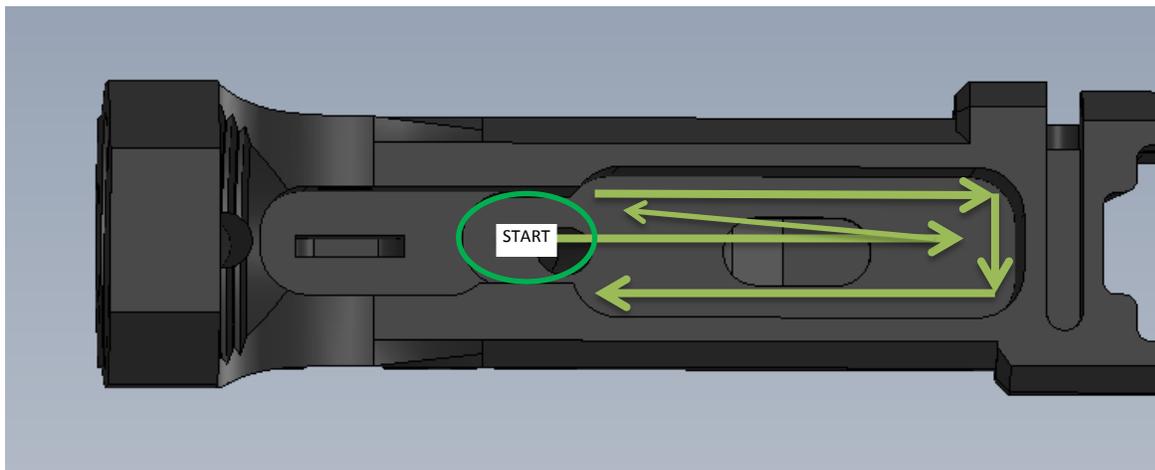


Figure 5

14. Note: Now that we're going to start drilling and cleaning out the main fire control pocket using a milling procedure, it's important to note that the drill bit in a drill press is spinning in a clock-wise direction towards you, from right to left. **ASSUMING YOU ARE USING A CROSS SLIDE VICE** therefore, when moving the jig underneath in the slide vice, follow the path pictured in Figure 4 to prevent the bit from jumping and chattering. You will work against the grain in one sense, rather than allowing the bit to grab and run.
15. Use **drilling procedures** to clear out the majority of the core section by plunging and lifting the press head up, move to the next section, and plunge down again until you clear out the majority of the interior red ABS parts (mostly should be down up through step 12). Now we switch to using a **milling procedure** (leave the head down in the pocket and move the jig/lower in the vice to smooth the edges and floor if you are using a cross slide vice).
16. Start at the rear side in the pocket where the safety selector switch goes through (Figure 4). Move straight down the middle, then go back and start on the right side, swinging down, around the edge, and then back towards the rear of the fire control pocket.
17. **Each time you go through this process, FOLLOW THE PATH IN FIGURE 5.**
18. Once you are finished with the interior pocket, it's time to drill the side pin holes (Hammer, Trigger and Safety Selector Switch Hole) on the side of the Jig. You can put the jig/lower in a regular vice on your bench at this point, select the proper bits provided and **drill on one side only**, then flip the jig and drill the holes out on the opposite side. **DON'T try to drill through both sides at one time, GUARANTEED THE BIT WILL DRIFT AND MISS THE TARGET ON THE OTHER END!!** These holes have to be exact. Start the drill full speed with the proper drill bit sizes designated on the side of the Jig, push it into the hole steady and level.
19. Clean out the trigger hole with a small dremel. I've used a ceramic wall tile cutting bit such as the #562 at the **LOWEST SPEED** to clean up areas like the trigger hole and the side walls as I fit the trigger. (Link to the drill bit is above in the table named Methods to Finish the Lower Receiver.
20. Final step is to start the trigger fitting: In **Figure 6**, there are 3 general areas that you'll focus on (besides the trigger hole itself). The trigger should just drop straight down in there cleanly, but it's never happened to me without some additional fine tuning. **Using the dremel bit on the slowest setting**, I carefully and slowly trim surfaces to make sure the trigger operates without touching anything. The rear section on the left side of the Figure 6 is where you need to be careful not to penetrate too far on the wall because the safety selector switch **detent and spring** are very close to this area, and the Milspec leaves very little room for error.

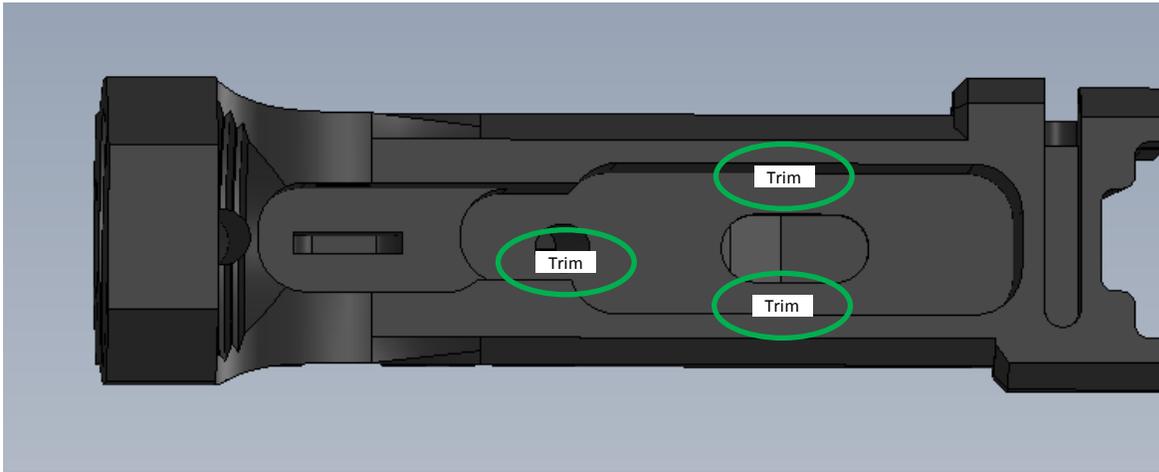


Figure 6

Final checks and misc notes:

1. The depth of the fire control pocket should be 1.25 inches from top of receiver...precise. That's why we're using the end mill bit on this area to make sure it's clean and flat. The upper section of the pocket (holes 1 and 2) is .63 inches from the top of the receiver. There's a table at the beginning of this document that has the specifications.
2. If you have a ton of trouble getting the trigger in because the pin holes aren't aligning, you might consider several inspections/mods in the following order:
 1. Make sure the trigger hole is vacated of any material that prevents proper movement.
 2. Make sure the rear of the trigger is not rubbing against that odd offset wall that houses the safety selector switch detent.
 3. Taking a very slight amount more off of the floor of the fire control pocket with the end mill bit (go back to the vice and make sure the jig/lower is level and just take several hundredth's or so of an inch off then go back to the trigger fitting to see if that helps).
3. At the front side of the fire control pocket, there's very little room in the original Milspec design between what I term the firewall and the mag release button housing. If you see exposure to that area after you drill, don't be alarmed, there's almost no material there by milspec design, but this will not impact performance of the firearm. Even on aluminum 80% receivers, it's common to shave off an amount that allows you to see through into the mag release button area.
4. In the rear of the fire control pocket (Figure 7), there's an area where you might see some "pitting". This pitting is not the lower receiver Polycarbonate structure. There are remnants of the ABS Core which goes much deeper here. Don't remove this, there's no impact to performance. Just clear out the backside enough for the rear take down pin to clear and be careful to not come too close to the right side wall where the detent pin comes through.
5. After you install the trigger and hammer, the trigger should release the hammer properly and cleanly of course.

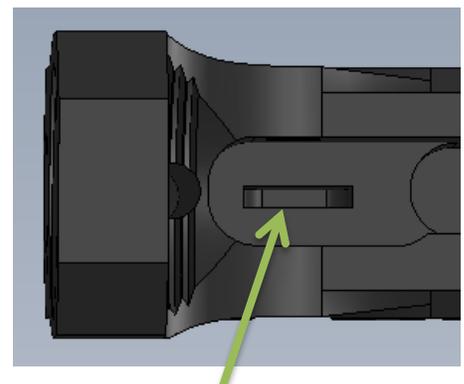


Figure 7 (ABS Pitting in this area can be ignored)

Any further questions, feel free to email us at our support email address or call:

support@polymer80.com or call Dave at 707-688-3631

