

Constructing Your

HYBRID 3D PRINTED SUBMACHINE GUN

Version 1.0



By Professor Parabellum

The following quick guide should aid in the theoretical construction of a 9mm submachine gun utilizing a number of 3D printed components. The design borrows many of these parts from the recently released FGC-9 including the 'Shuty' type lower receiver, use of a printable Glock magazine and an Electrochemically Machined (ECM) rifled barrel made from a length of steel tubing. These parts are combined with an upper receiver fabricated from a length of steel box section and a part printed DIY open-bolt, full auto only trigger as an alternative to using an AR15 Fire Control Group.



Before attempting this project it would be beneficial to familiarize yourself with concepts and techniques outlined in the following documents:

‘Getting Your First 3D Printer and How to Use it’

<https://ctrlpew.com/getting-started-0-introduction/>

‘ButWhatAbout: DIY Electrochemical Machining a 9x19mm Rifled Barrel’

<https://lbry.tv/@Deterrence-Dispensed:2/Project-ButWhatAbout-ECM-9x19-Barrel-DIY-V1-Package:7>

‘ButWhatAbout: Ammo Volume 1: How to create live 9x19mm ammo from deactivated ammo in Europe’

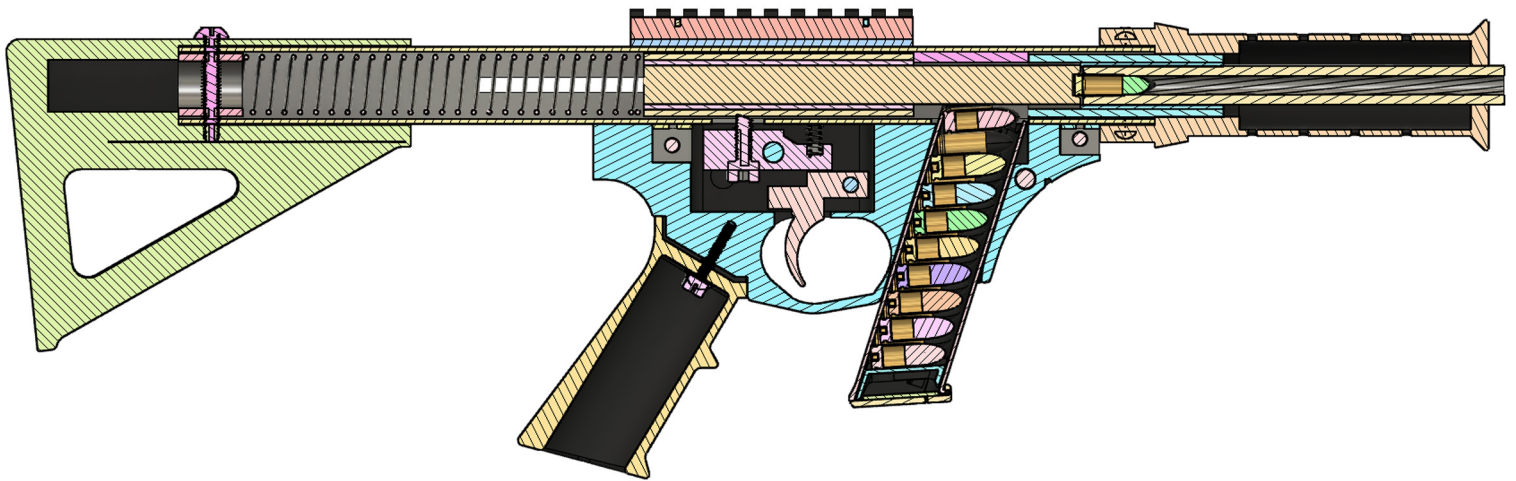
<https://lbry.tv/@Deterrence-Dispensed:2/BWA-Ammo-V1.0:b>

‘Expedient Homemade Firearms Vol II – PA Luty’

<https://thehomegunsmith.com/pdf/Expedient-Homemade-Firearms-Vol-II-PA-Luty.pdf>

‘The FGC-9’

<https://lbry.tv/@Deterrence-Dispensed:2/FGC-9:e>



For legal purposes the dummy, non-firing mock up replica shown was built with a blocked, perforated dummy barrel as well as a dummy bolt with no provisions for a firing pin. All information herein is provided for purely academic study purposes only.

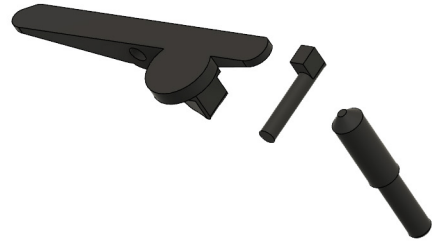


Parts to print

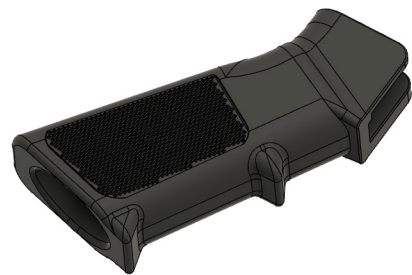
Lower Receiver



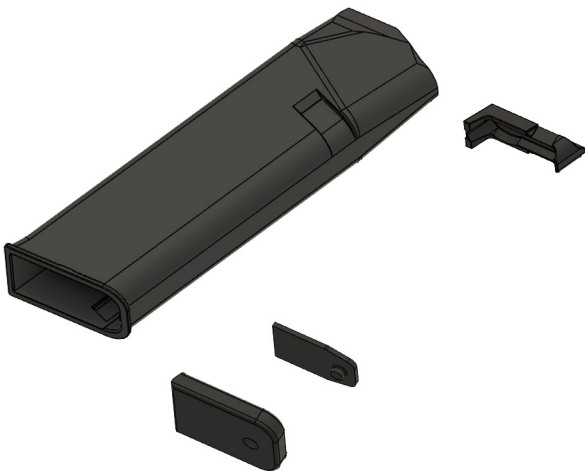
Magazine catch assembly



AR / M4 Pistol Grip



Glock Magazine Body Assembly



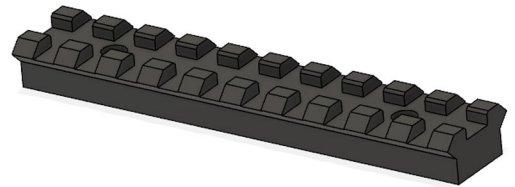
Stock



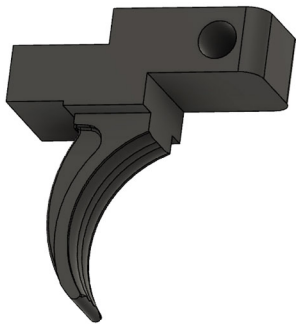
Handguard



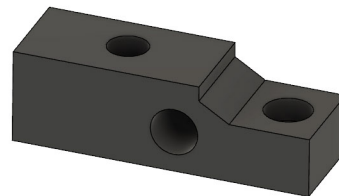
Upper Receiver Rail



Trigger



Sear Block (For temporarily testing function)



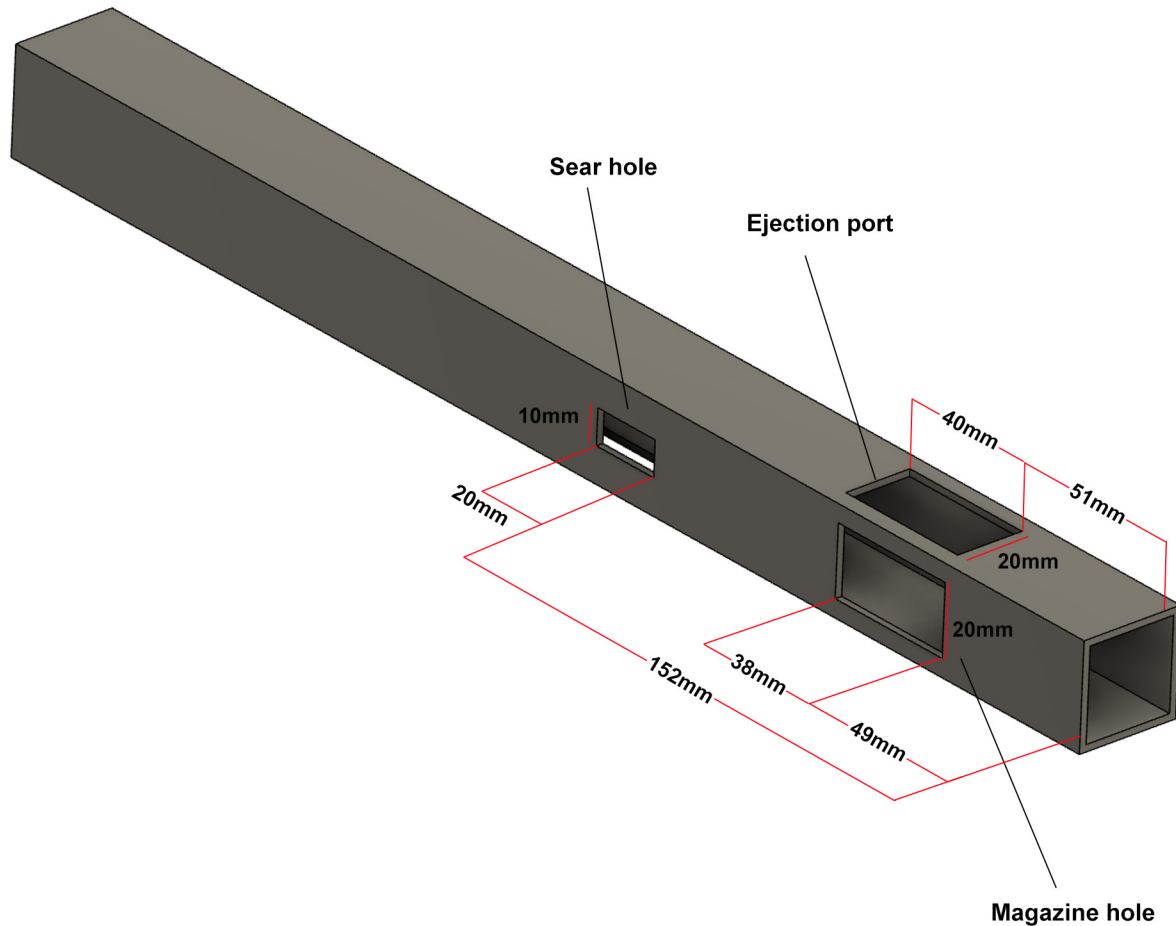
Cocking handle sleeve

Screws onto a 40mm long M6 socket head bolt

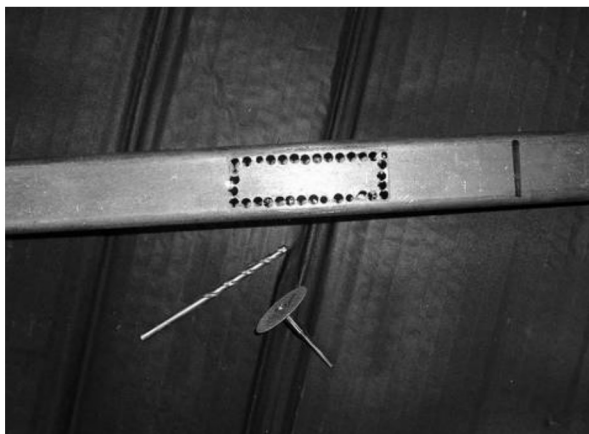


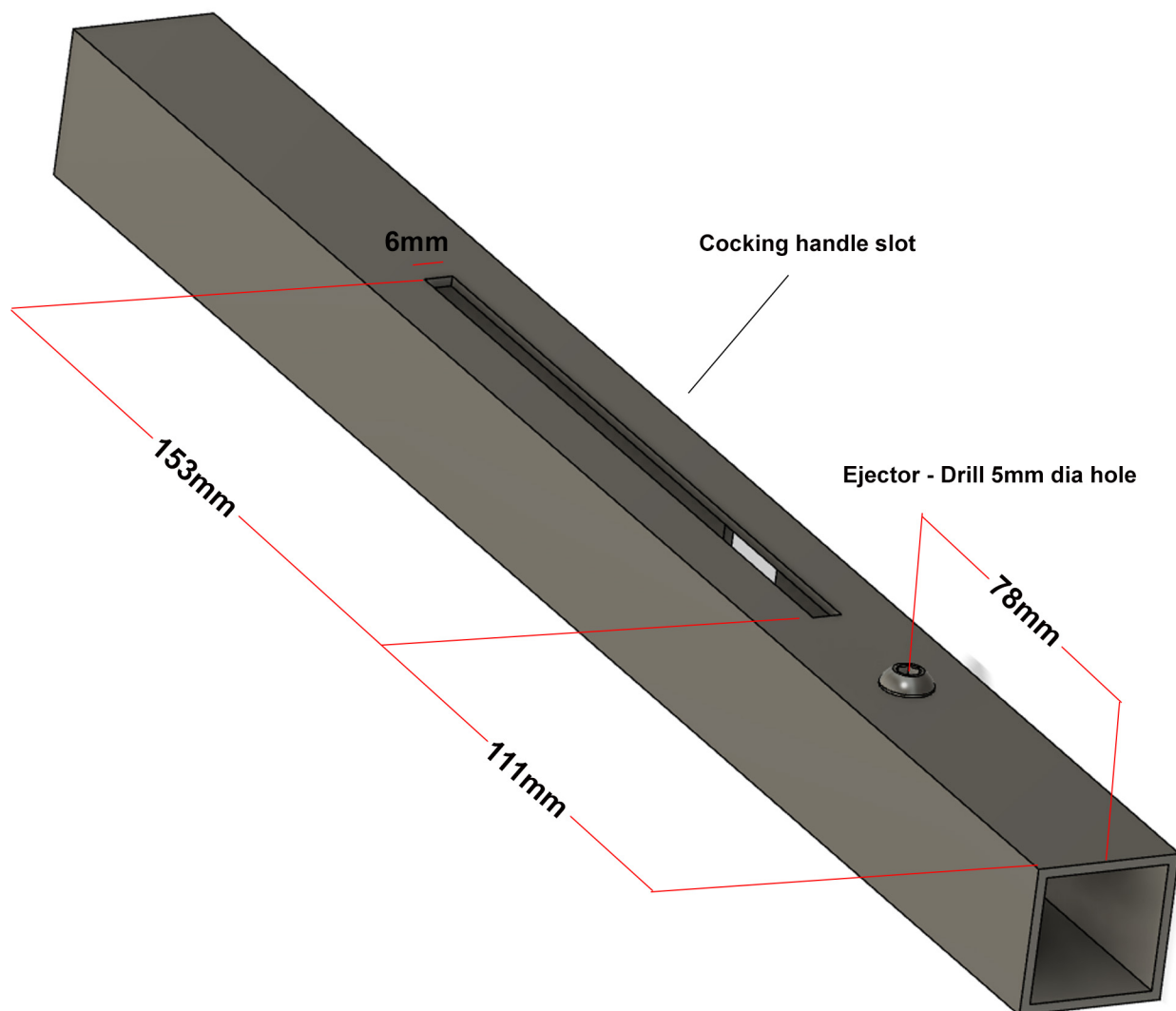
Construction of the Upper Receiver

30mm x 30mm x 2mm wall Mild Steel Square Box Section, 380mm long.



Each opening can be formed by 'chain drilling' a series of holes using a 4mm bit after which a Dremel type rotary tool fitted with a 'reinforced cutting disc' can be used to cut out each piece while grinding each surface flat.

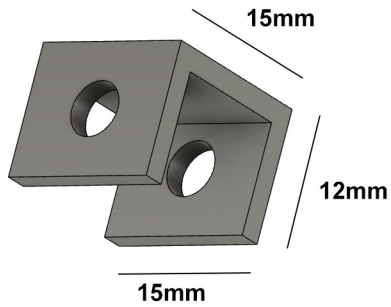




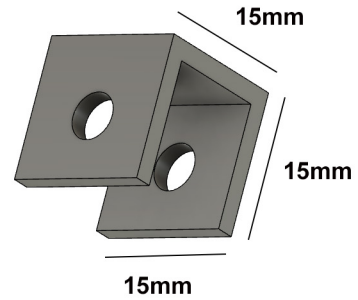
Receiver attachment lugs

Cut from 15mm square or rectangular box section or bend from a 2mm thick strip cut from the same tubing as the receiver. After welding in place mark hole positions using printed lower receiver as a reference.

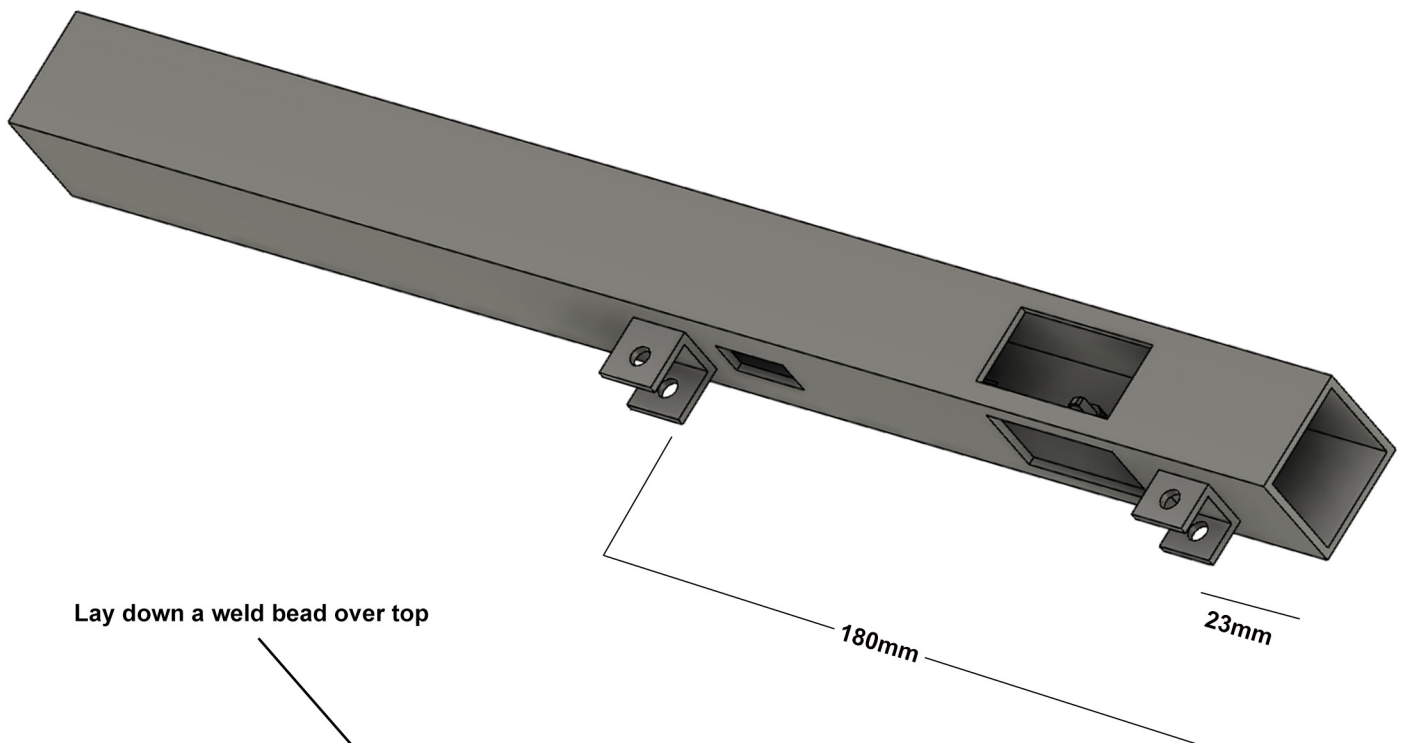
Front lug



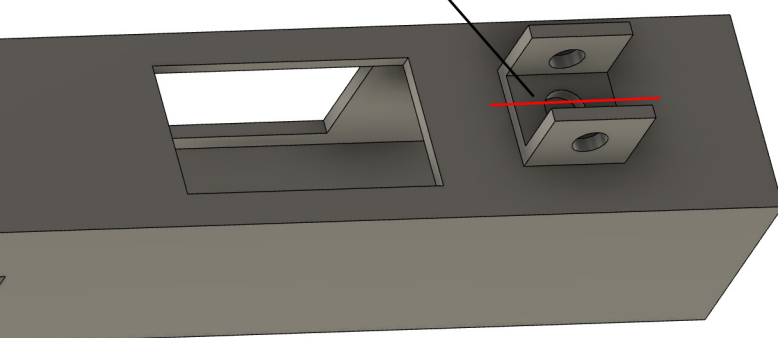
Rear lug



Holes: 5mm dia



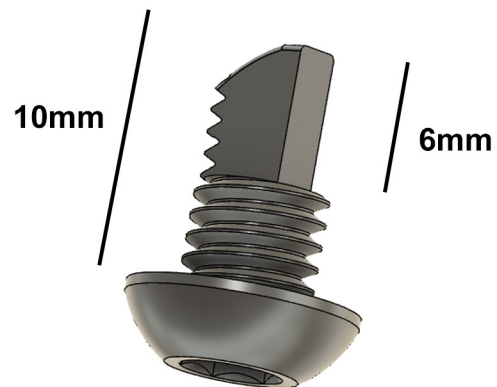
Lay down a weld bead over top



Receivers can be retained together using two 40mm long M5 bolts or 5mm dia pins.

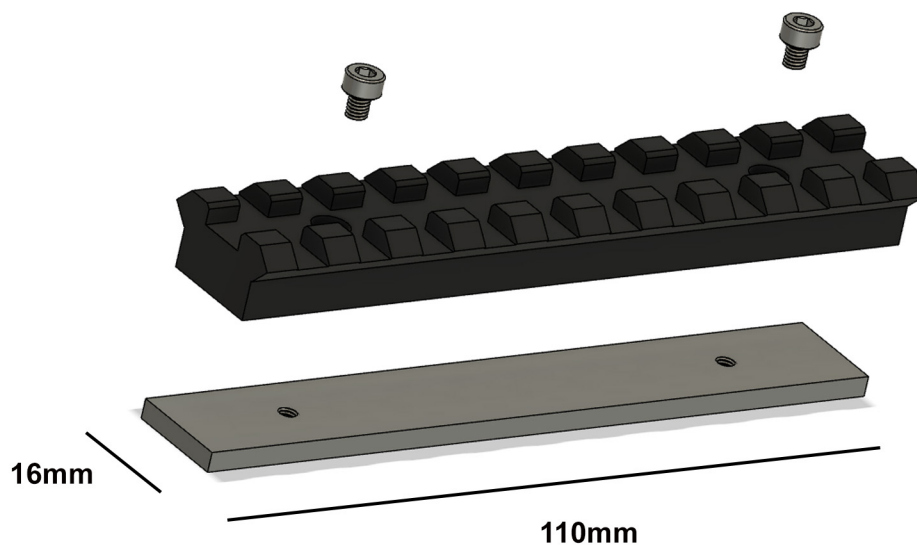
Ejector

M6 bolt, 10mm long. File to shape.

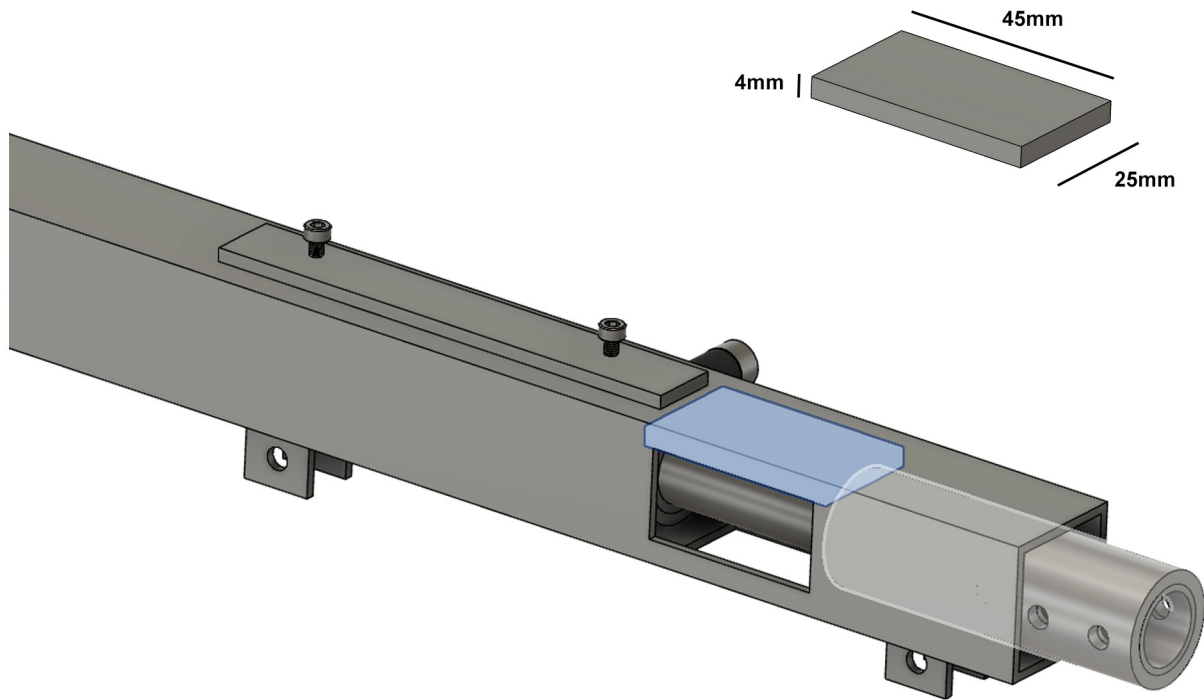


Rail mount plate

4mm thick mild steel plate. Weld to upper receiver.

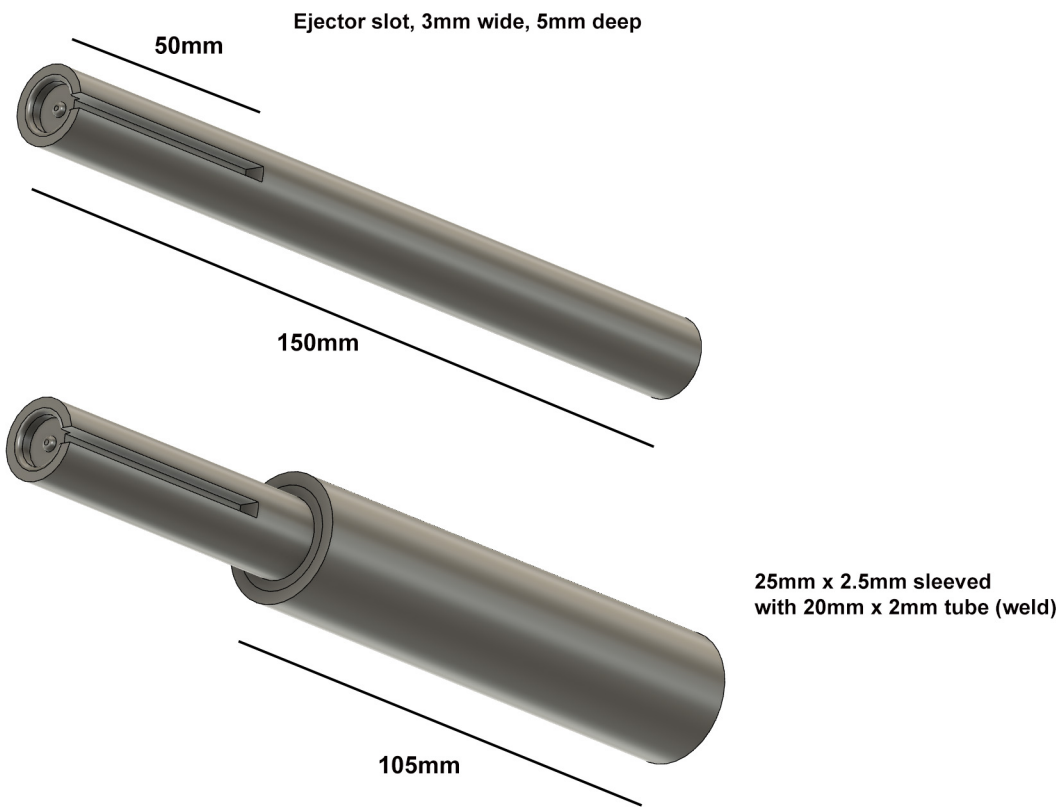
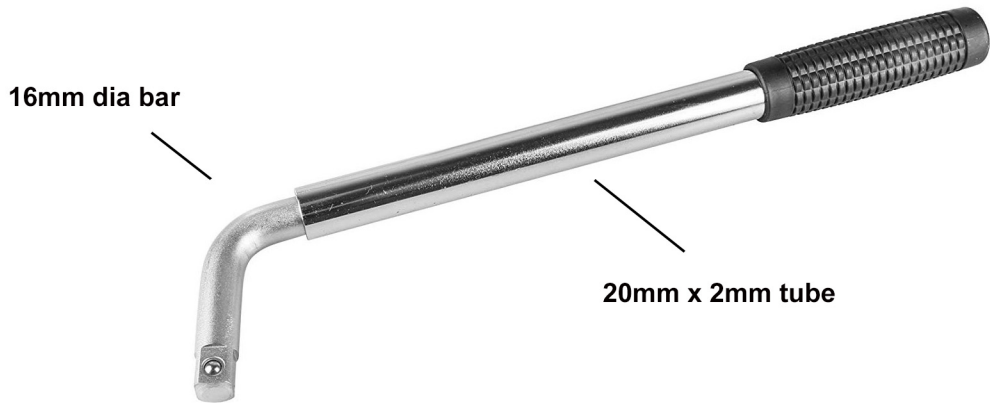


To prevent the face of the bolt causing wear to the front of the chamber, a section of 4mm or 5mm plate should be welded inbetween the barrel collar and the bolt body. Drill two holes through the top of the receiver and plug weld in place. The top front surface of the bolt should be gradually filed back until unloaded cases display full depth penetration of firing pin.

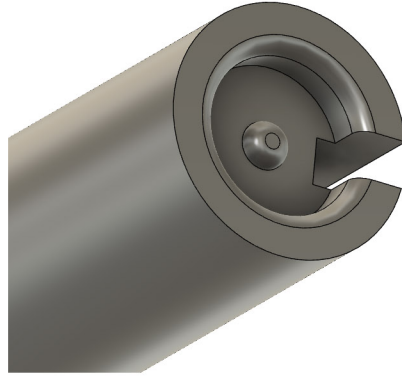


Bolt construction

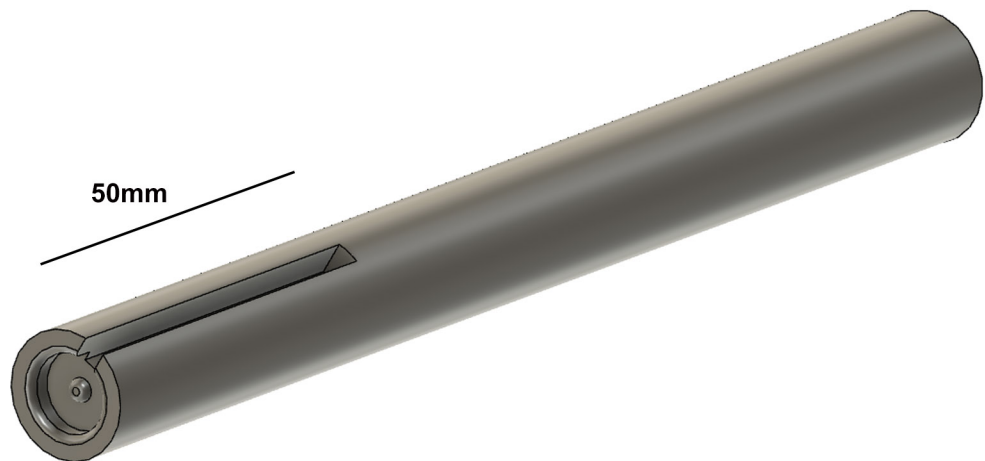
The bolt can be constructed by combining a length of both the bar and tubular sections of a retractable lug wrench with a section of 25mm (1" OD) x 2.5mm steel round or square tube.



To form the face of the bolt mark the center and drill using a 10mm drill bit until a depth of 10mm is achieved. At this point a 3mm drill bit can be used to drill a 10mm deep hole for the firing pin. Next the hole is levelled flat using a 10mm bit having had the tip removed to create an improvised flat cutting tool. Before insertion of the firing pin, the inner rim of the bolt face should be slightly bevelled using a 16mm dia bit or taper cutting tool. The firing pin can be made from an 11mm long section of 3mm dia drill bit shank with the tip having been rounded. The firing pin can be permanently retained in the hole using JB Weld or similar.

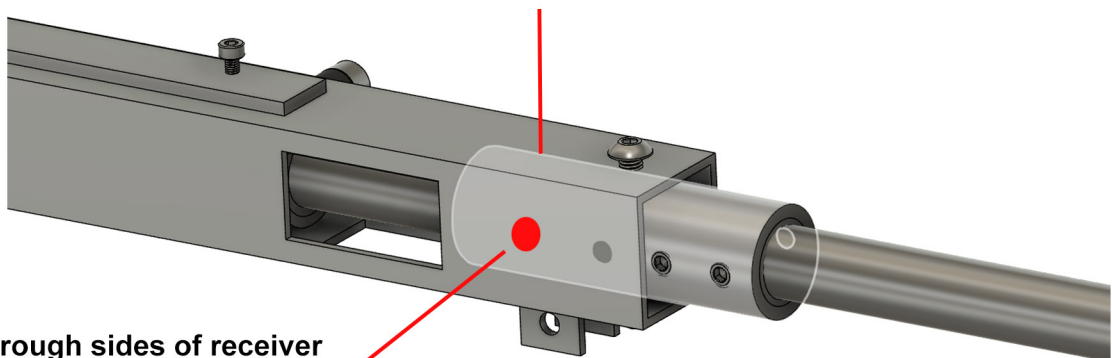
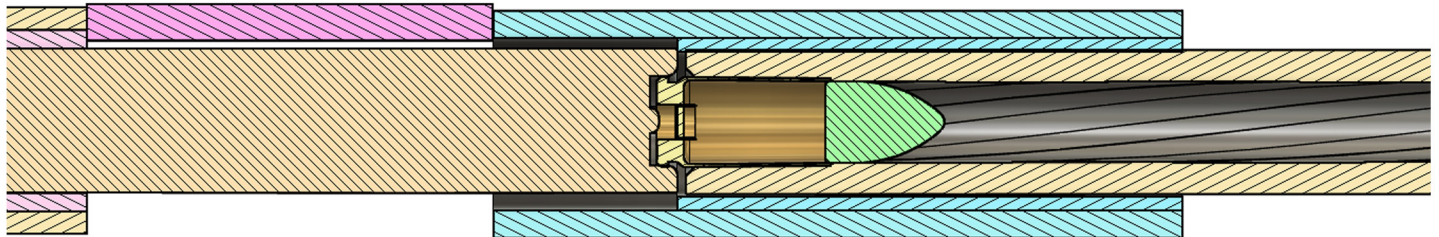
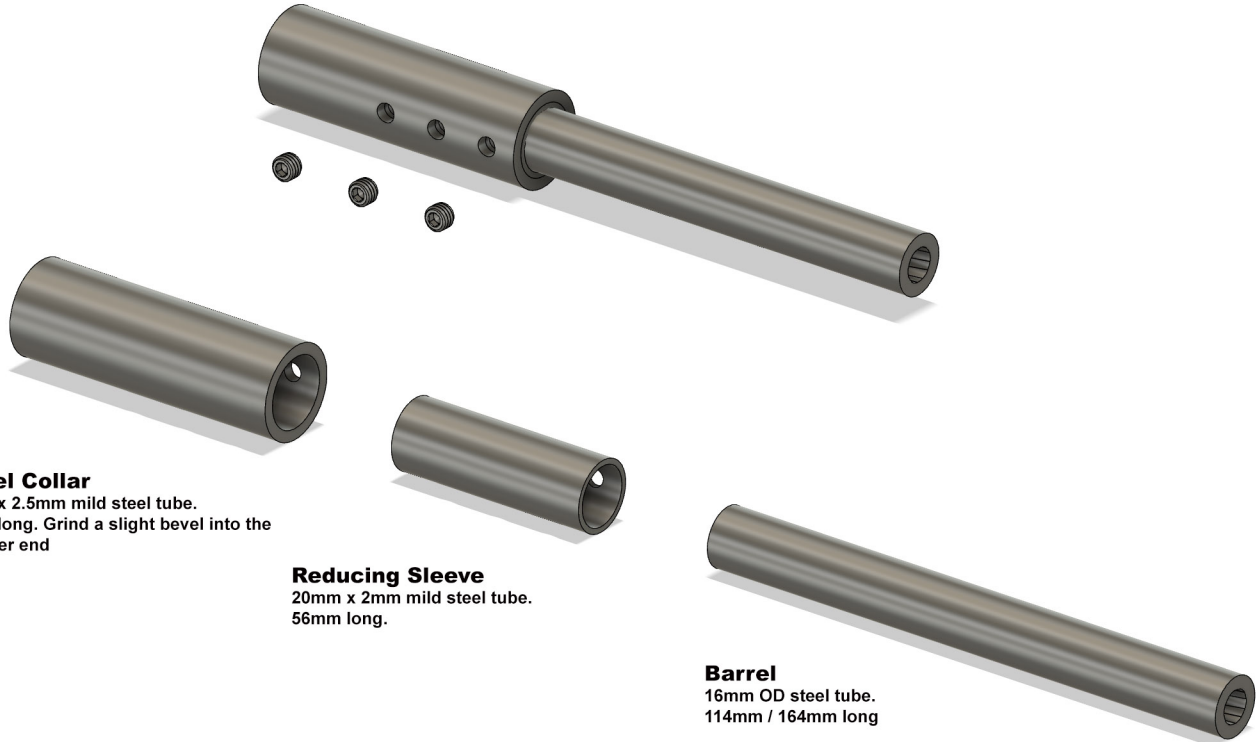


To form the ejector slot, a series of holes can be drilled to depth of 5mm using a 3mm dia drill bit in a straight line marked 50mm in length. An angle grinder fitted with a 2mm thick disc can then be used to slot out a consistent channel able to accommodate free passage of the ejector bolt which should ride deep enough to 'flick' out a cartridge case through the ejection port once fired.



Barrel assembly

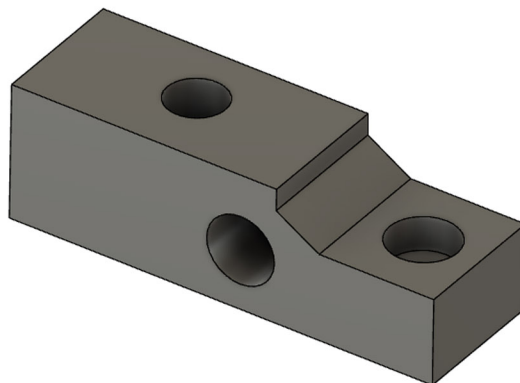
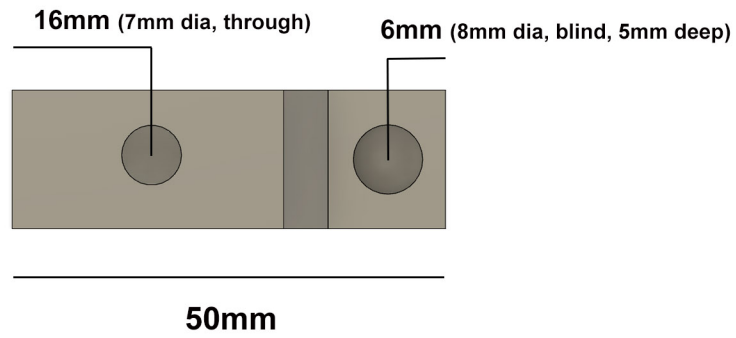
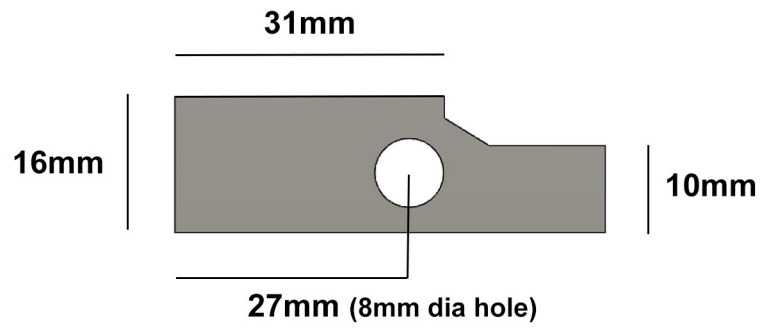
The barrel assembly consists of three parts which are the barrel collar, the reducing sleeve and the barrel itself. The reducing sleeve should be plug welded into the barrel collar, after which three holes should be drilled using a 5mm drill bit and tapped to each except an M6 x 5mm grub screw to create what is functionally a large shaft locking collar. The inch or so of space of which the front of the bolt protrudes into the collar provides an extremely reliable means of feeding and will even chamber and fire primed empty cases.



Drill 4 holes through sides of receiver and plug weld collar in place.

Sear block

Cut from 15mm thick aluminum plate



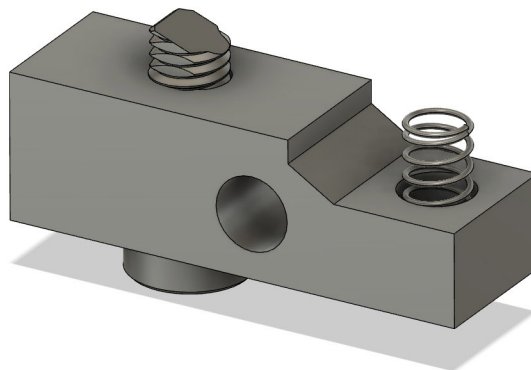
Sear tooth

M8 bolt, 20mm long.

File to a ramp profile. File back flat where exposed.



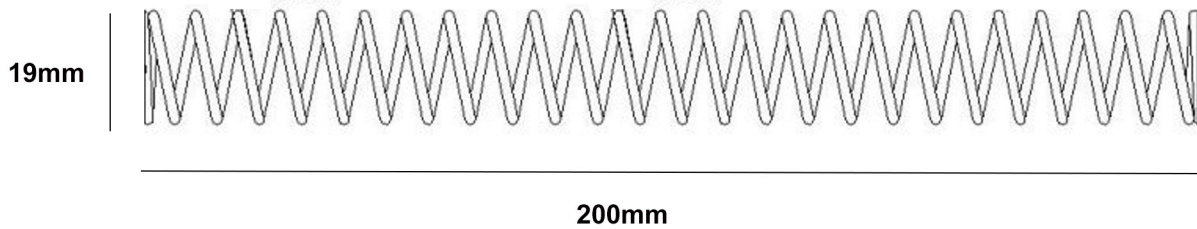
Tap sear bolt hole using an 8mm - 1.25 hand tap.



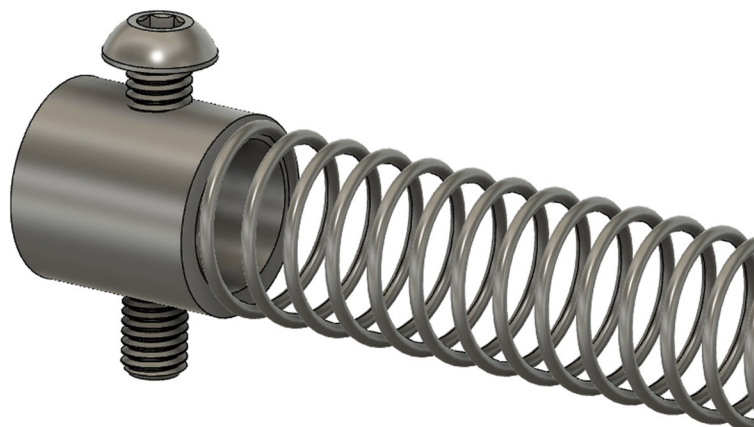
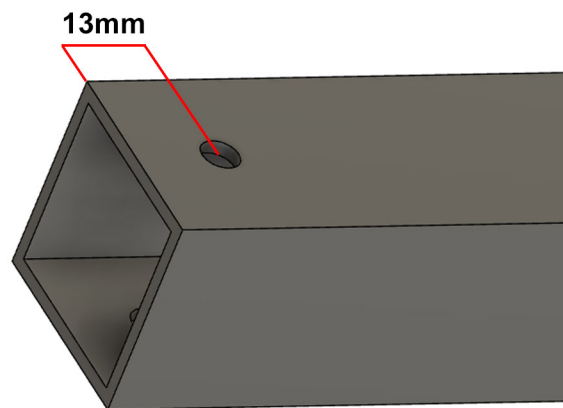
Front hole accepts a 5mm x 13mm dia compression spring.

Recoil spring and plug

Shop purchased compression spring - 8" long, 3/4" (19mm) diameter, 1.6mm wire



To retain the recoil spring in the upper receiver a plug is made from a 25mm long section of 25mm round or square tube. A 6mm dia hole is drilled through both the upper receiver and the plug. A 45mm long M6 bolt can then be inserted which also retains the stock in place.



Improvised Glock Magazine Springs - By i5bkq

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Here is an easy way to make a jig to make Glock magazine springs for around a quarter a spring.

Jig:

- Need 4 feet of 3/4 x 1/8 in flat bar aluminum (available at many hardware stores)
- Need a drill, files, and hacksaw or something to cut the aluminum

To make the jig:

- Cut the aluminum in to 2 sections 13" long, and 2 sections 11" long
- Stack the 4 pieces so the 2 shorter ones are on the outside, and the long ones are in the middle (see image)
- Note that the top 2 inches will only have the 2 middle pieces - this is because the glock springs get narrower at the top (see picture)
- Drill a hole at the bottom and put a small bolt through to hold the 4 pieces together (don't worry about a bolt at the top, the jig will be able to fan out, but that is ok (it will be in a vice when being used later which will keep it from fanning out), and putting a bolt at the top would get in the way when the spring is slid off later)
- Using a file or some other method, round the 4 edges of the jig (see picture, a little more rounding than I did would probably be better)
- LIGHTLY file line indentations where the spring should wrap around the jig (look at a factory spring to see the spacing/angles). I only put the line indentations on the front and back of the jig, not on the sides of the jig.
- Drill starting holes for different size springs (see picture)

To make spring:

- Wear safety glasses at all times when working with the wire!
- I used 0.051" music wire
- Cut off a section of wire (around 2 or 3 feet depending on spring length)
- put bottom of jig in a vice
- put wire through starting hole of jig
- wrap the wire around jig using filed lines as a guide
- when you get to the top wrap it around several extra times and crimp with pliers (I don't use that hole at the top you see in the picture).
- put the aluminum jig/wire in the oven at around 475 degrees (F) for a couple hours, then turn off oven and allow to cool in the oven (which takes another couple hours)
- Cut the wire at the bottom where it went in to the starting hole.
- Cut the wire at the top where it should end
- slowly slide the spring up and off the jig (this takes a minute, if you can't do it you filed the line indentations too deep)
- once off the jig, the spring will be a little twisted and some of the angles will be off.
- use pliers and go through and fix each angle so it is right
- make a couple of passes at this (getting it closer each time) ”



Spring winding jig and completed magazine spring.