RIVAL CALIBURN ASSEMBLY

08/02/18

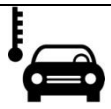
The RIVAL Caliburn is a Mag-Fed Pump-Action Homemade Nerf Blaster design released as a Public Domain license file set by Captain Slug (http://www.captainslug.com).

You are welcome to and encouraged to modify the files in any way you want. The majority of the parts can be printed with infill as low as 20% in PLA, but I would recommend printing in layers of 300 Micron or smaller.

The Following parts however ARE REQUIRED to be printed at 50% infill with 2mm walls/perimeters: Sear, Spreader (if used), and RDartJam

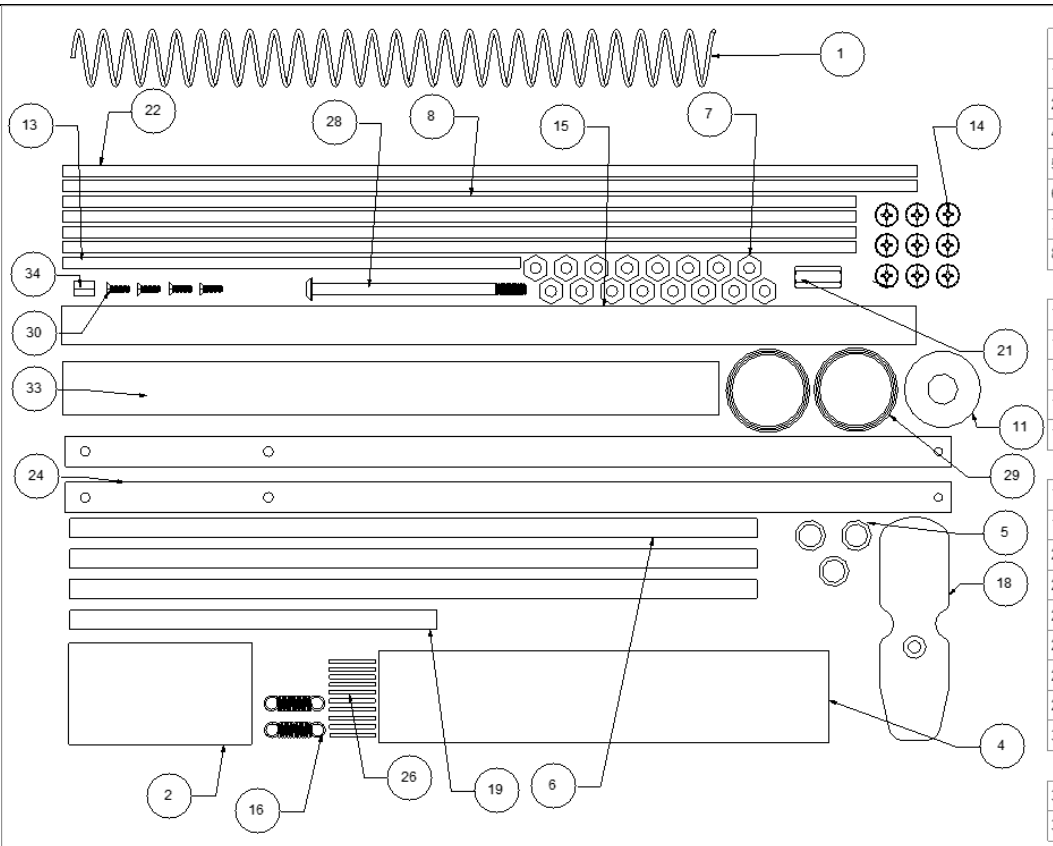
Hardware kits and Full Blasters are available for sale as made-to-order items. I'm producing these myself in what remains of my free time.

https://www.etsy.com/shop/CaptainSlug



DO NOT STORE IN TEMPERATURES ABOVE 100F. Storing the blaster inside of a car in warmer months will cause the printed parts to distort or warp beyond their intended shape. If you have to store one in a vehicle, store it in the trunk.

DO NOT use this blaster for indoor wars or wars involving very short distances. The muzzle velocities this design can reach are between 150fps and 210fps depending upon the darts used and the spring installed. If indoor use is intended, obtain the lower fps springs that are currently available for this design (K31 and 788) and use them.



Item #	Quantity	Part Name
1	1	Spring
2	1	StockSpacerAlt2
4	1	Plunger Tube
5	4	012 O-Ring
6	3	11.25" Spacer
7	16	Locking Hex Nuts
8	4	13" Threaded Rod
11	1	ShockPad
13	1	8" Threaded Rod
14	9	10-32 Screws
15	1	Barrel
16	2	Extension Springs
18	1	ButtplateFoam
19	1	6" Spacer
21	1	Coupling Nut
22	2	14" Threaded Rod
24	2	BoltArm
26	10	Pin Short
28	1	Buttplate Screw
29	2	Dash 123 O-Ring
30	12	4-40 Short Screw
33	1	Barrel Shroud
34	1	4-40 Standoff

CALIBURN HARDWARE KIT

02/27/18

Printed/Cast Parts NOT included.

Tools needed: **#1 Philips Screwdriver, Slotted Screwdriver, 3/8" Combination Wrench, Small Needle File,**

For most of the above hardware list the quantities are the MINIMUM required for assembly. Easily-lost items will have several spare and I typically include extras of the majority of the items. The quantity for Item #16 for this version of the Caliburn will need to be THREE, but having FOUR might be preferable.

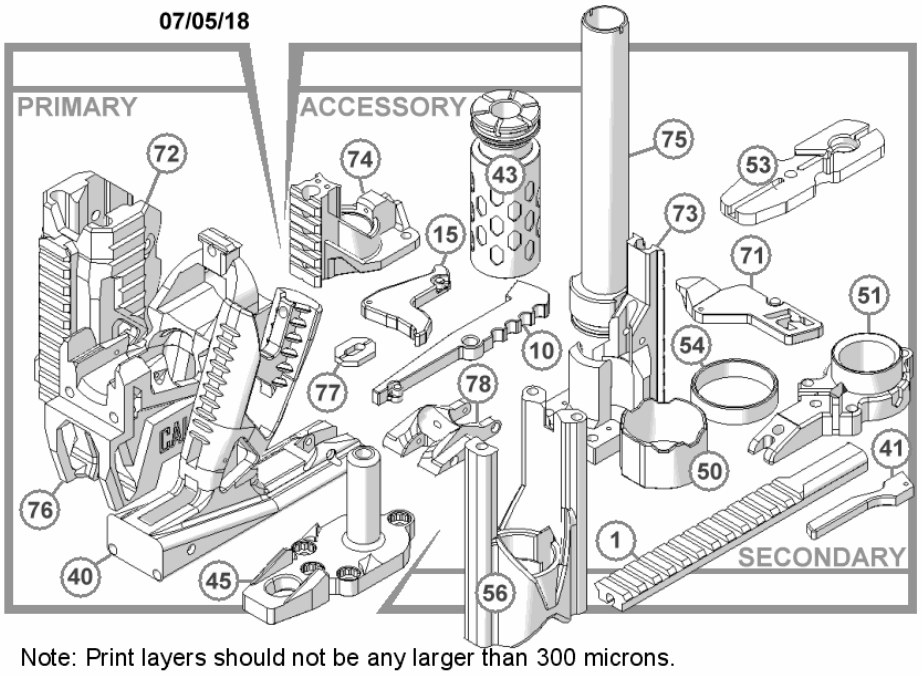
To assemble this blaster you will need a Slotted Screwdriver, Small Philips Screwdriver, 3/8 Combination Wrench, Needle-Nose Pliers (or hemostats), Round Needle File, and in some cases super glue.

The Plunger Tube in the Hardware Kit does come pre-lubricated. But it's also a good idea to have extra lubricant on-hand for the Plunger Tube and I would recommend only using a clear Silicone Grease such as Oatey's brand #30219. Any clear 90% silicone grease will work fine so long as it does not include any additives. NEVER USE SILICONE LUBRICANT FROM AN AEROSOL CAN. The propellants used in those are harmful to plastic parts.

ALSO AVOID DRY-FIRING THIS BLASTER EXCESSIVELY. Firing without ammunition in the barrel will add unneeded wear on this blaster, especially if the higher load rating springs are installed. Also do not pull the trigger with the foregrip in the rearward position (with the breech open). The breech being slammed closed by the main spring is very likely to damage both the breech itself and the magwell.

RIVAL CALIBURN PRINTED PART SET

07/05/18



Item #	Quantity	Part Name	Infill %
1	1	rail_top	20
10	1	Sear	100
15	1	TriggerAlt	20
71	1	RMagRelease	20
72	1	RForegrip	20
73	1	RDartJam	20
40	1	Grip5	20
41	1	Tguard5	20
74	1	RMuzzle	20
43	1	PlungerE	20
75	1	Ram2R	20
45	1	BackButtP	20
76	1	RMagwell_m	20
77	1	RHopT	20
78	1	RTooth	20
50	1	RyanTube	20
51	1	FrontButt7	20
53	1	ButtplateFlat	20
54	1	Ring	20
56	1	Stock_Kiri	20

OPTIONS

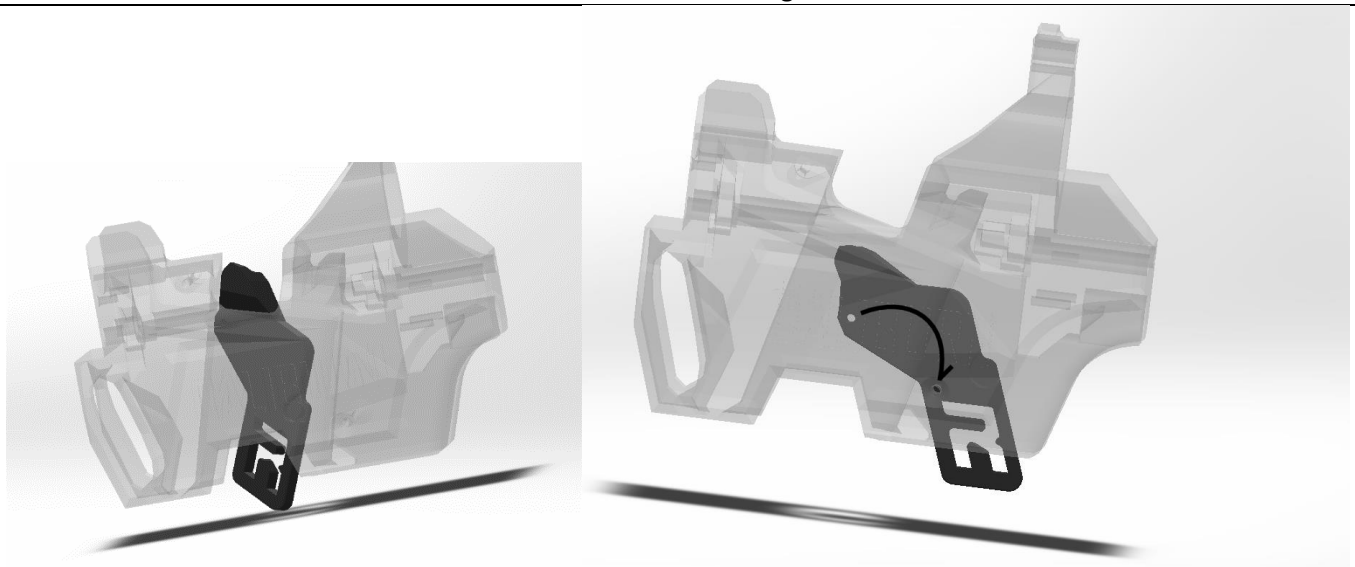
		Railgasm	
		AFG	AyyFG
		Ayy LMAO	
		Grip Insert	
		Stock Upgrade	
		Iron Sights	

Note: Print layers should not be any larger than 300 microns.
Parts were designed for PLA filament, but can be printed using ABS without issue. No support material is needed.
Most of the parts should print to tolerance on their hole diameters, but results may vary so expect to have to touch up some of them with a round needle file

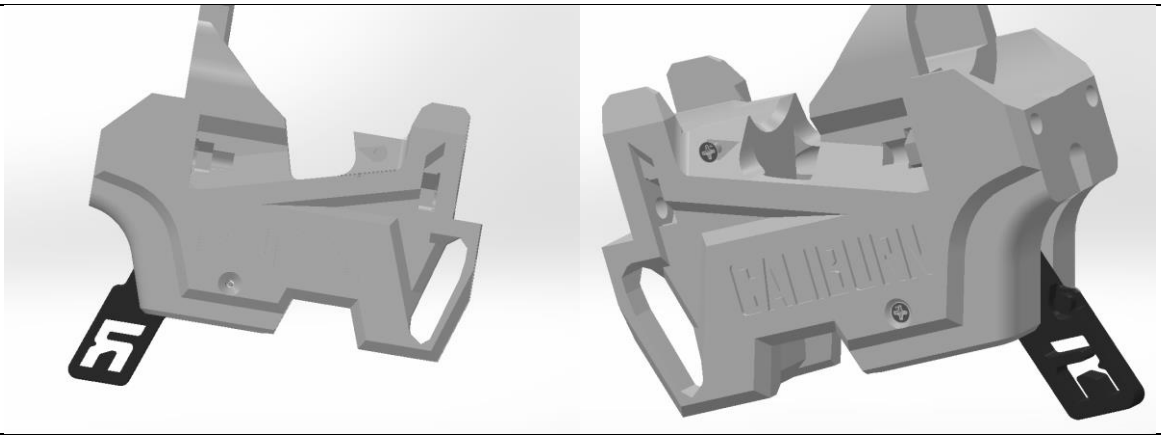
- Captain Slug

Assembly Instructions:
http://www.captainslug.com/nerf/RCaliburnAssembly.pdf

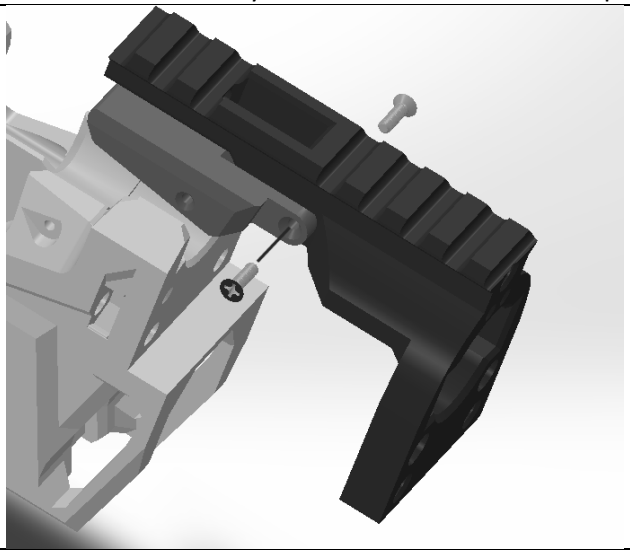
Above is a list of every printed part needed to assemble this blaster. The majority of the through holes should print to the required tolerance, but you will likely have one or two that may require minimal filing. Also make sure to trim off any burrs or oversized edges.



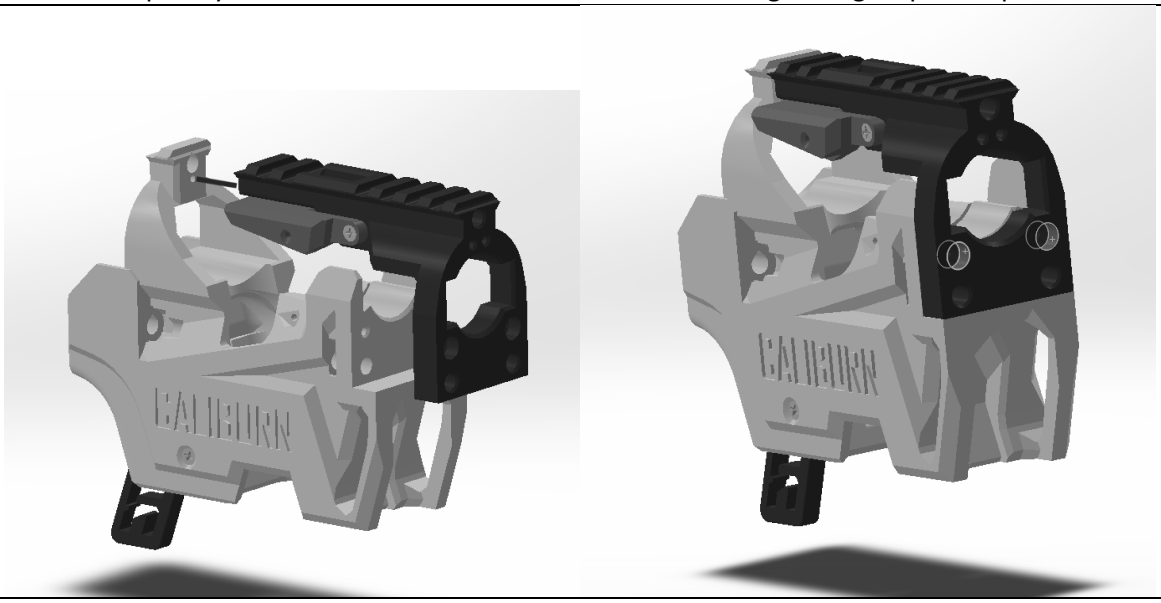
Slide the MagRelease up into the inside of the Magwell. Rotate it and then back it down into the slot in the back of the Magwell until the small hole in the MagRelease lines up with the small hole in the sides of the Magwell.



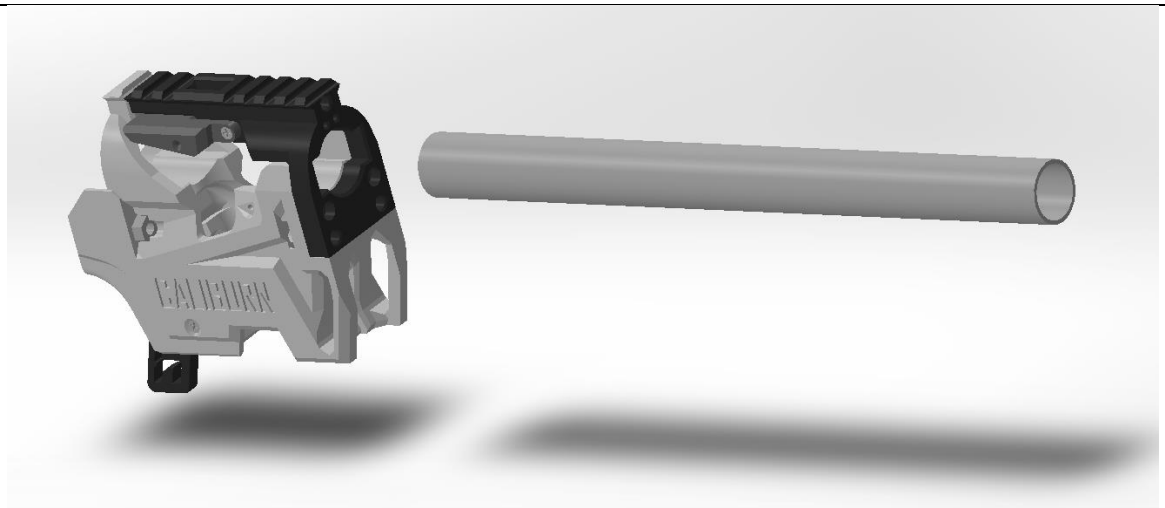
While holding the two up to a light, slide a short pin in through both. Drive a 4-40 screw into the small holes of the Magwell to close the hole off. Repeat with the opposite side of the Magwell while making sure that the short pin does not fall out. Drive another 4-40 screw halfway into the small hole further up the side of the Magwell.



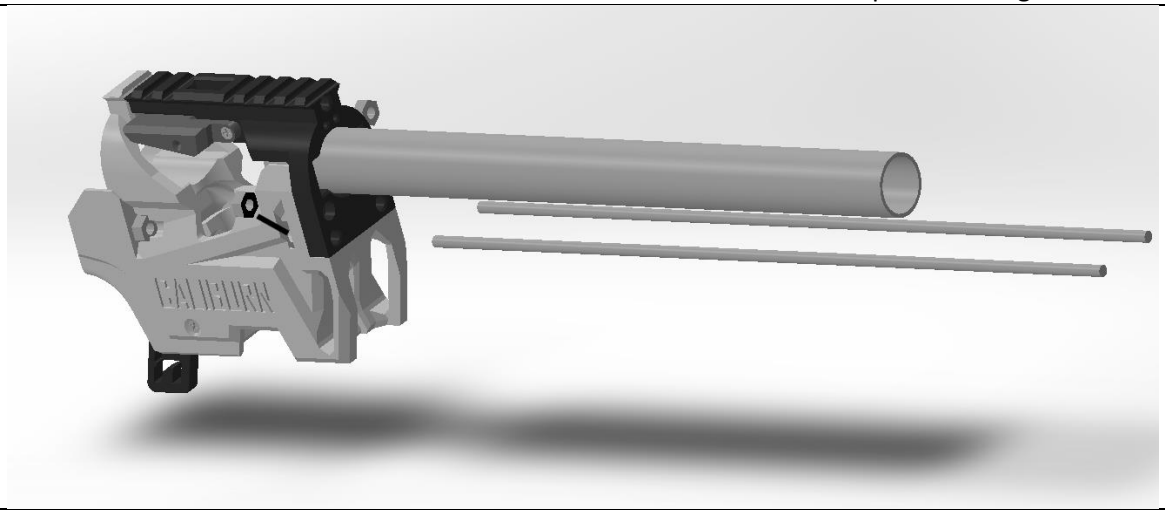
Attach the Tooth to the Dartjam by driving two 4-40 screws directly into the holes in the Tooth print. Make sure not to completely bottom out the screws in these holes as doing so might split the print.



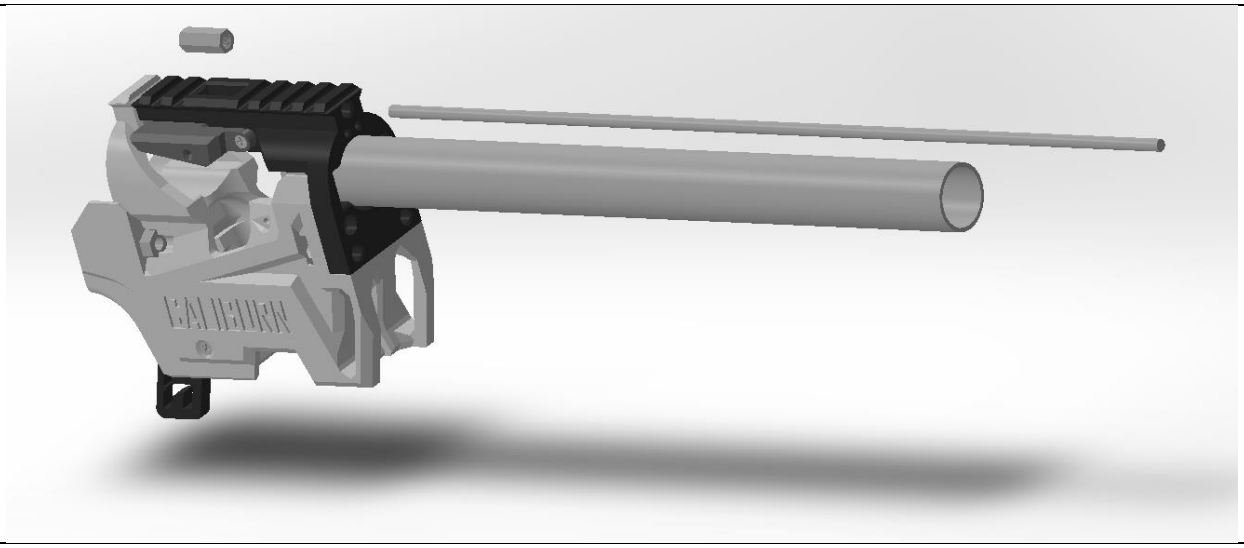
Use a short pin to align the back of the Dartjam with the small hole at the top of the Magwell and slide the two together. Use two 4-40 screws to secure the front of the DartJam to the Magwell where indicated.



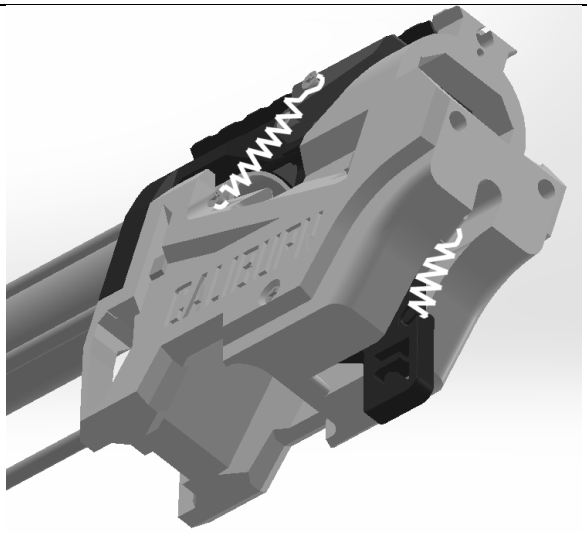
Check the fit of the Barrel inside the barrel hole of the Dartjam. If it does not fit you will need to touch up the inside with a round file. Install the barrel in the hole so that the back of it is flush with the lip on the Magwell and Dartjam.



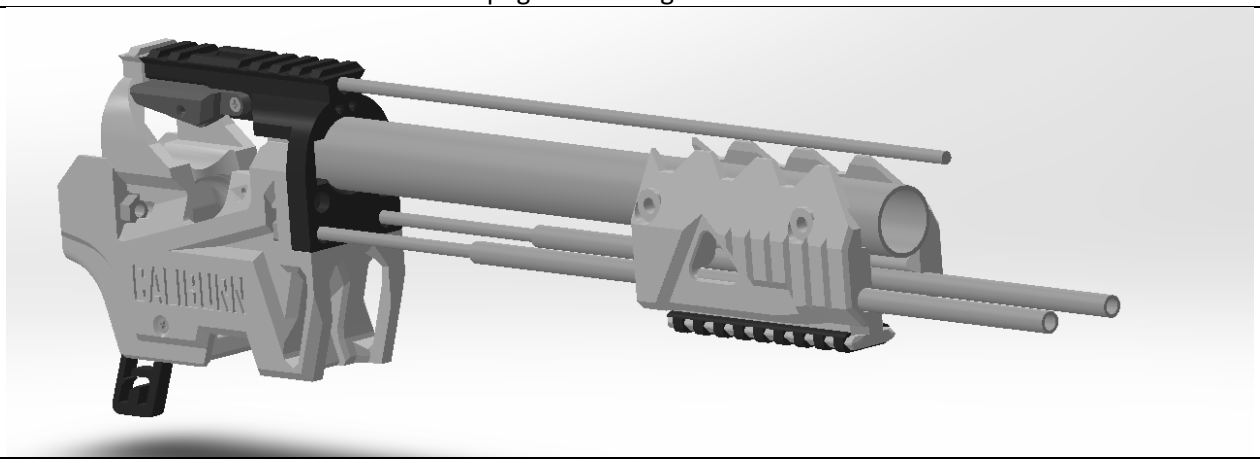
Slide a hex nut into the two slots where indicated . You may need to use a flat screwdriver to push them down to the bottom of the slots. Screw two 13-inch length threaded rods into those hex nuts from the front of the Magwell. If extra leverage is needed add an acorn nut to the opposite ends of the threaded rods so that you can use a wrench to tighten them into the hex nuts.



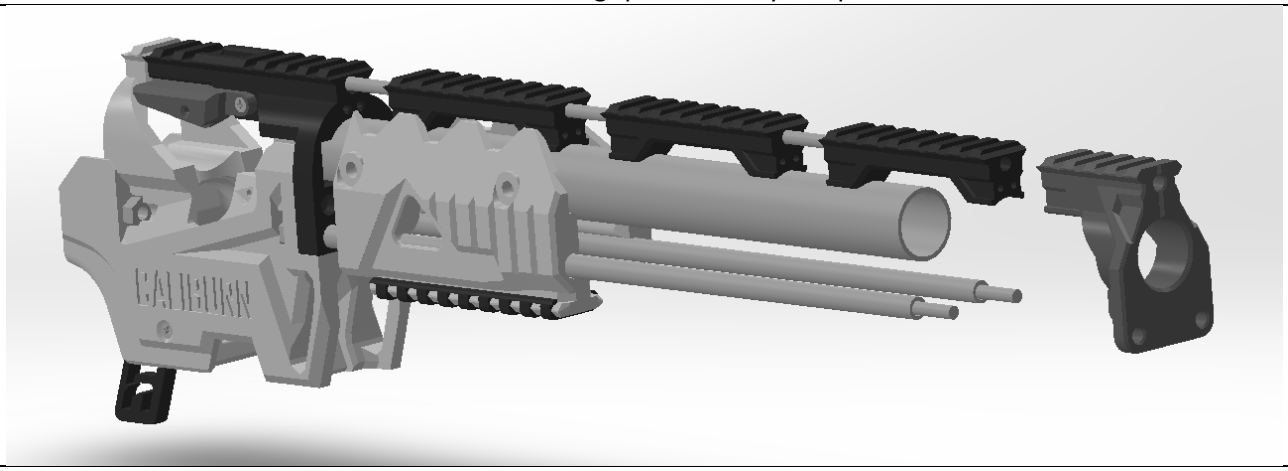
Add a coupling nut to the slot in the top of the DartJam piec. Screw a 14-inch length threaded rod into the DartJam from the top hole in the DartJam.



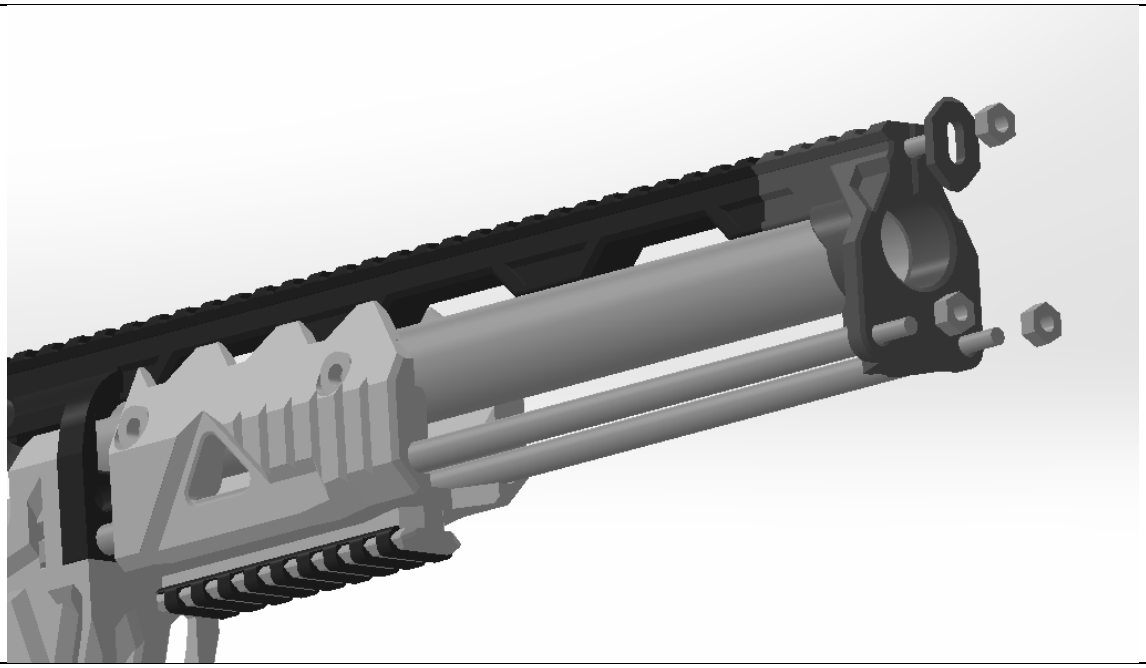
Drive a 4-40 screw halfway into the small hole in the side of the Tooth print. Hook one end of an extension spring to it, then the other end to the exposed screw in the side of the Magwell.
Hook one end of an extension spring to the printed hook hiding in the back of the Magwell, then the other end to the peg on the MagRelease.



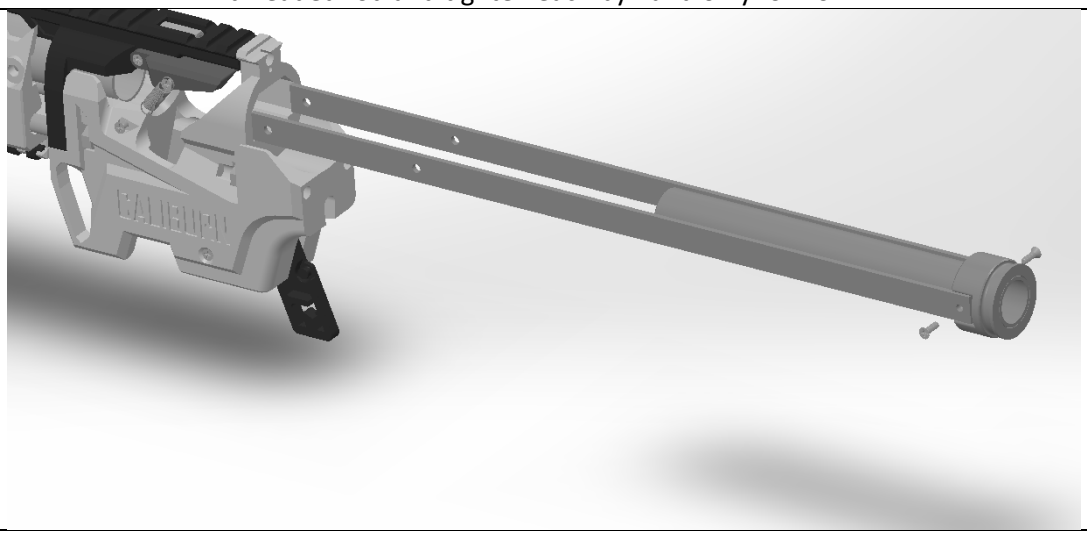
Slide two Nylon spacers onto the lower pair of threaded rods.
Slide the Base Foregrip over the nylon spacers.



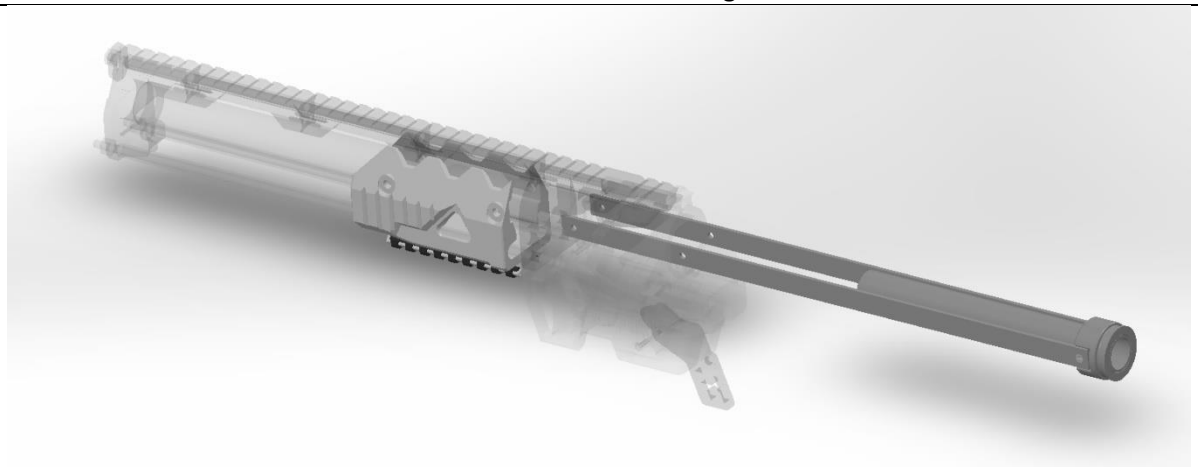
Slide the RailR segments onto the upper threaded rod, then slide the Muzzle onto the upper threaded rod, barrel, and lower threaded rods. You can optionally add one or two short pins between the DartJam, segments, and muzzle piece.



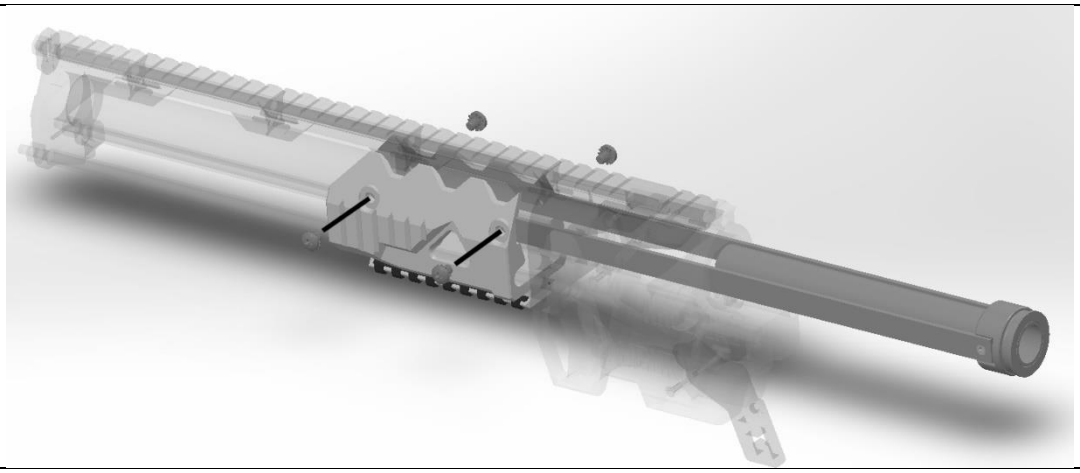
Add the RhopT to the upper threaded rod so that the knife-edge side is facing the Muzzle. Add a hex nut to each threaded rod and tighten each by hand only for now.



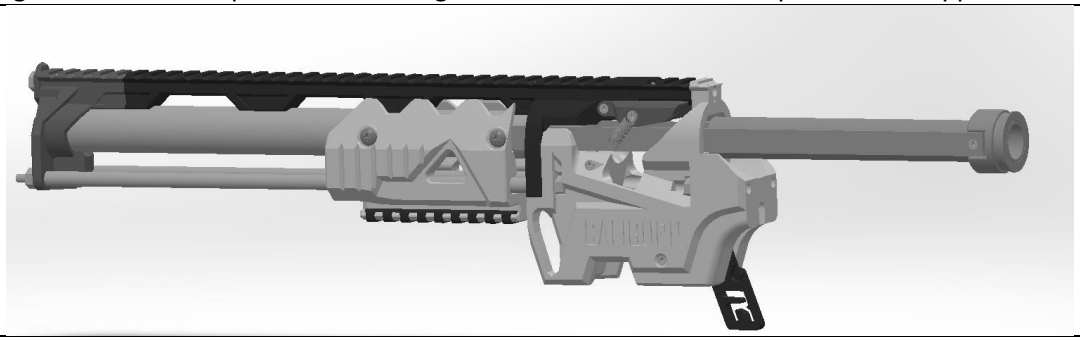
Attach a bolt arm to each slot in the Ramrod using a 4-40 screw for each side.



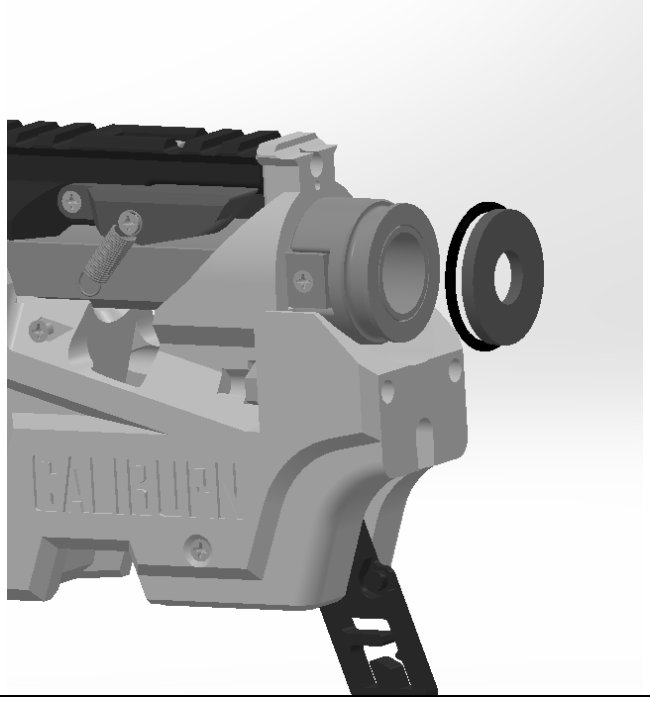
Slide the Bolt Assembly forward through the slots in the Magwell. You will need to pivot the Tooth part out of the way in order to do so.



Slide the Boltarms and Foregrip together until the threaded holes line up with the holes in the Foregrip. Secure them together at the rear pair of holes using two short 10-32 screws. Repeat for the opposite side.

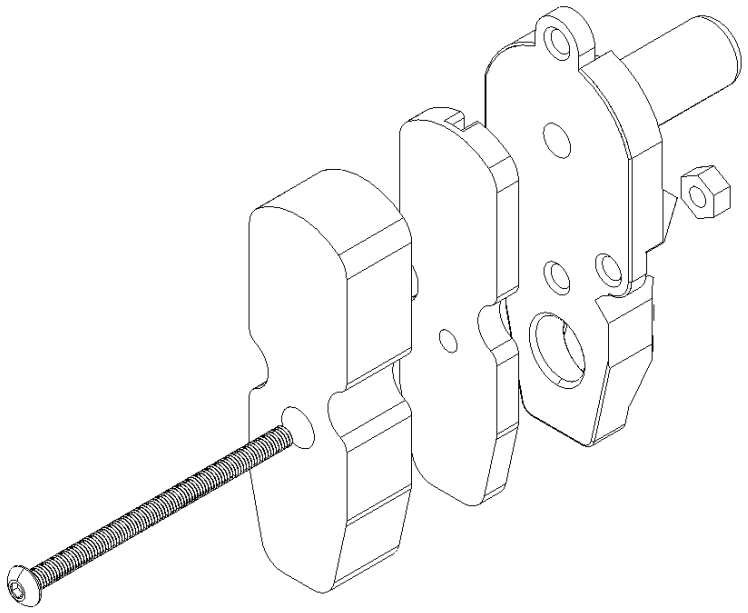


Slide the Foregrip forward and make sure the the Ramrod is entering the Barrel during this action. If it isn't doing so smoothly, double-check its alignment. Tighten the hex nuts at the front of the assembly then re-check that the ramrod is still entering the barrel smoothly. You will need to adjust the hex nuts again if the Ramrod isn't cycling smoothly.

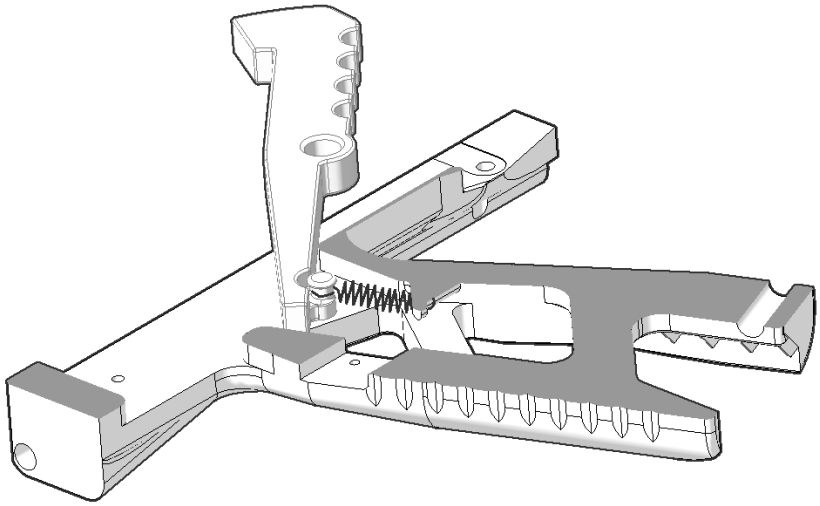


Add a 123 o-ring to the rear undercut of the Ramrod. Then remove the backing paper from the Shockpad and adhere it to the back of the Ramrod.

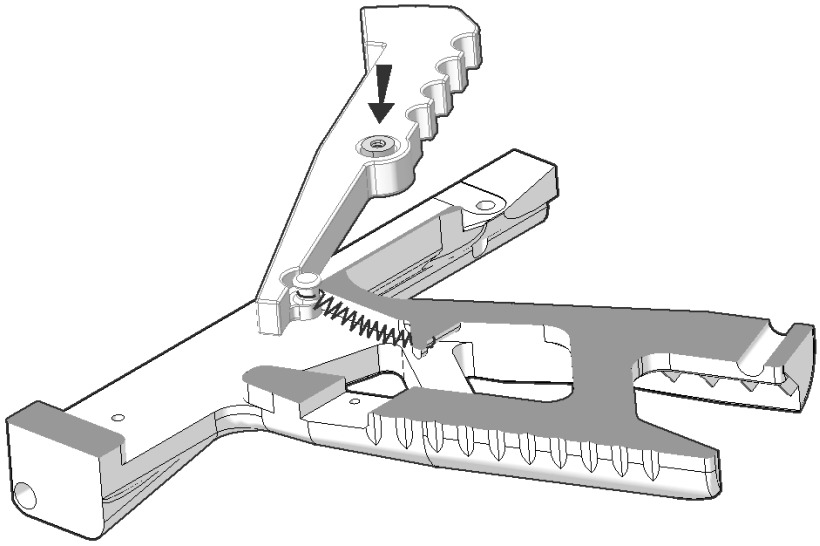
The assembly of the front half of the blaster is now complete.



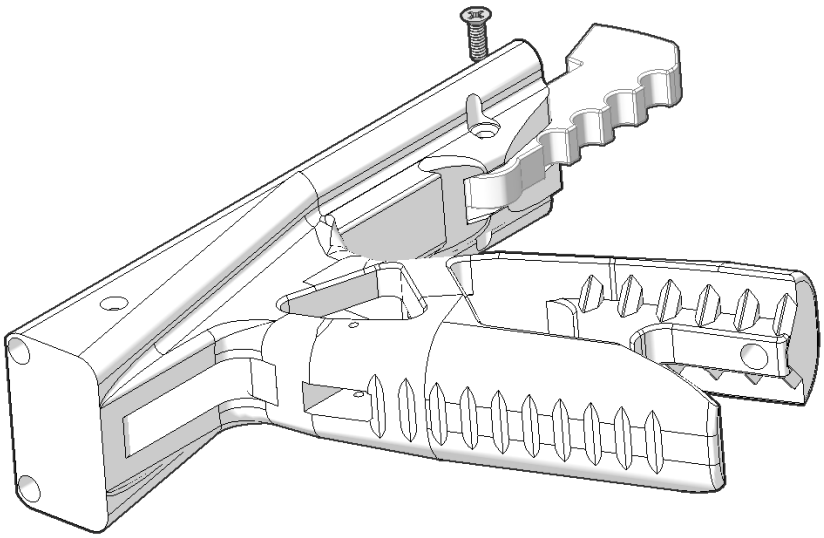
Adhere the Buttplate Foam to the Buttplate.Attach the Buttplate to "Back Butt" using the Long Screw and a Hex Nut. Set aside for later.



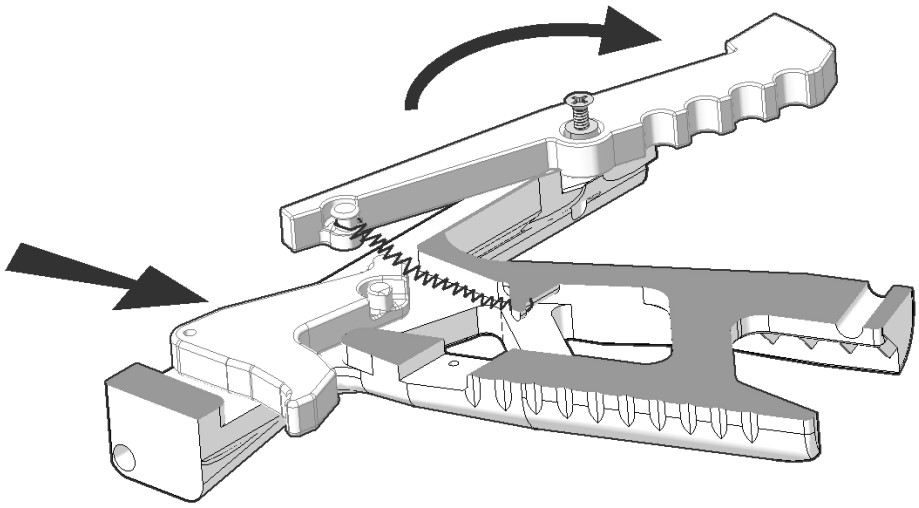
Add an extension spring to the peg on SEAR and use SEAR to fish the extension spring into the grip. Push the loop of the extension spring onto the hook inside of the grip.



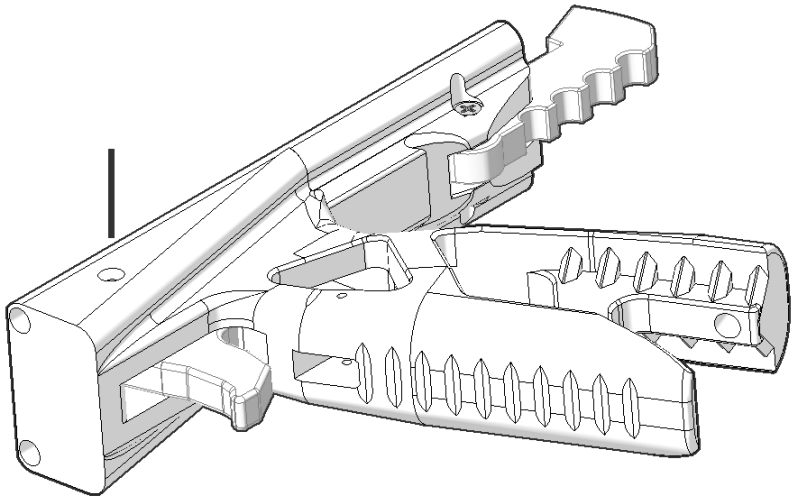
Insert the 4-40 standoff into the center hole of the SEAR and pivot it down towards the back of the grip.



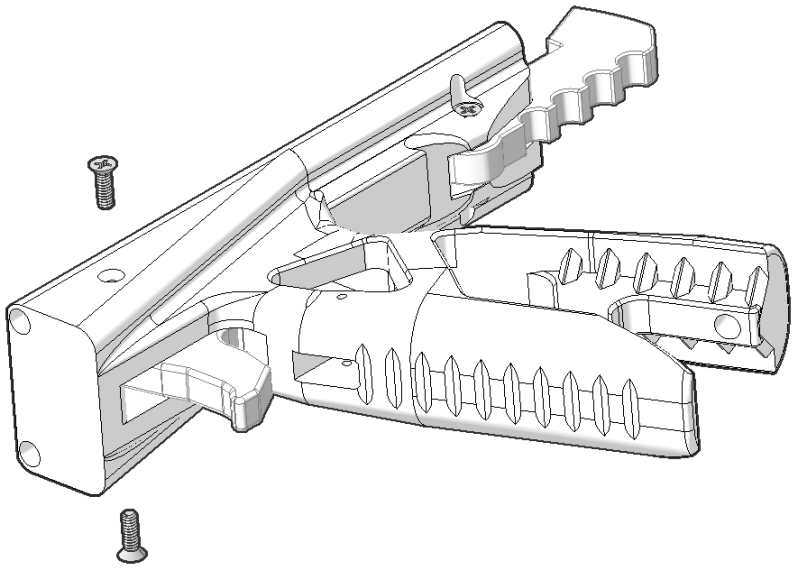
Use two short 4-40 screws to secure the standoff to the back of the grip.



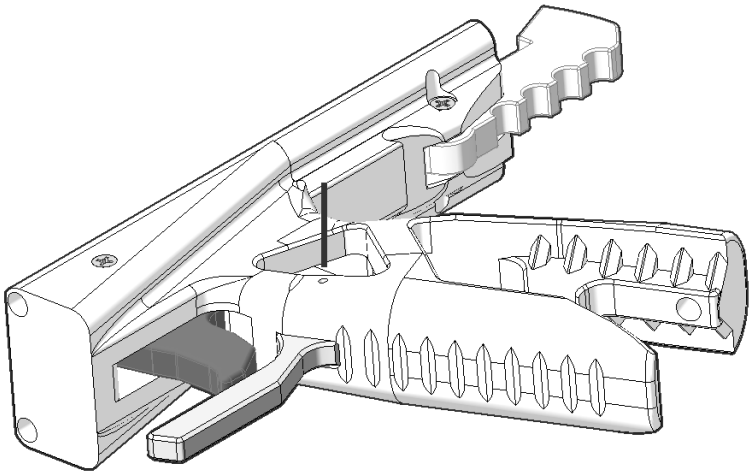
Fish the TRIGGER in through the front of the grip. You may need to pivot the SEAR back in order to get the TRIGGER in place. Once in place, the bump on the back of TRIGGER needs to sit underneath the front lip of the SEAR.



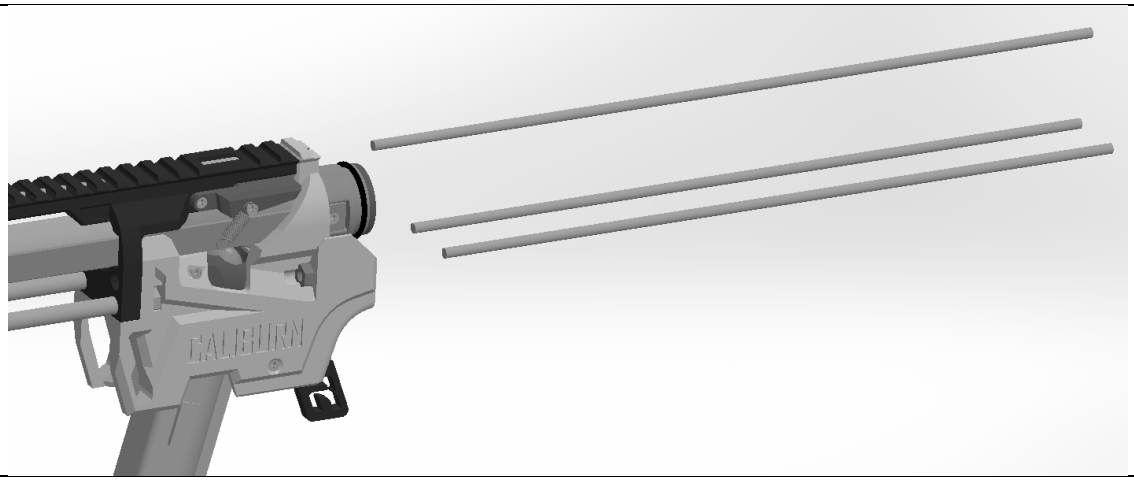
Slide a Short Pin in through the side of the grip and through the hole in the TRIGGER. You may need to use a 1/16" drill bit or another Short Pin and a hammer to lightly tap it through the trigger.



You can use a 4-40 short screw on each side of the grip to retain the Short Pin for the trigger.



Slide the Tguard piece into the slot in the front of the Grip.
Insert another short pin into the grip and through the TGUARD piece to secure it. Tap it into place lightly with a hammer if needed. If the fit was too loose, apply from super glue and set it aside to dry.

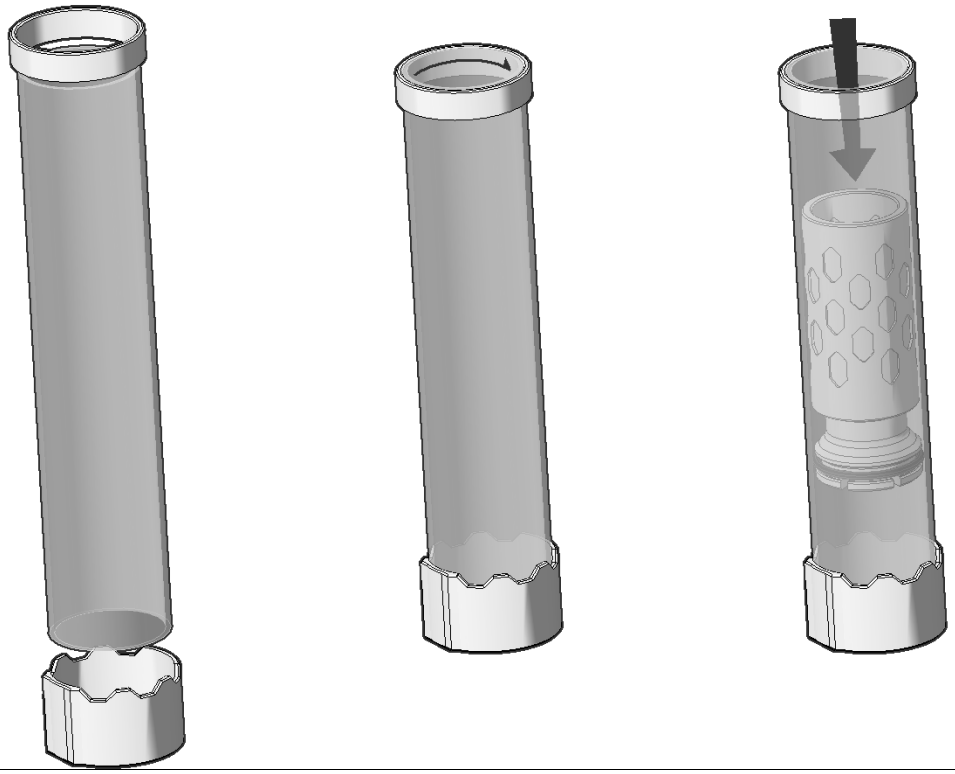


Add a hex nut to each slot in the rear portion of the magwell.

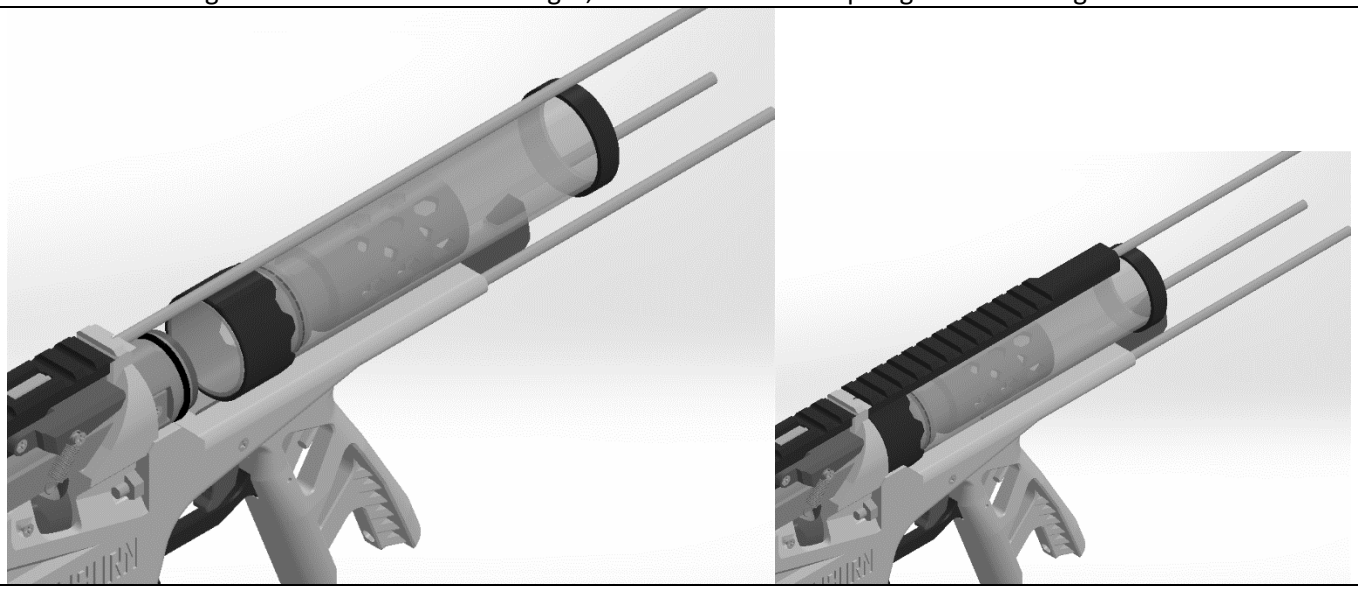
Screw a 14-inch long threaded rod into the Coupling Nut through the upper hole in the Magwell (or Spreader). If it does not want to go through the upper, touch up the hole with a small needle file.

Screw a 13-inch threaded rod into each of the hex nuts you installed in the slots in the Spreader. Screw them in until the bottom out against the flat of the Magwell and then wedge the Hex nut against the opposing face of the slot.

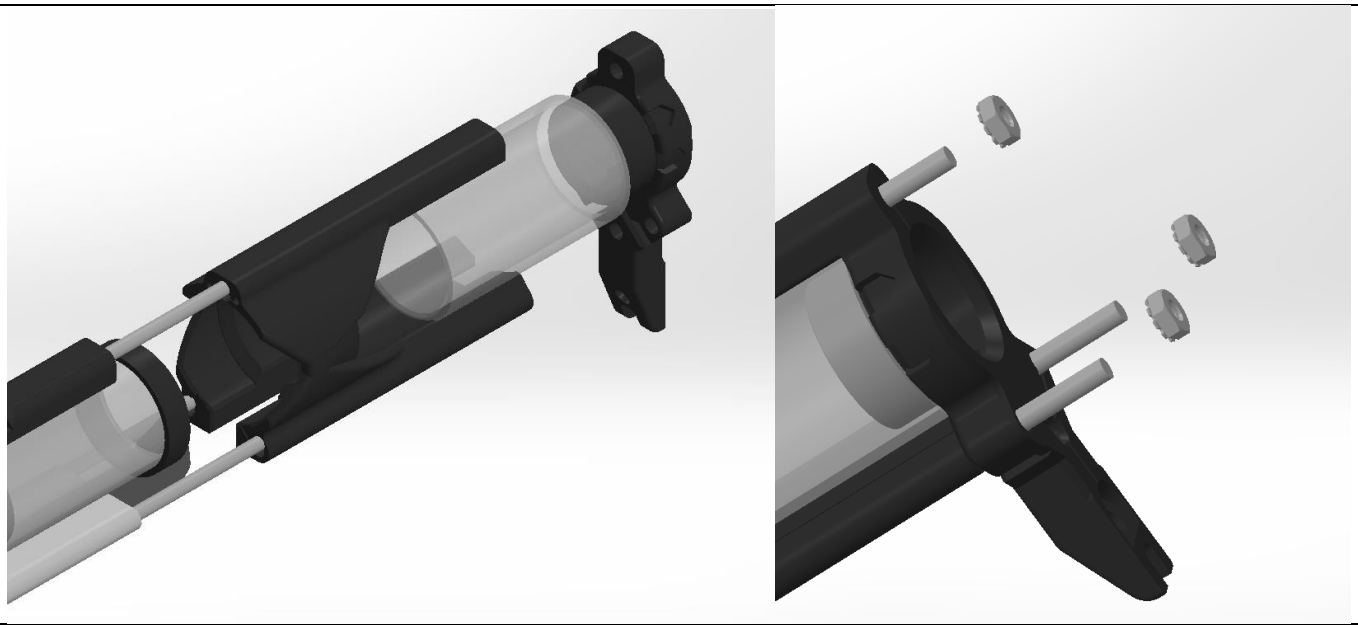
Slide the completed Grip assembly onto the 13" Threaded Rods.



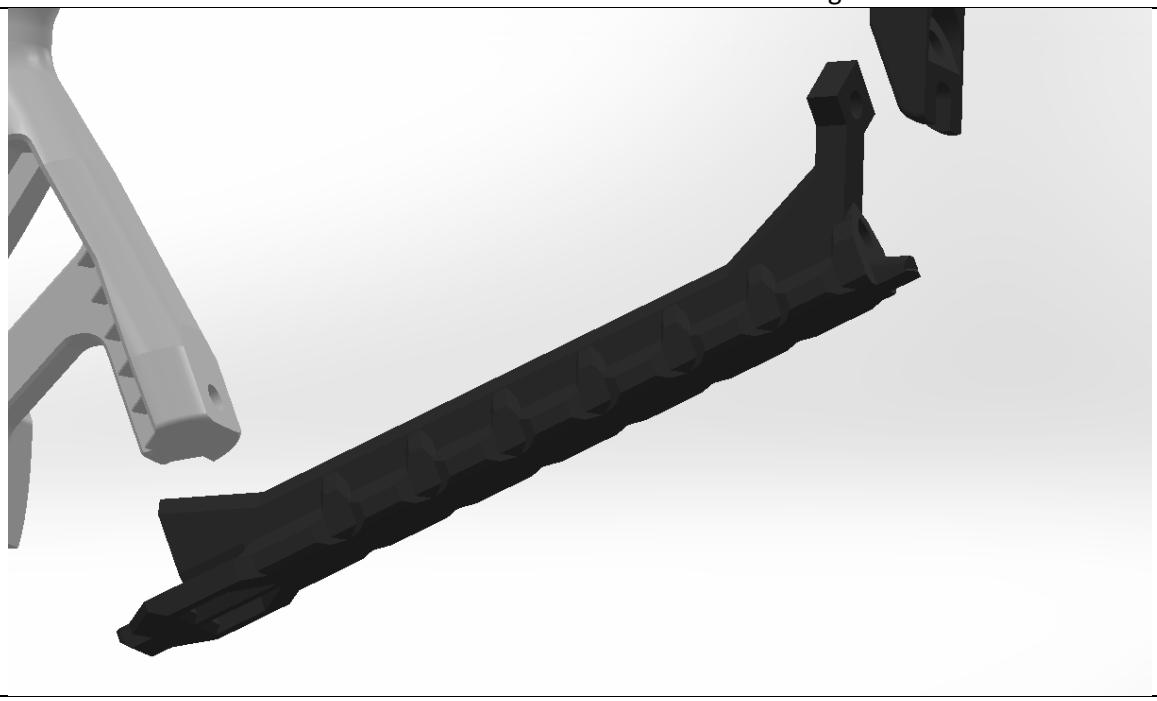
Installed a Ryan Tube onto one end of the Plunger Tube. Use a hammer to push it on until it is flush with the end of the tube. Install the Ring on the opposite end until it too is flush.
If they however both fit loosely secure them with super glue.
If not already present, apply clear silicone grease to the inside of the Plunger tube at the end with the Ring.
Add a 123 o-ring to the undercut in the Plunger, then slide it into the plunger tube through the lubricated end.



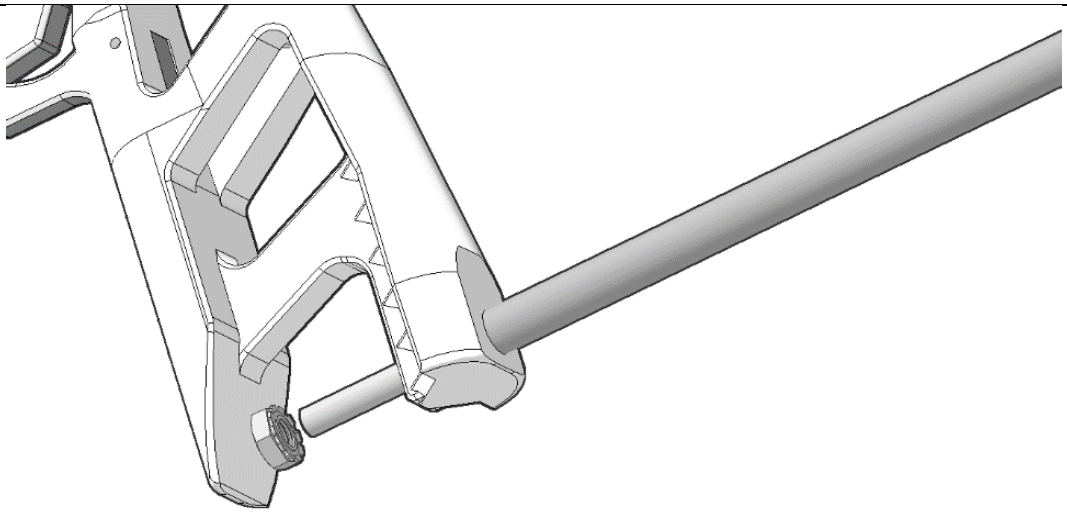
Hold down the trigger down and work the front end of the Plunger Tube assembly onto the back of the Ramrod O-Ring.
Align the flat side on the Ryan Tube with the 14-inch long threaded rod.
Slide the Rail_Top part onto the 14-inch long threaded rod and wedge it against the flat side of the Ryan Tube.



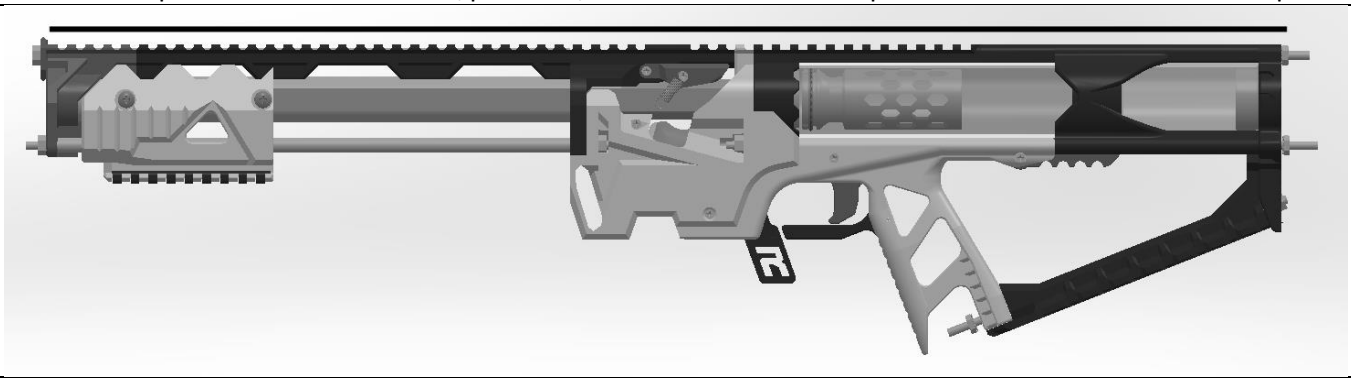
Slide the Stock_Alt part onto all of the threaded rods.
Then slide the rest of the components into place as shown: “Stock_Kiri, Stock Spacer, and FrontButt”
Add a Hex nut to each of the threaded rod ends and tighten them.



Wedge a nylon spacer or the printed stock spacer between the heel of the grip and the end of “FrontButt”. You may need to file the sides of the little nub at the back of the printed stock spacer in order to get it to fit into the slot of the FrontButt piece.
Add a Hex nut to the end of the 8-inch long threaded rod, then feed it in through the lowest hole of FrontButt, through the Stock Spacer, and through the hole in the heel of the Grip.



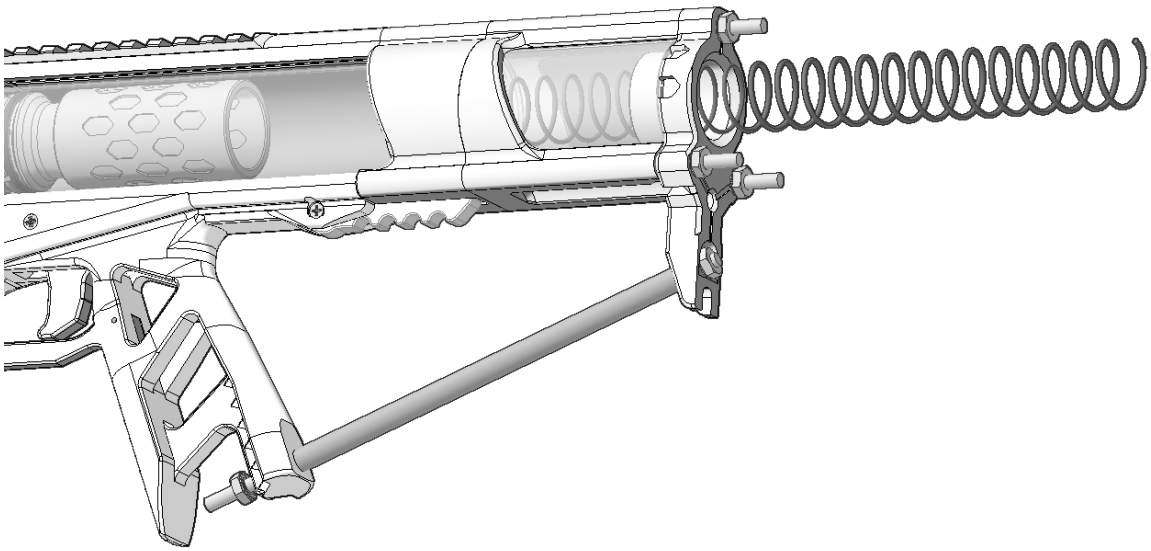
If the Grip Insert was not included/purchase, add a Hex nut to the exposed threaded rod end in the Grip.



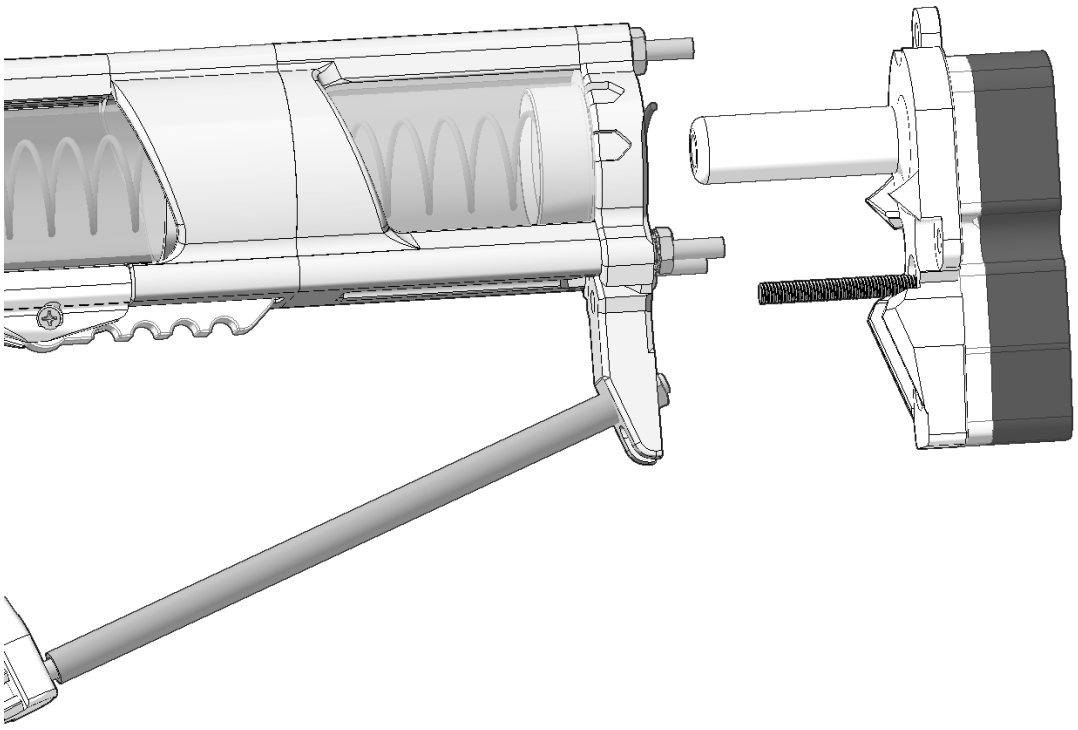
Check the top side of the assembly against a ruler or another flat surface. Adjust the tightness of the hex nuts at both ends of the blaster until the topside is as close to flat as possible. Also look down the top from the back and make sure that the assembly is straight from right-to-left. Adjust if it isn't.

To finally confirm alignment use the foregrip to cycle the Ramrod in and out of the barrel. If cylcing isn't smooth make some more adjustments to the hex nuts.

Once cycling of the ramrod into and out of the barrel is smooth, continue with assembly.

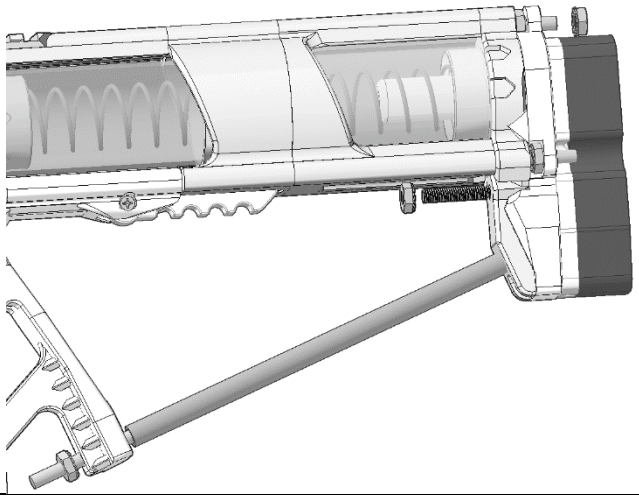


Install the Main Spring of your choice.



Align all of the Hex nuts parallel with the FrontButt itself so that they will engage correctly with the 12-point socket features in the ButtPlate.

Install the ButtPlate Assembly onto the Main Spring and into the center hole of FrontButt until it encapsulates the Hex nuts.. If it fails to do so, recheck alignment of the Hex Nuts.



Add a hex nut to the exposed upper threaded rod and tighten it. Add a hex nut to the long screw and tighten it.

The hop-up tab at the front of the Muzzle will require successive adjustment and testing to get the best flightpath results for a given spring. You will be loosening and tightening that hex nut quite a lot and retesting your current setting on it.

Slide the foregrip back to compress the mainspring until the plunger gets engaged on the Sear.

With the breech OPEN install a Magazine loaded with HIRs. Slide the foregrip all the way forwards to chamber the HIR in the top of the Magazine. You can load up to three HIRs into the barrel at a time if desired by cycling the Foregrip back and forth multiple times prior to pulling the Trigger. ONLY PULL THE TRIGGER WHEN THE BREECH IS CLOSED AND THE FOREGRIP IS IN THE FORWARD POSITION. If you do not have an HIR loaded in the barrel and need to de-prime the blaster KEEP A SECURE HOLD ON THE FOREGRIP and slowly cycle the breech forward while holding the Trigger down.

Replacing the Main Spring does not require full disassembly of the Blaster. You just need to reverse the last 2 steps in these instructions to take the buttplate off.

The Blaster and Hardware Kits are shipped with K25 springs. The K26 spring has a higher spring load, but hasn't proven to offer a performance advantage with the specific ammunition type. The alternate spring options are the K31 and 788 which both can be purchased separately or opted for as a replacement. Either are recommended for indoor use, or for younger players.